SCM Award — Sustainability Excellence 2026

Automatic Speech Recognition ASR

The BDMS × Cariva Collaboration
AI-Powered Healthcare Value Chain Transformation:



Healthcare Runs on Information

When information is delayed, every decision downstream is delayed.

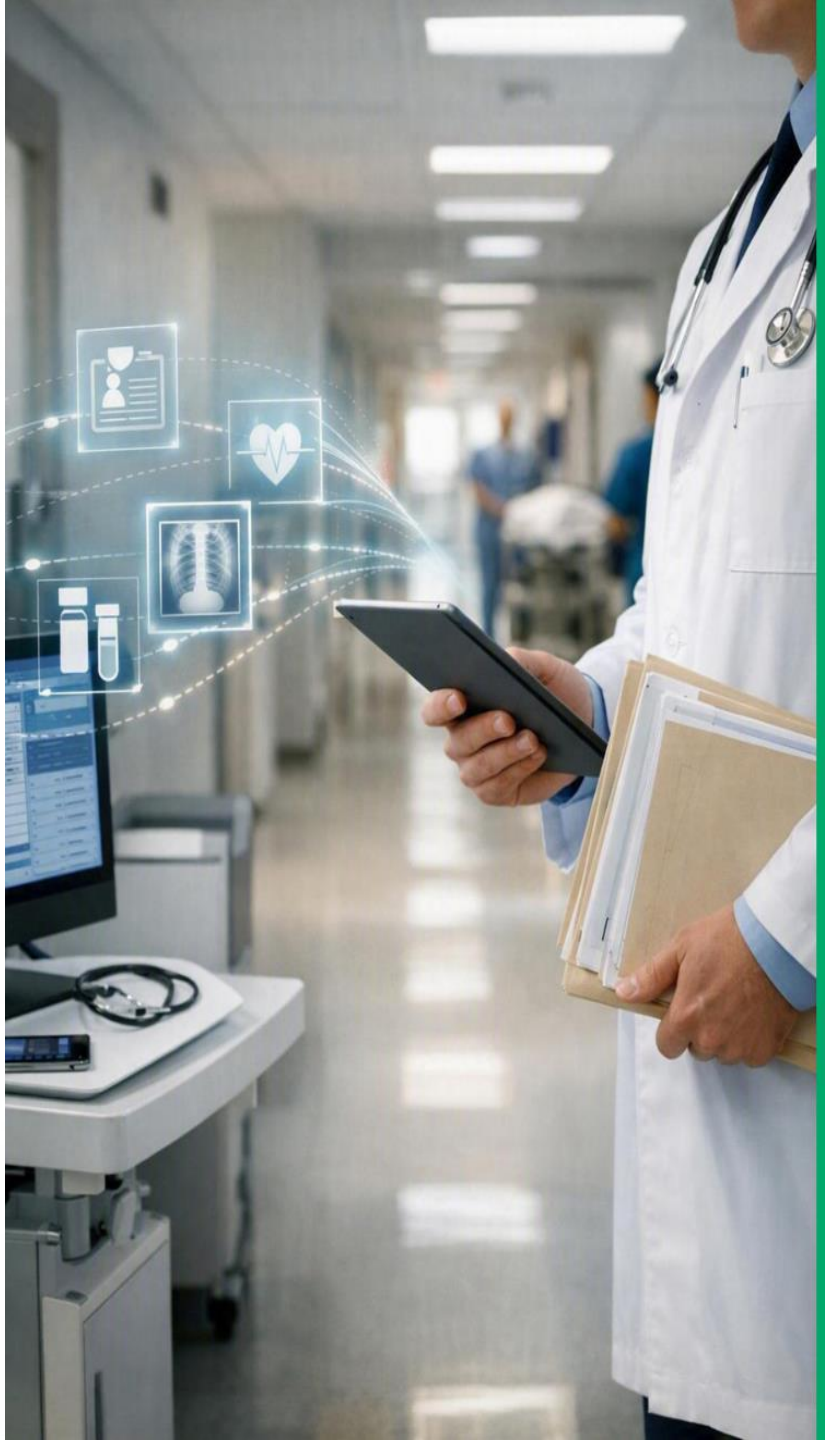
Clinical information is the critical upstream input of every patient journey;
if it is delayed or incomplete, every downstream step is compromised.

Information missing at the point of decision **leads to a 59.5% likelihood** of care delay (Smith PC et al., 2005).

Communication failures from **unrecorded** information contributed to **37%** of high-severity injury cases (CRICO, 2010).

Discharge summaries omitted diagnostic test results, remaining pending at discharge in **65%** (Kripalani S et al., 2007).

5 of Thailand's Top 10 patient safety issues for 2026 are information-flow failures (NRLS,2026).





The Bottleneck Starts Before the Diagnosis.

Documentation burden and delayed coding

Valuable clinical time is consumed by manual documentation, reducing patient-facing time and increasing documentation risk under fatigue.

CLINICAL DOCUMENTATION BURDEN

80% say documentation time impedes care; burnout risk 2.8x.

INCONSISTENT NOTE & OPD CODING

Coding errors weaken analytics, quality reporting, and value-based care.

IPD CODING CYCLE DELAY

~15-day discharge and manual coding delays slow claims and revenue realization.

WITHOUT STRUCTURED CLEAN DATA, HOSPITAL STRATEGY RUNS ON UNRELIABLE INPUTS

The Bottleneck Begins Before Diagnosis

In the healthcare value chain, accurate and timely clinical documentation is a critical upstream input.
Delays or errors at this stage can cascade across every downstream step of care.

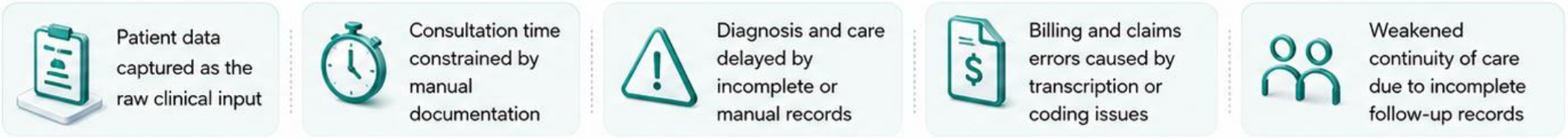
1 Patient Journey



2 Medical Data Pipeline



3 Healthcare Value Chain Impact



Manual documentation can consume up to one-third of the consultation window, creating a critical bottleneck at the very start of care delivery.

~4,000
BDMS daily OPD visits affected

40,000 min
Manual documentation burden per day

500 FTE
Equivalent physician documentation workload per day

5 areas
Downstream impact across diagnosis, treatment, medication, billing, and follow-up

1 critical bottleneck
Upstream issue affecting the full care pathway

Cariva ASR | The AI assistant that turns every clinical conversation into structured care, data, and intelligence



Automatic Speech Recognition : ASR

Speech-to-Text

Features

- OPD Note
- Progress Note (SOAP)
- Nurse Notes (ADPIE /FAIE/SBAR)
- Operative Note

Build Foundation
From voice to structured, high-quality medical records

Analytics

Features

- ICD-9/10 Suggestion
- AI Medical Summary
- Discharge Summary
- Personalized Chatbot
- Package Suggestion

Insight

- Analysis from data
- Assists workflow steps

De-identification Shield Module

Hospital Intelligence

Features

- Hospital Analytics Dashboard
- Price Estimator

Hospital Strategy

- Hospital-level insights,e.g. resource allocation and disease prediction

ASR-Enabled Clinical Workflow Across OPD and IPD

Rather than adopting a generic speech-to-text tool, we redesigned clinical workflow to deliver structured documentation directly into HIS/EMR.

OPD Workflow (Outpatient)

BEFORE
Manual Documentation



Higher burden & fragmented data

1. **Clinical Conversation**
   Physician–patient encounter in Thai, including Thai–English code-switching
2. **Manual Note Taking**
   Physician writes or dictates notes manually
3. **Unstructured EMR Entry**
   Notes typed or pasted into HIS as free text or unstructured data

AFTER
ASR-Assisted Documentation



Less burden
More value

1. **Clinical Conversation**
   Physician–patient encounter in Thai, including Thai–English code-switching
2. **ASR Capture**
   Real-time speech capture trained for Thai clinical language & pronunciation
3. **Structured EMR Output**
   Physician-verified structured notes sent directly to HIS — no unstructured transcripts

IPD Workflow (Inpatient)

PREVIOUS: ~15-DAY CYCLE



1. Patient Care
2. Physician drafts summary
3. Coder reads and assigns codes manually

Manual documentation leads to:
- Delayed documentation
- Coding errors & rework
- Revenue leakage
- Lower productivity

TODAY: ~1-DAY CYCLE



1. Patient Care
2. AI drafts summary + suggests ICD code
3. Physician & Nurse review & confirm

Up to 50% time saved

AI-assisted documentation enables:
- Faster documentation
- Higher coding accuracy
- Better claim quality
- Improved productivity

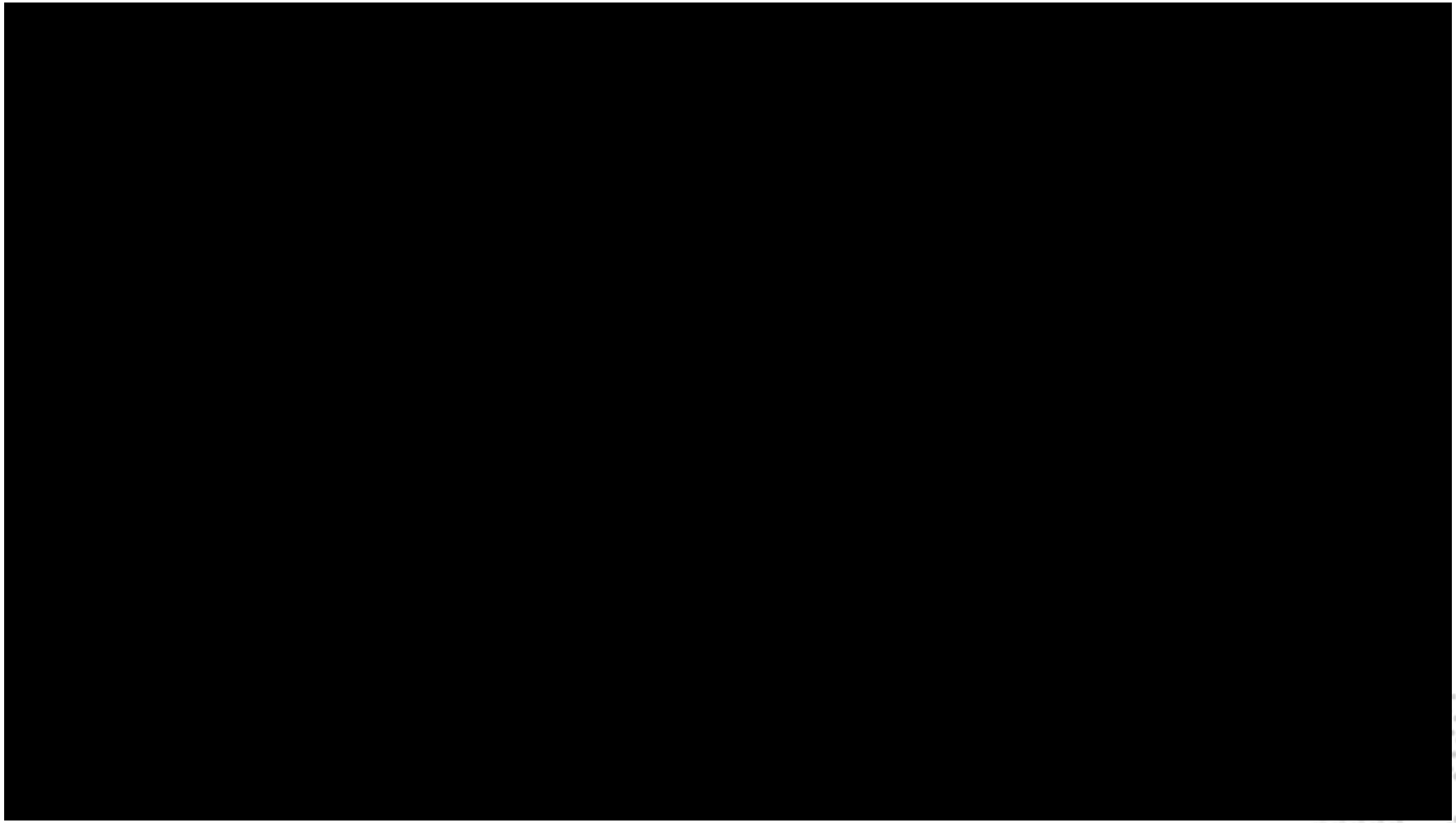
IPD EMR
Auto-documentation for inpatient care

Nurse Note
Automated nursing record documentation aligned with clinical standards

Impact at a Glance

- Up to **50%** Time reclaimed for patient & doctor engagement
- Supports physician and nurse productivity
- Reduced manual documentation burden
- More complete, accurate & timely documentation
- Structured data available in requested HIS/EMR format
- Better data quality drives clinical and business outcomes

ASR – Automatic Speech Recognition



Collaboration for Innovation Across the Health Value Chain

Uniting clinical expertise and Thai medical AI to strengthen Thailand's medical competitiveness

2023

Phase 1 — Co-Design & Framework

FRAMEWORK & ALIGNMENT

- Established collaboration framework
- Defined scope, AI requirements, and medical-record documentation

2023–2024

Phase 2 — Co-Develop the Model

RESEARCH & PROTOTYPING

1st Prototype: >70% Error Resolution

Research collaboration with Siriraj Faculty of Medicine

2024

Phase 3 — Co-Validate the Model

UAT & INTEGRATION COMPLETE

1st Pilot: 68 Doctors at Bangkok Hospital HQ

HIS/EMR integration completed

2025–2026

Phase 4 — Expansion & Scale-Up

MODEL IMPROVEMENT & DEPLOYMENT

Go Live: 33 Hospitals

(28 BDMS + 5 non-BDMS)

Achieving 90% error-resolution capability

BDMS
Bangkok Dusit Medical Services

Clinical Expertise & Annotation

Training Data & Compliance Framework

Network-Scale Deployment Infrastructure

From Trusted Vendor to Strategic Partner

CARIVA

Medical AI Engine for Thai Clinical Language

Engineering, ASR Development & Continuous Improvement

Commercial Roadmap with BDMS as Anchor Co-Development Partner

Strategic Alignment for Value Across the Entire Healthcare Chain.

1 PERFORMANCE EFFICIENCY

- **AI-powered speech-to-structured data**
  - reduces documentation time (2-3 minutes per case, up to 50%) and
  - standardizes medical records
- **AI-powered ICD coding** — accelerates claim cycle from 15 days to 1 day

ASR KPI 1 — **Efficient Operation Integration**
Lower cost · higher productivity

2 SMART HEALTHCARE

- **ASR today ⟶ Hospital Intelligence tomorrow**
- **Enables data-driven decisions from structured data and clinical insights**

ASR KPI 2 — **Digital & Innovation-Driven Quality**
Faster decisions · better outcomes

BDMS
Bangkok Dusit Medical Services
Your Trusted Healthcare Network

CARIVA
health in hand

3 EXCELLENCE & TRUST

- **Enhances patient experience and continuity of care** — through standardized records and AI-assisted workflows

ASR KPI 3 — **Healthcare beyond excellence**
Patient Trust

4 MARKET EXPANSION

- **Expands market presence beyond BDMS** — non-BDMS private hospitals, public sector, and SEA markets
- **Enables wellness, home care, and post-discharge follow-up workflows**

ASR KPI 4 — **Health Service Expansion**
revenue opportunities

Impact from Collaboration as a Strategic Partner

The Intelligenc Health Data System for a Sustainable Thai Healthcare Ecosystem

BDMS

30 sites
Target: 20 sites in 2026
No. of BDMS Hospitals Deployed

96.84% Target: 90%
AI Response Time
Service Quality Improvement

100% Target: 100%
Medical Record Completeness

5% Increase from baseline
Value Equivalent from Intelligence

STRATEGIC VALUE CREATED TOGETHER

Operational Excellence
Efficient Operation Integration

Digital & Quality Innovation
Innovation-Driven Quality

Healthcare Excellence
Excellence & Trust

Health Service Expansion
Future Plan by Y2030

CARIVA
health in hand

460K Target > 200K
Accumulated ASR Transactions

88% Target > 80%
Overall User Satisfaction

91.7% Target > 90%
AI Model Performance on Accuracy

20% Increase from baseline
Revenue Generation from Intelligence

Data updated as of Q2 / 2026

STRENGTHENING THE ENTIRE CHAIN, CREATING RESILIENCE THROUGH SUSTAINABLE HEALTHCARE

THE IMPACTS ACROSS THE HEALTHCARE VALUE CHAIN

Thai Healthcare Ecosystem Resilience



PUBLIC HEALTH SYSTEM	Secure a governed data foundation for system learning, planning, and surveillance.
HEALTH TECH INNOVATORS	Drive transactional efficiency and revenue growth for the entire hospital network; expand international market presence.
PAYERS & INSURERS	Accelerate claims processing and lower expenditures via structured health data.
HEALTHCARE PROVIDERS	Achieve standardized, integrated health information flow through HIS; enhance operational efficiency and patient experience.
PHYSICIANS	Create more time for patient care; reduce burnout risk; improve documentation accuracy.
PATIENTS	Deliver faster diagnosis, safer medication plans, and consistent quality of care across all tiers.

Milestones to Strengthen the Healthcare Value Chain

Moving from a documentation tool to a scalable healthcare intelligence ecosystem.

2026 | Foundation



Expand beyond the current 28 hospitals.



Expand ASR use cases

- ER
- Operative Notes
- Family Medicine & Psychiatry
- Nurse Care Plans

Foundation of Coverage & Integration



2027 | Expansion



Target 60 hospitals

Expand to selected non-BDMS hospitals.



Enhance AI model performance with automated medical coding.

From Data to Intelligence



2028 | Deepening



Enhance NLP capabilities and expand to the AEC market.



Develop hospital intelligence analytics and decision support for executive dashboards.

Executive Intelligence & Decision Support



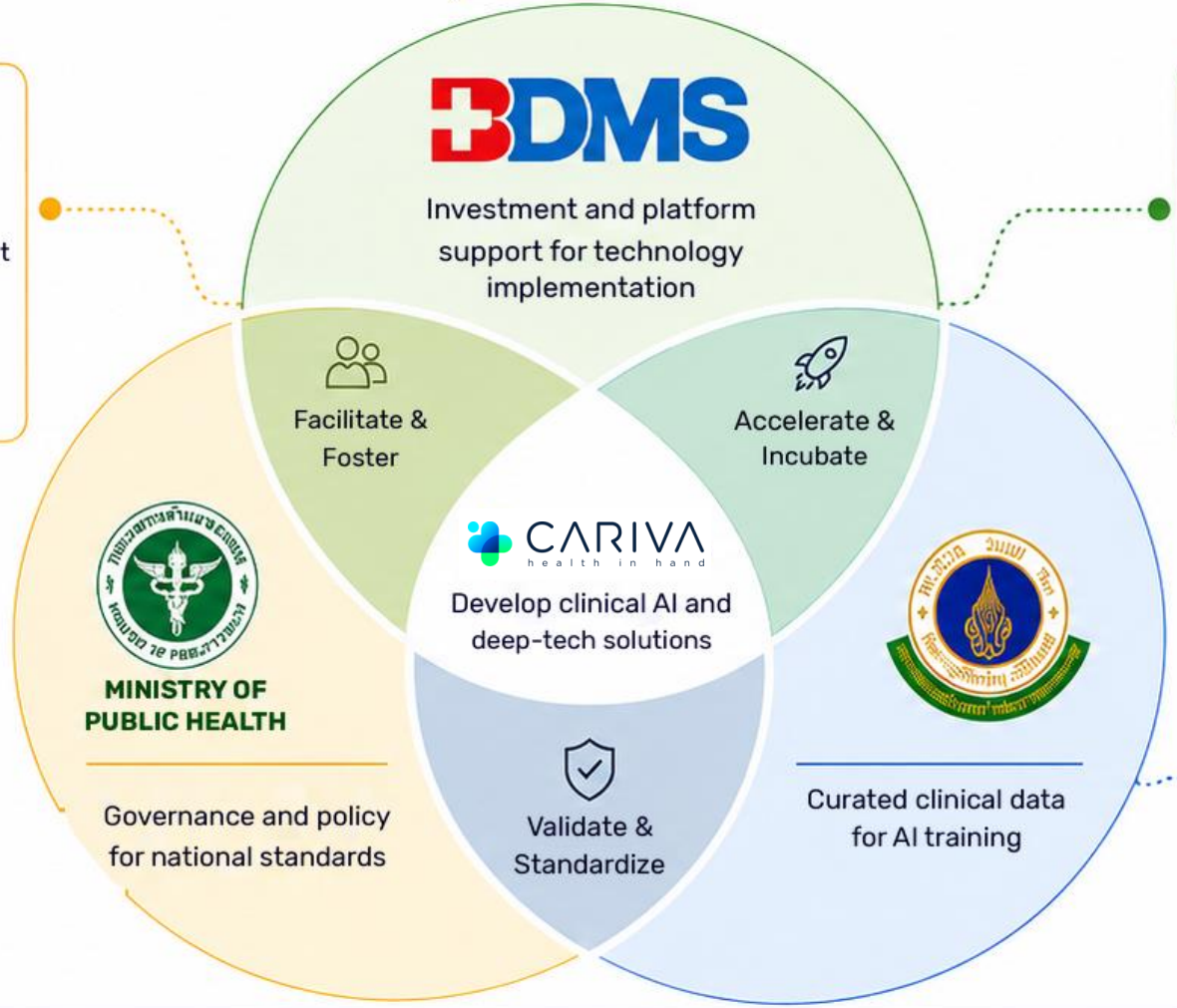
Strengthening the healthcare value chain through scalable intelligence

Intelligent Health Data System

A Collaborative Ecosystem for Sustainable Healthcare

FACILITATE & FOSTER

- ✓ Facilitate access to resources and knowledge for co-development
- ✓ Host a sandbox for workflow integration and deployment



ACCELERATE & INCUBATE

- ✓ Accelerate research into clinical AI applications
- ✓ Incubate business models for sustainable revenue

PROVIDE & SUPPORT

- ✓ Provide data sources for AI training and clinical validation
- ✓ Support and facilitate talent upskilling

Collaborative Ecosystem
Stronger partnerships across sectors

Trust & Governance
Secure, ethical, and standardized data use

Intelligence at Scale
Data-driven innovation for better health outcomes

Sustainable Value
Long-term impact for patients and partners