

Intelligent Patient Medication Guidance

Bridging the gap between prescription and proper use across Singapore Public Hospitals (Use Case 18)

A **S\$4.2M** investment to deploy a predictive, AI-powered platform across 8 hospitals, targeting a reduction of **S\$180-240M** in preventable medication-related hospitalizations.



Adherence Focus

PDC Growth: 74%

Baseline → **85%** Target



Operational Efficiency

Adverse Event Triage:

48 hours → <4 hours

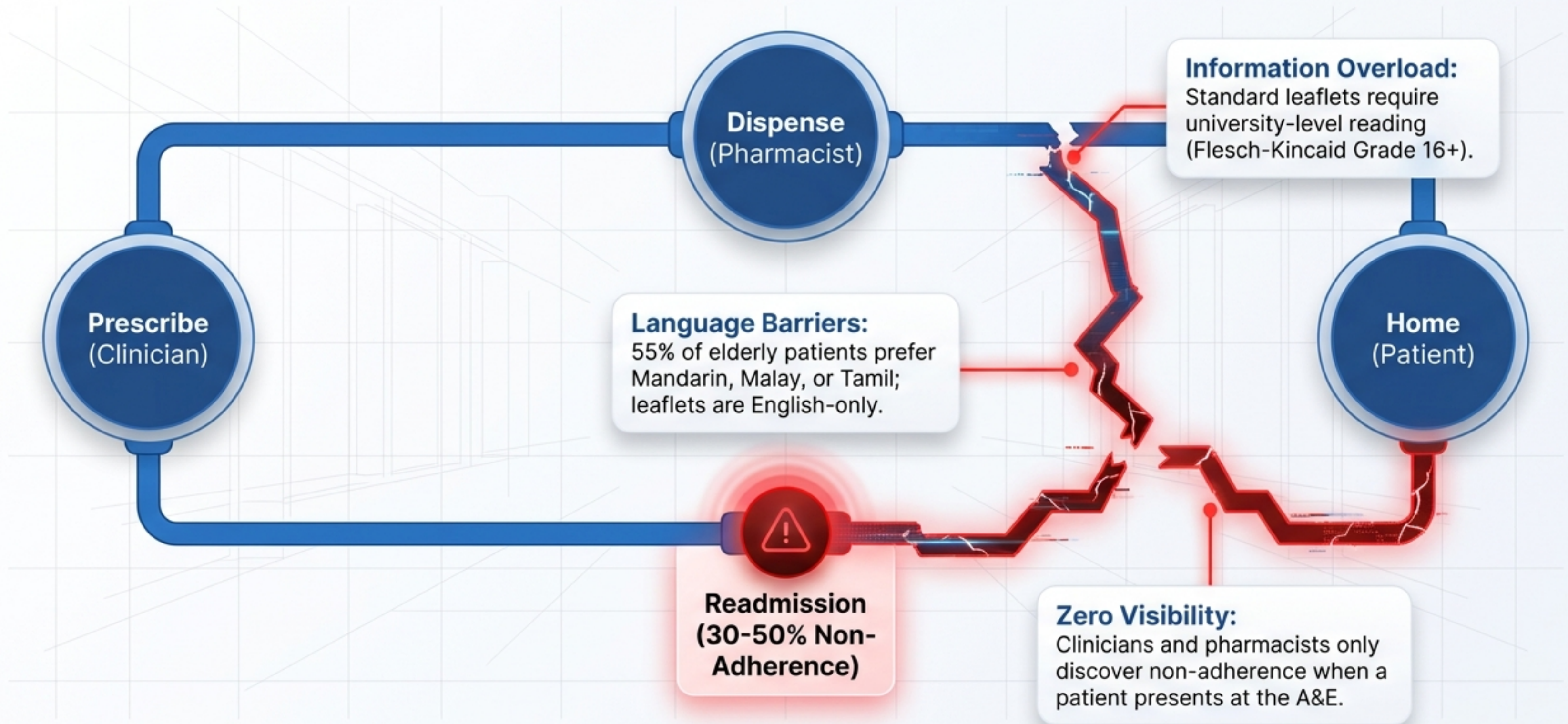


Enterprise Scale

500,000 Enrolled Patients

Across SingHealth, NUHS, and NHG

A Broken Feedback Loop Drives S\$180-240M in Preventable Admissions



The Adherence Blindspot Impacts the Entire Care Ecosystem

The Patient: Mdm. Tan, 74

Context: 12 chronic meds, low health literacy. MED_COUNT:12

Pain: Generic, English-only leaflets cause confusion.

Consequence: Skips doses due to dizziness; fears taking the wrong pill.

The Pharmacist: Sarah Lim, 34

Context: 200+ scripts/day, SGH Cardiology. DAILY_SCRIPTS:200+
RISK_ID:NONE

Pain: Zero time for counseling; no way to identify high-risk patients.

Consequence: Blind to which 30% of patients will be readmitted.

The Administrator: Dr. Kumar, 48

Context: Director of Pharmacy, NUHS. DATA_LAG:3MONTHS

Pain: 3-month lag on PDC claims data.

Consequence: Cannot measure intervention ROI or comply with real-time MOH reporting.

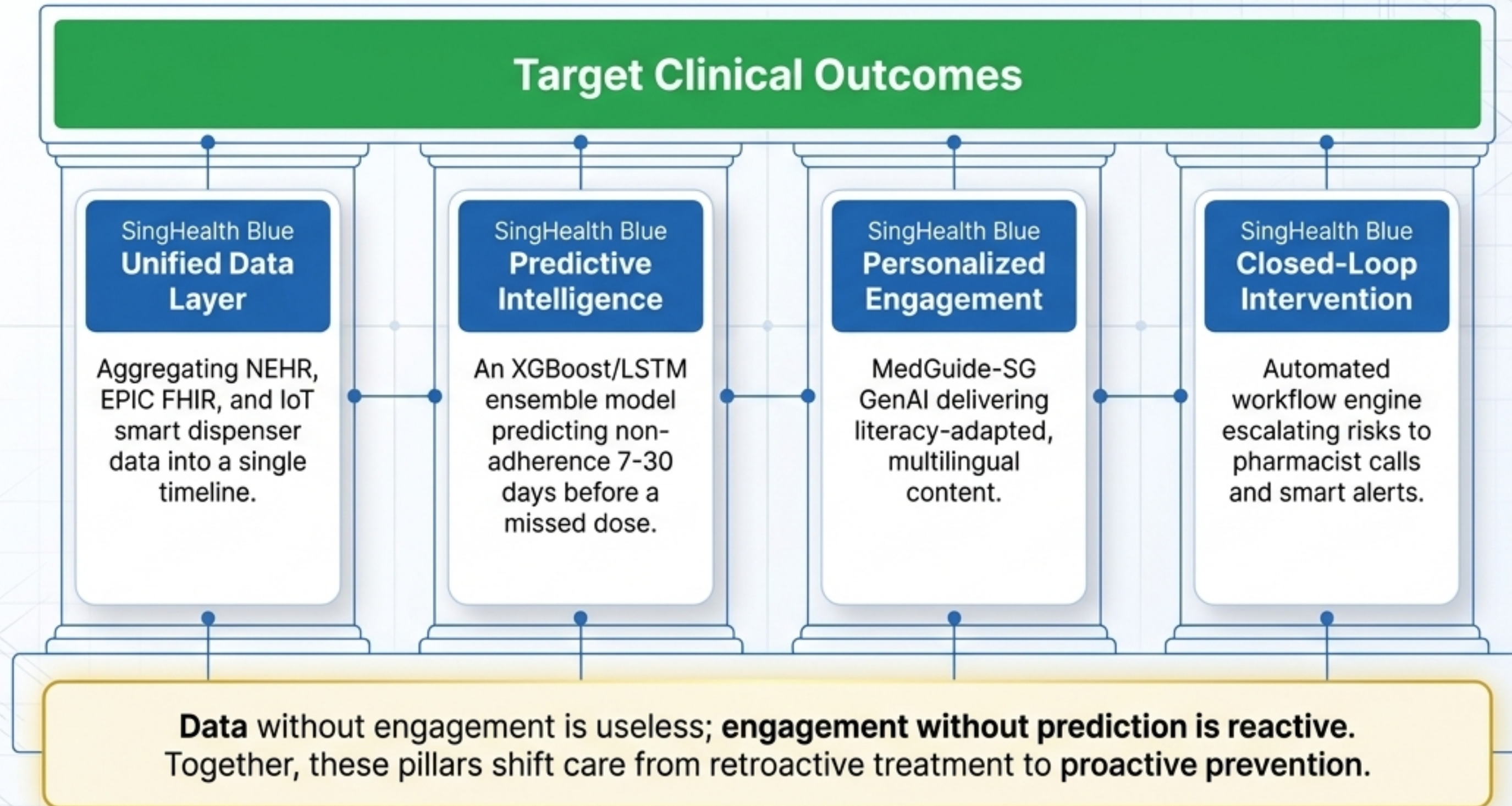
The Caregiver: Jason Tan, 42

Context: Proxy user for elderly parent. PROXY_USER:YES
REFILL_SCHEDULES:5

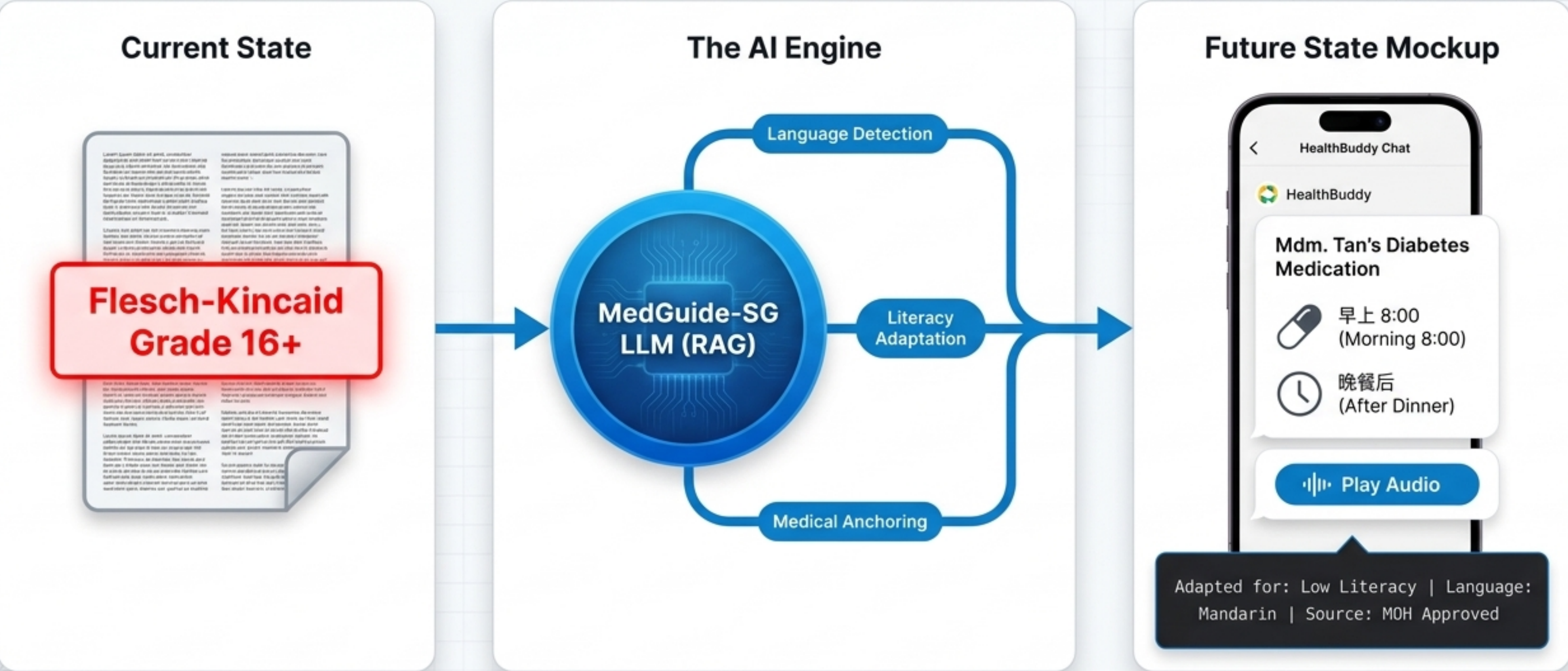
Pain: Zero visibility into parent's 5 different refill schedules.

Consequence: Missed doses, panic calls, emergency room visits.

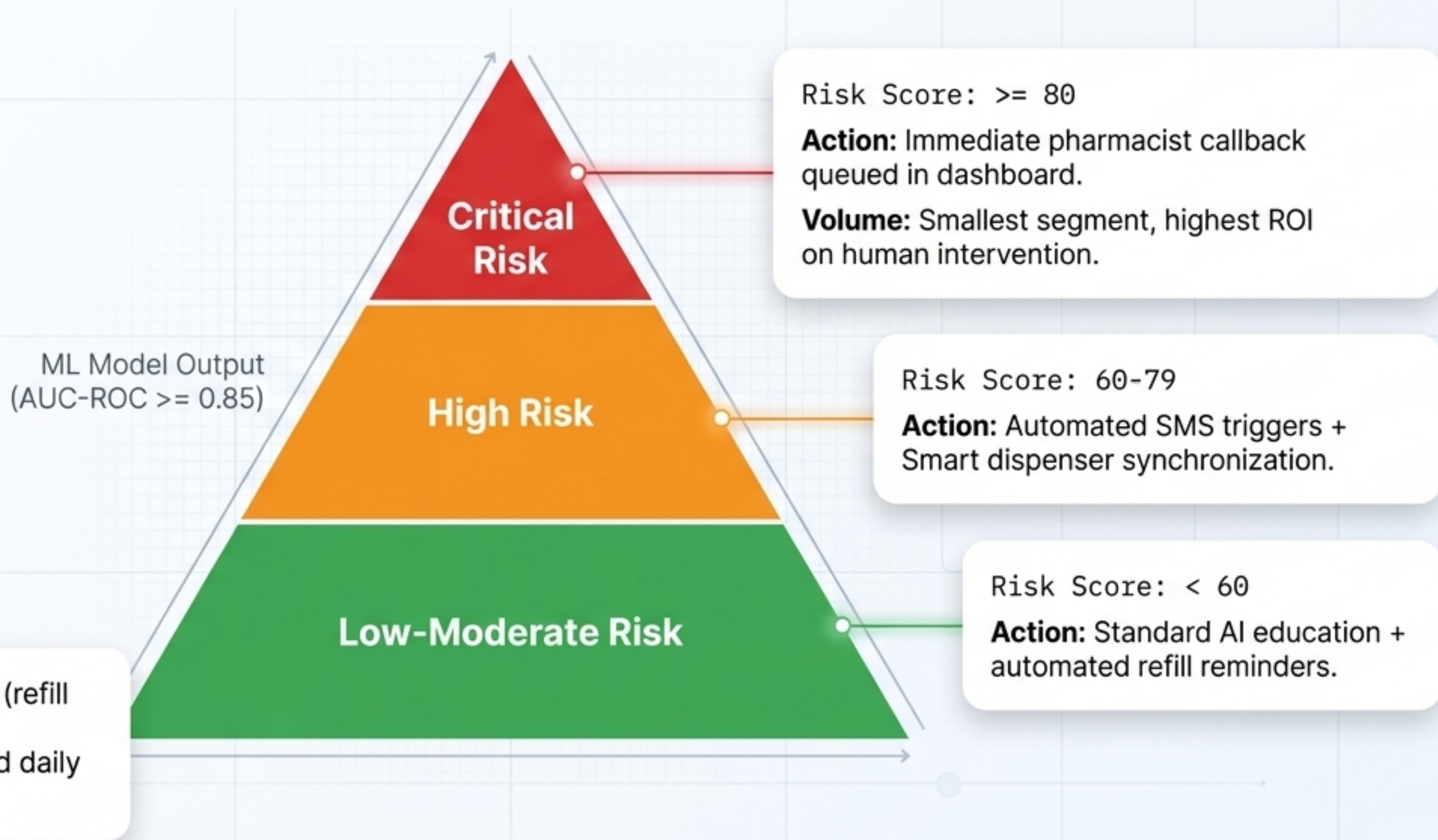
Four Interlocking Pillars Form a Proactive Clinical Nervous System



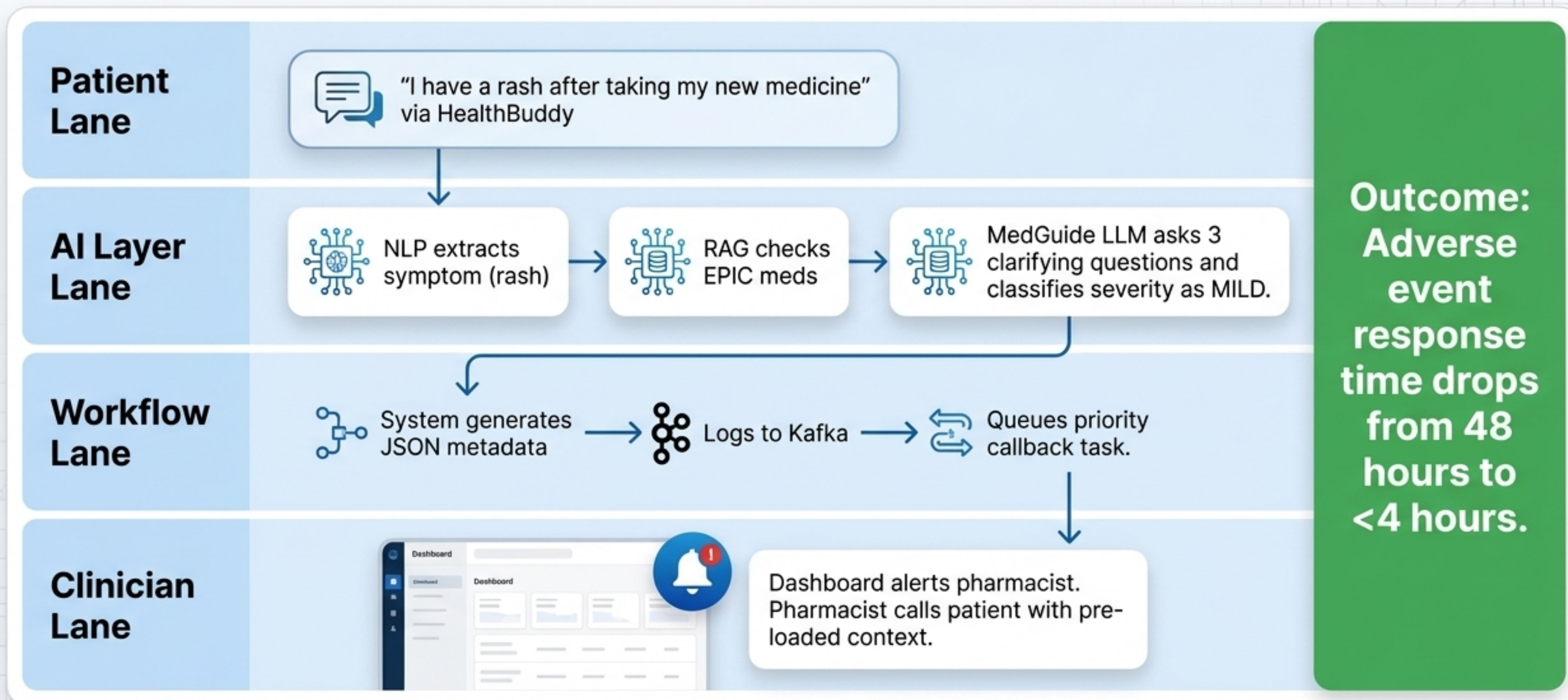
MedGuide-SG Adapts Complex Instructions into Actionable Guidance



The 7-Day Risk Engine Foresees Non-Adherence Before It Happens



Automated Side-Effect Triage Closes the Loop in Real Time



A Scalable, Event-Driven Stack Powers Real-Time Interventions

Security Wrap

🔒 Zero-Trust: SingPass OAuth + Role-Based Access Control

Presentation Layer

Kong API Gateway feeding into React Dashboard, HealthBuddy WebView, and Smart Pill Dispensers.

Application Layer

FastAPI (ML serving), Node.js (Real-time chat), Temporal.io (Intervention Workflow).

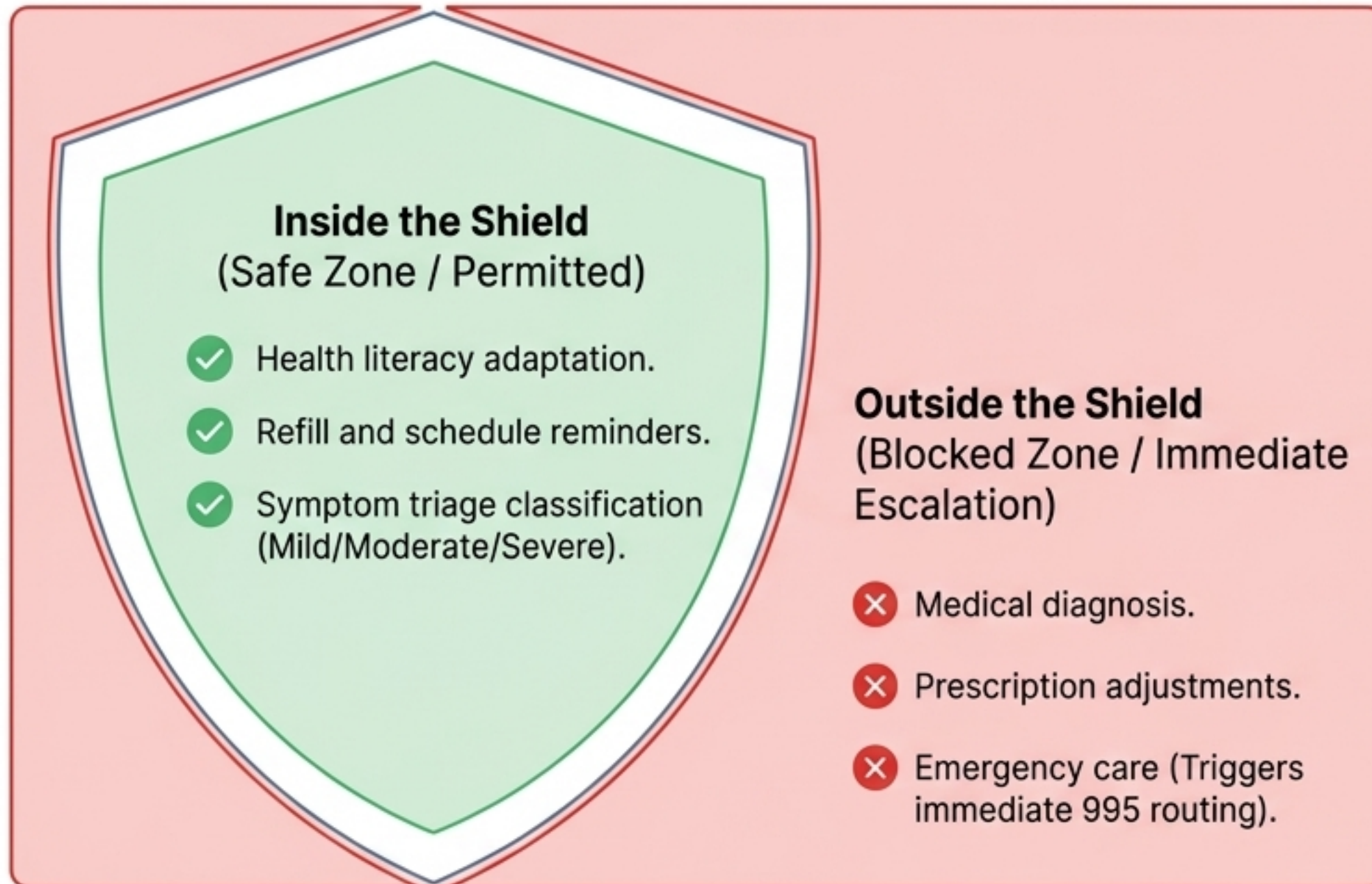
AI/ML Layer

NLP Pipeline, Adherence Model (XGBoost/PyTorch), MedGuide LLM + RAG Pipeline.

Data Layer

Apache Kafka (Streaming) → Airflow/dbt (ETL) → Snowflake & Vector DB (Storage).

Hard-Coded Boundaries Guarantee AI Safety and Clinical Oversight



Data Provenance

RAG-only responses utilizing MOH-approved leaflets.

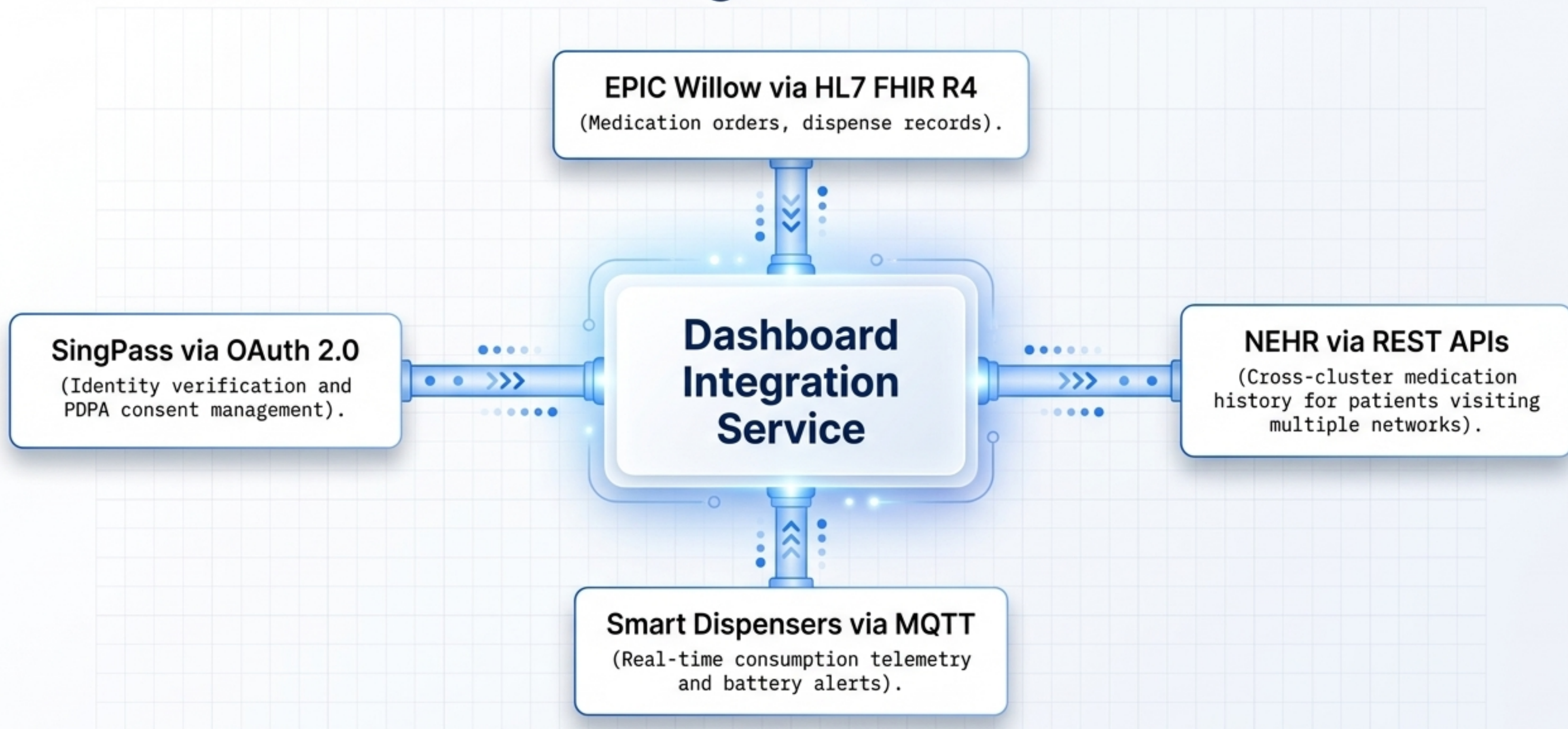
Auditability

WORM storage of all interactions with 7-year retention.

Human-in-the-Loop

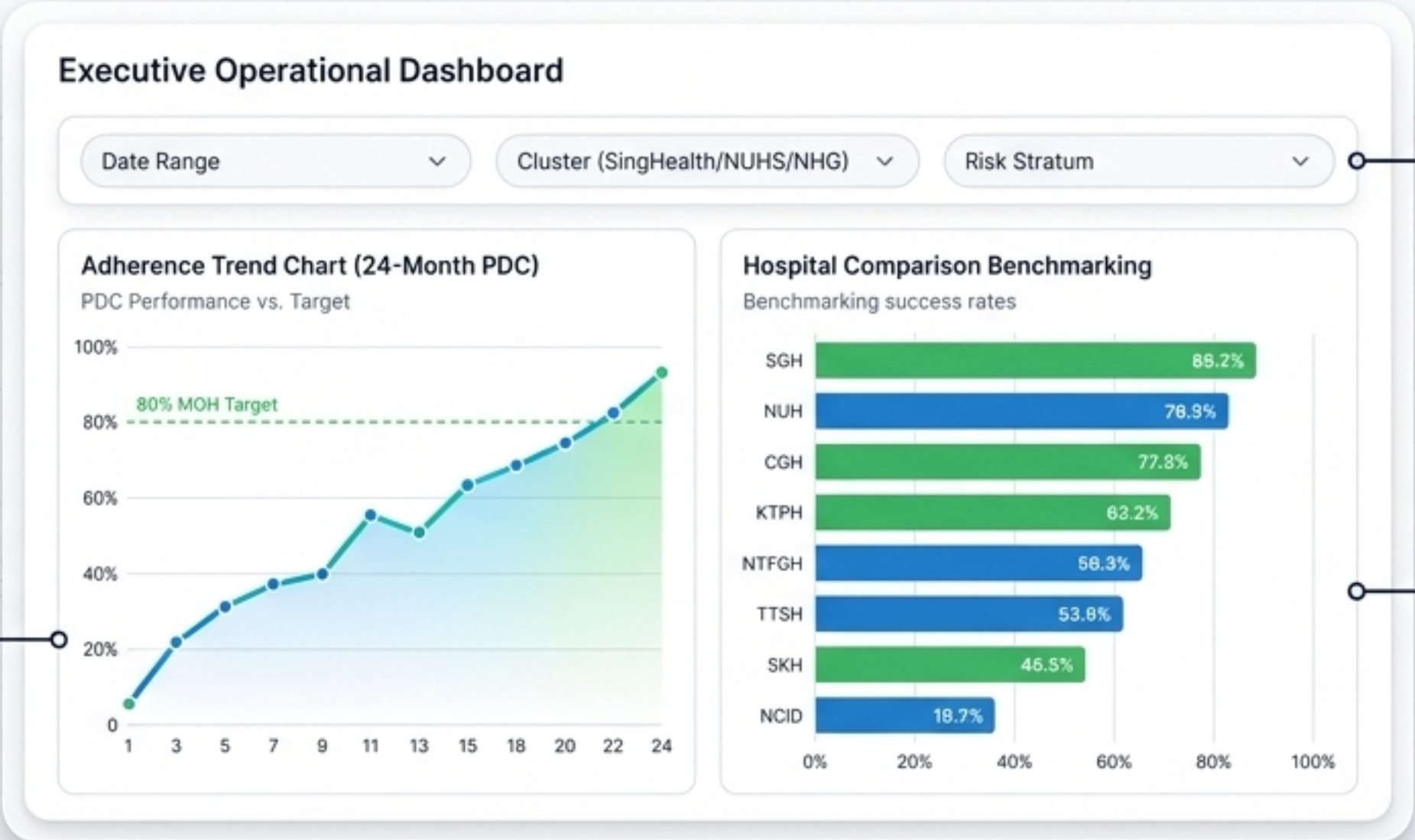
100% clinical audit rate for RED-level AI responses.

The Dashboard Unifies Fragmented Health Data Streams



Bypasses data silos to create a single, continuous patient medication timeline.

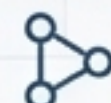
Executive Visibility Unites SingHealth, NUHS, and NHG Metrics



Adherence Trend Chart: Track 24-month PDC performance against the 80% MOH target.

Global Filter Bar: Instantly slice data across clusters, dates, and risk levels.

Hospital Benchmarking: Compare intervention success rates across all 8 hospitals.

 **Cross-Cluster Data Model:** Unified schema allows MOH-compliant quarterly reporting with zero manual data entry.

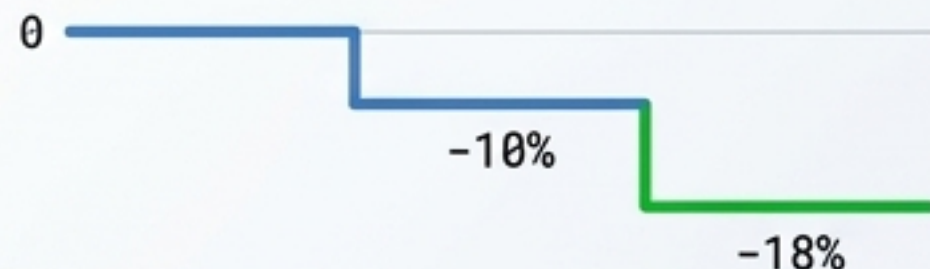
\$4.2M Investment Yields System-Wide Clinical and Operational ROI

Clinical Outcomes

Overall PDC



Preventable Admissions



Equates to \$32M+ in early systemic savings.

Operational Efficiency

Pharmacist Time per Intervention



MOH Reporting Automation



Patient Engagement

Chatbot Resolution Rate



Patient Satisfaction



An 18-Month Roadmap to Enterprise-Wide Deployment

