University of Kentucky

Artificial Intelligence: Precision Medicine at Scale

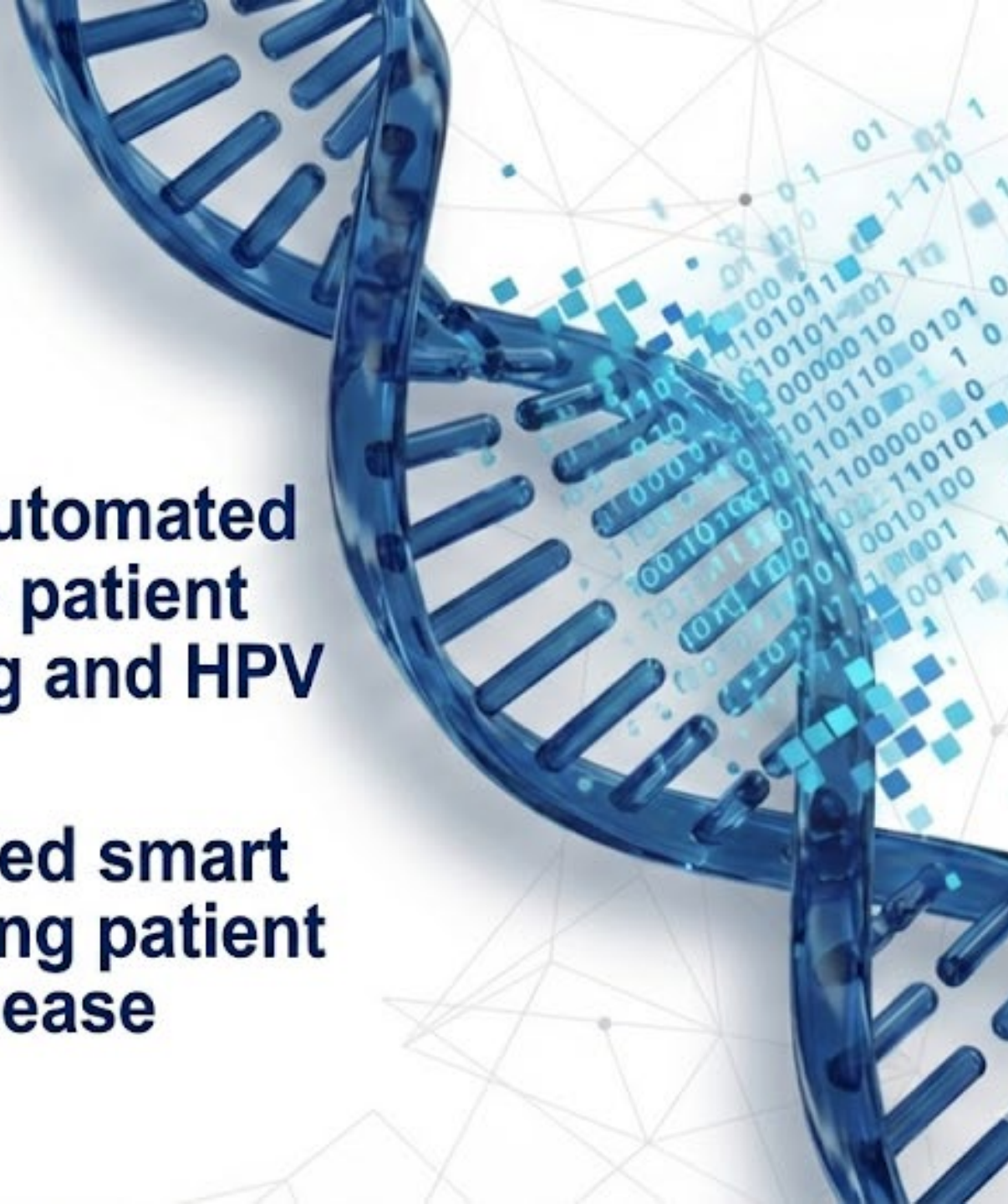
Tama Thé, MD
Assistant Professor - Emergency Medicine
UK Markey Cancer Center
Tenth Annual Precision Medicine Symposium
Jan. 30, 2026

University of Kentucky

I have no disclosures

Evaluate the use of AI-driven automated outreach systems to enhance patient participation in cancer screening and HPV vaccination programs.

Analyze the impact of AI-enabled smart medication systems on improving patient adherence and chronic disease management.



Artificial Intelligence: Precision Medicine at Scale

University of Kentucky
University of Kentucky HealthCare

THE PROACTIVE CARE LAYER

EARLY DETECTION OF AT-RISK PATIENTS

Identifies high-risk individuals before symptoms manifest to enable early intervention.

CLINICAL DECISION SUPPORT

Provides data-driven recommendations to guide personalized patient journeys.

TARGETED PRECISION THERAPY

Scales individualized treatment plans to improve overall clinical outcomes.

THE ARTIFICIAL INTELLIGENCE LAYER

Combines EHRs, genomics, imaging, and wearables into a foundational layer to precision medicine

Multi-Source Data Integration

EHRs

Genomics

Imaging

Wearables

THE DATA FOUNDATION

Continuous AI Data Combing

Combines EHRs, genomics, imaging, and wearables into a single foundational layer.
The AI layer constantly analyzes foundational data to identify actionable health patterns.

Precision Public Health in Action: The AHEAD Initiative

AHEAD: AI for Health Engagement And Detection

A State-University Partnership with the Kentucky Cabinet for Health and Family Services to close the cancer screening gap.

A Two-Phase Model for Population-Scale Precision

Phase I: Statewide Identification

Analyze statewide Medicaid data to create a precise map of screening gaps for HPV, cervical, colorectal, and lung cancers.

Phase II: Targeted Intervention

Deploy targeted, AI-powered outreach to connect with overdue patients and facilitate access to care.

< Back to Roles

Steven
Ongoing: Type II Diabetes
Steven radiates warmth and understanding, making patients feel heard and valued. Her compassionate nature and patient demeanor foster a sense of trust and comfort, even over the phone. Steven's ability to explain things clearly and answer questions patiently is highly appreciated by those she interacts with.

Ways to Evaluate Steven on Ongoing: Type II Diabetes

0:00 / 1:03

Listen to Steven's Full Call *Patient played by nurse

Review Steven's Safety Data *As tested by clinicians

Talk to Steven

Customize Your Agent

Agenda

Ongoing: Type II Diabetes

Closing the Screening Gap with AI

Multilingual AI outreach significantly increases cancer screening engagement among underserved Spanish-speaking populations.

SCREENING OPT-IN: **7.1%**

SCREENING OPT-IN: **18.2%**

2.6x Higher Opt-In

Bilingual AI Agent Conducts Personalized Outreach

The AI agent, "Ana," engaged 1,878 patients in natural, empathetic phone conversations to provide colorectal cancer education.

Superior Engagement Across All Measured Metrics

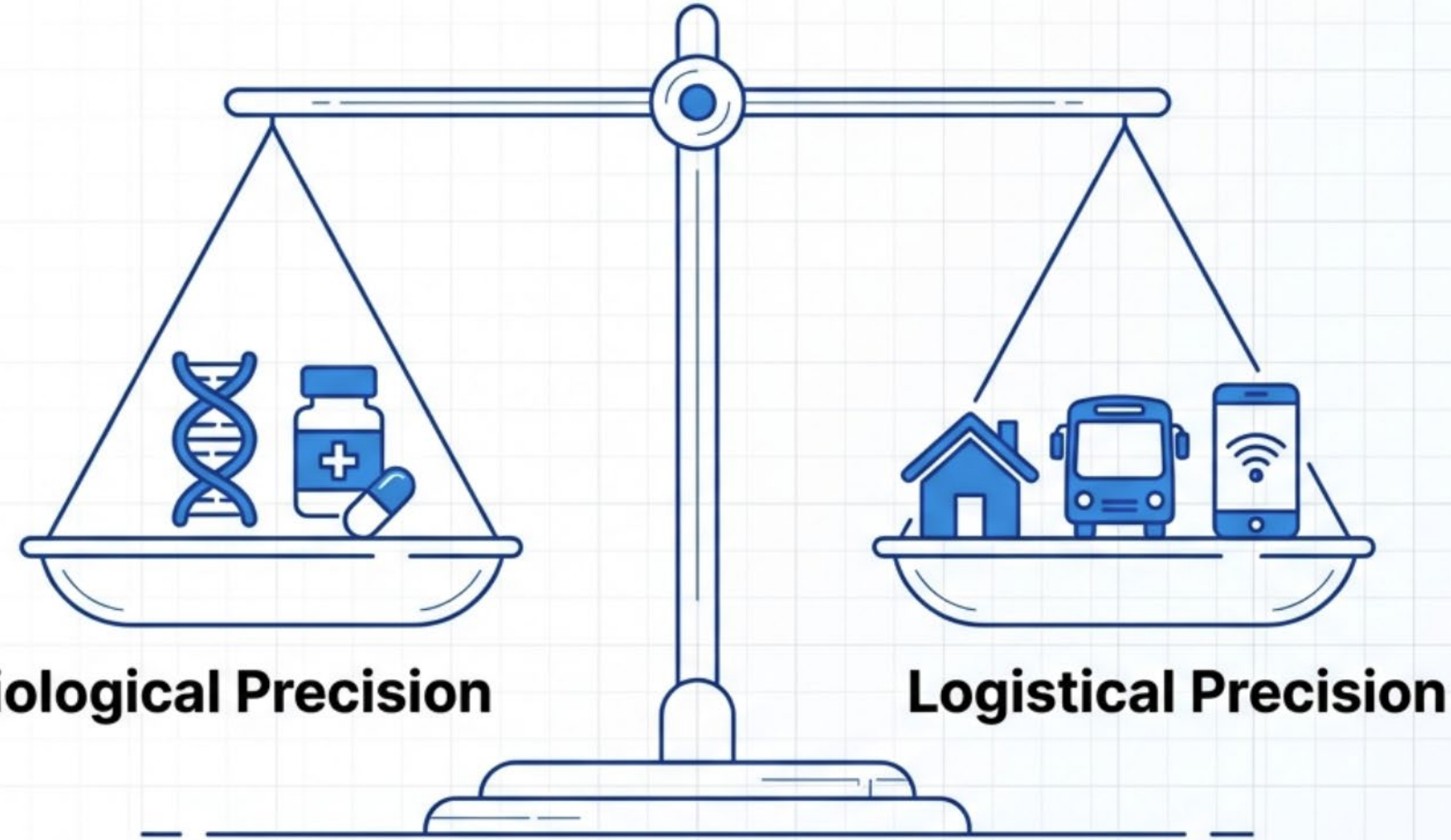
Spanish speakers showed higher connect rates (69.6% vs. 53%) and significantly longer educational call durations.

AI Tools Can Actively Promote Equity

These results challenge the assumption that technology inherently disadvantages non-English speaking populations.

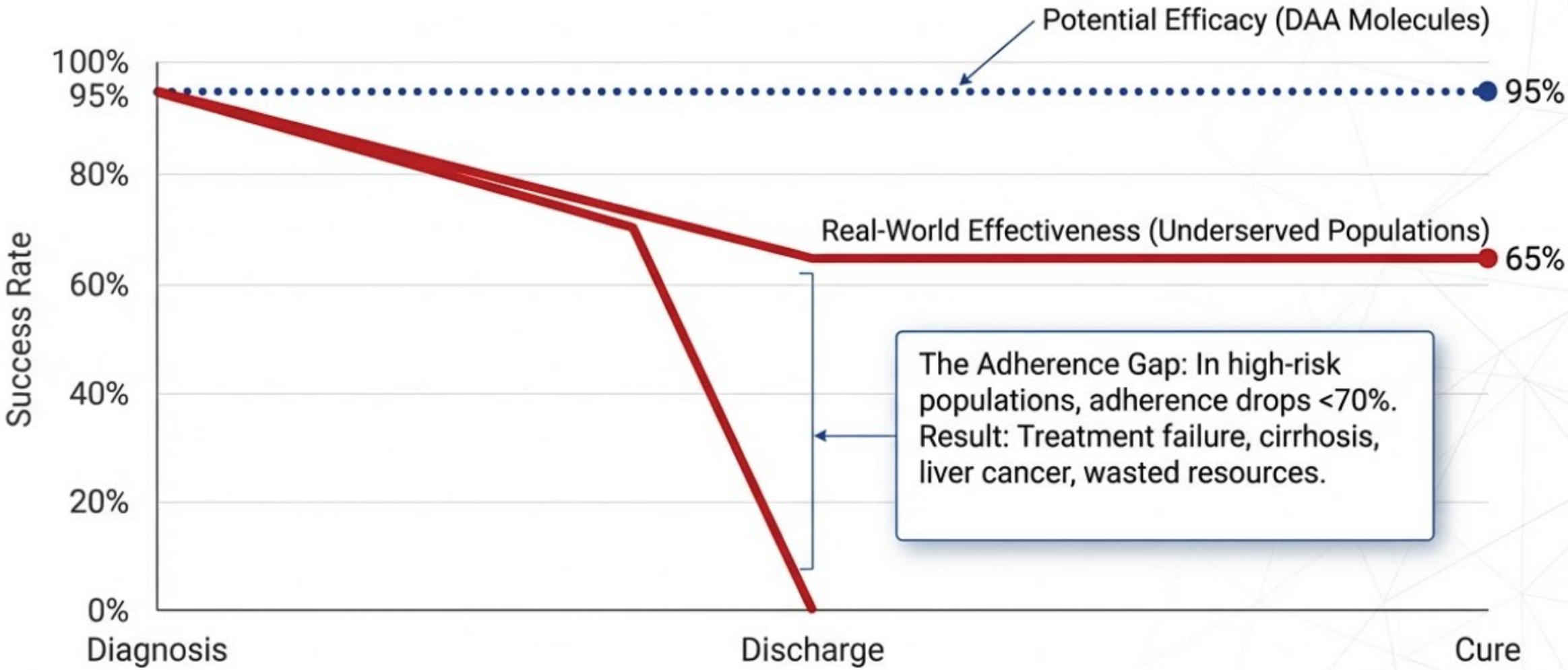
Based on Bhimani et al., 2025, *Journal of Medical Internet Research*.

Precision Medicine at Scale



Artificial Intelligence balances the scale, bringing world-class care directly to the patient.

THE PARADOX OF POTENTIAL: BIOLOGICAL CURE VS. REAL-WORLD FAILURE



PRECISION MEDICINE 1.0 GAVE US THE RIGHT MOLECULE.
PRECISION MEDICINE 2.0 MUST GIVE US THE RIGHT DELIVERY.

Active Adherence Loop

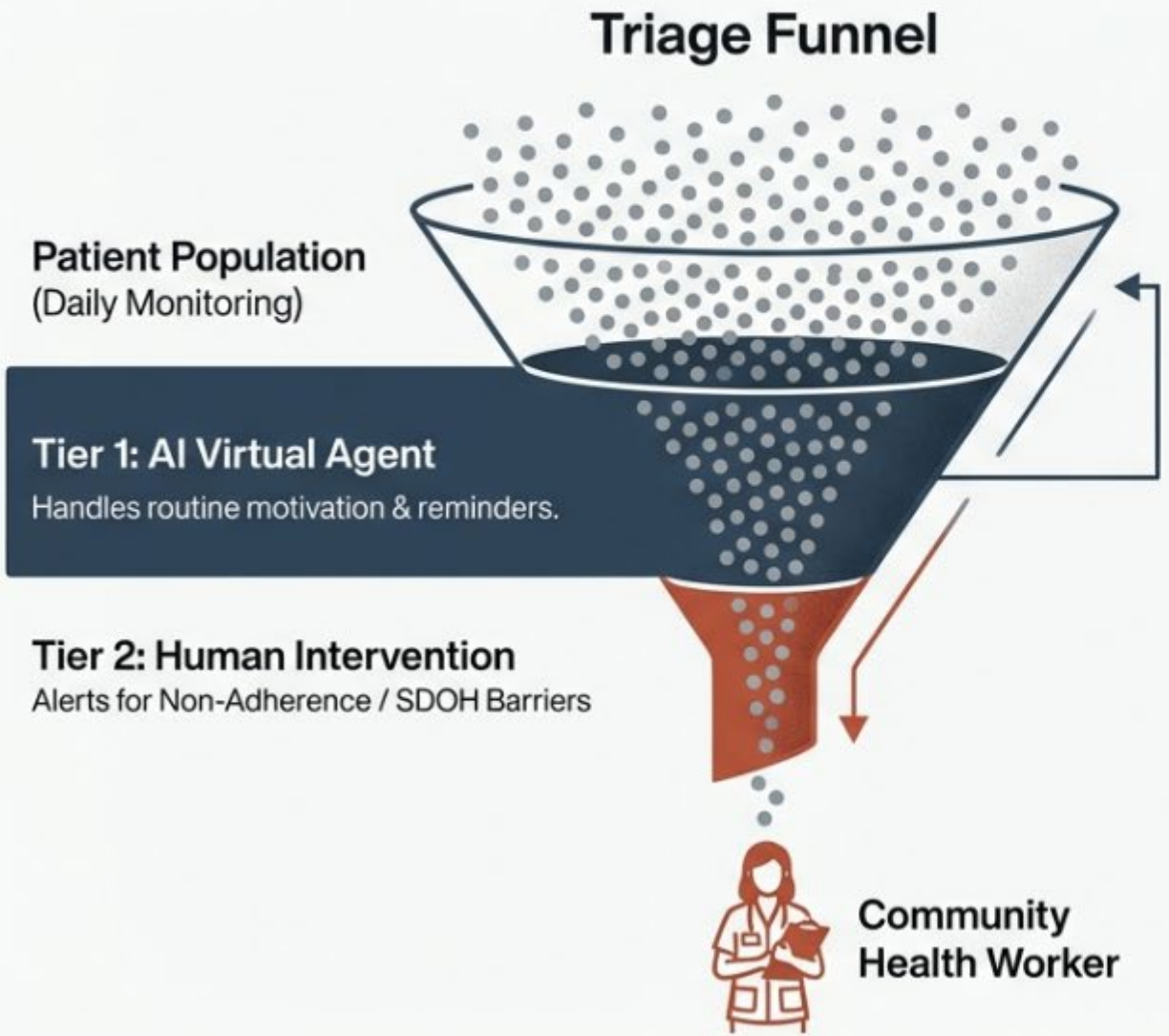
Smart Pillbox

Real-time cellular adherence monitoring (passive data collection).

AI Virtual Agent

Automated personalized reminders & motivational support.

High-Tech Triage: Algorithmic Monitoring Meets Human Empathy



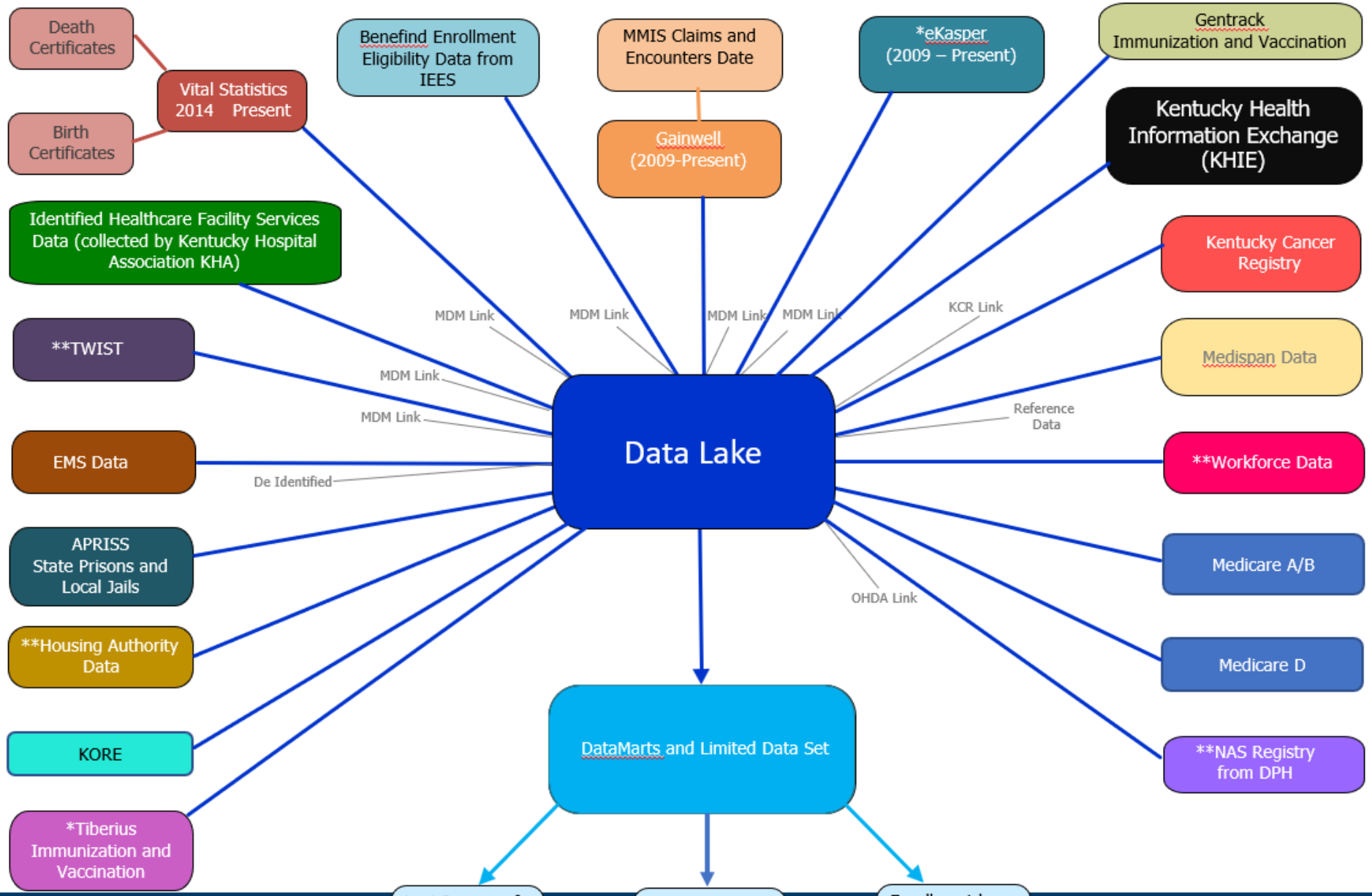
Symbiosis in Action

AI does not replace the human; it directs the human to where they are needed most.

Role of the CHW:

- Culturally sensitive support
- Addressing Social Drivers of Health (SDOH)
- Housing & Transport assistance

*In Progress **Future



TEAM KENTUCKY
CABINET FOR HEALTH AND FAMILY SERVICES

Rural Health Transformation (RHT) Program

Program Structure

RHT Program funding is $50 billion to be allocated to approved States over five fiscal years, with $10 billion of funding available each fiscal year, beginning in fiscal year 2026 and ending in fiscal year 2030.

- 50% to be distributed equally amongst all approved States
- 50% will be allocated by CMS based on a variety of factors including rural population, the proportion of rural health facilities in the State, the situation of certain hospitals in the State, and other factors to be specified by CMS in the NOFO

Gov. Beshear: Kentucky's Rural Health Transformation Plan Accepted In Full, $212.9 Million Secured

Scottie Ellis
502-564-2611
https://governor.ky.gov/

Office of the Governor
501 High Street
Frankfort KY 40601

Beshear administration created proposal in partnership with health partners from across the state

FRANKFORT, Ky. (Dec. 29, 2025) – Today, Gov. Andy Beshear announced that Kentucky's Rural Health Transformation Plan (RHTP) was accepted in full by the Trump administration, securing $212.9 million in funding to lessen the impacts of recent federal cuts and help support health care in Kentucky's rural communities. The funding was authorized by Congress earlier this year (2025) and administered by the Centers for Medicare & Medicaid Services.

"Health care is a basic human right, and it was a priority for me and my administration to submit this application and fight for funding to support our rural health communities – especially following the passage of devastating Medicaid cuts," said **Gov. Beshear**. "I am proud our community-driven plan was accepted in full and now $212.9 million will help provide our fellow Kentuckians with the quality care they need and deserve."

Kentucky's plan was developed by the Beshear administration in partnership with health partners from across the state and will use the $212.9 million over five years to help address the unique challenges rural Kentucky faces, including high rates of chronic conditions, maternity care deserts and gaps in coverage for oral care, emergency services and behavioral health.

Uses of Funds

States must use RHT Program funds for three or more of the approved uses of funds:

- Promoting evidence-based, measurable interventions to improve prevention and chronic disease management.
- Providing payments to health care providers for the provision of health care items or services, as specified by the Administrator.
- Promoting consumer-facing, technology-driven solutions for the prevention and management of chronic diseases.
- Providing training and technical assistance for the development and adoption of technology-enabled solutions that improve care delivery in rural hospitals, including remote monitoring, robotics, artificial intelligence, and other advanced technologies.
- Recruiting and retaining clinical workforce talent to rural areas, with commitments to serve rural communities for a minimum of 5 years.
- Providing technical assistance, software, and hardware for significant information technology advances designed to improve efficiency, enhance cybersecurity capability development, and improve patient health outcomes.
- Assisting rural communities to right size their health care delivery systems by identifying needed preventative, ambulatory, pre-hospital, emergency, acute inpatient care, outpatient care, and post-acute care service lines.
- Supporting access to opioid use disorder treatment services (as defined in section 1861(jjj)(1)), other substance use disorder treatment services, and mental health services.
- Developing projects that support innovative models of care that include value-based care arrangements and alternative payment models, as appropriate.
- Additional uses designed to promote sustainable access to high quality rural health care services, as determined by the Administrator.

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Kentucky Precision Health

Building the Digital Care Grid

A Proposal for AI-Powered Transformation and Sovereign Health Intelligence.

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Virtual Tele-Healthcare

Delivering specialized expertise to every corner of the Commonwealth

Care Beyond Walls

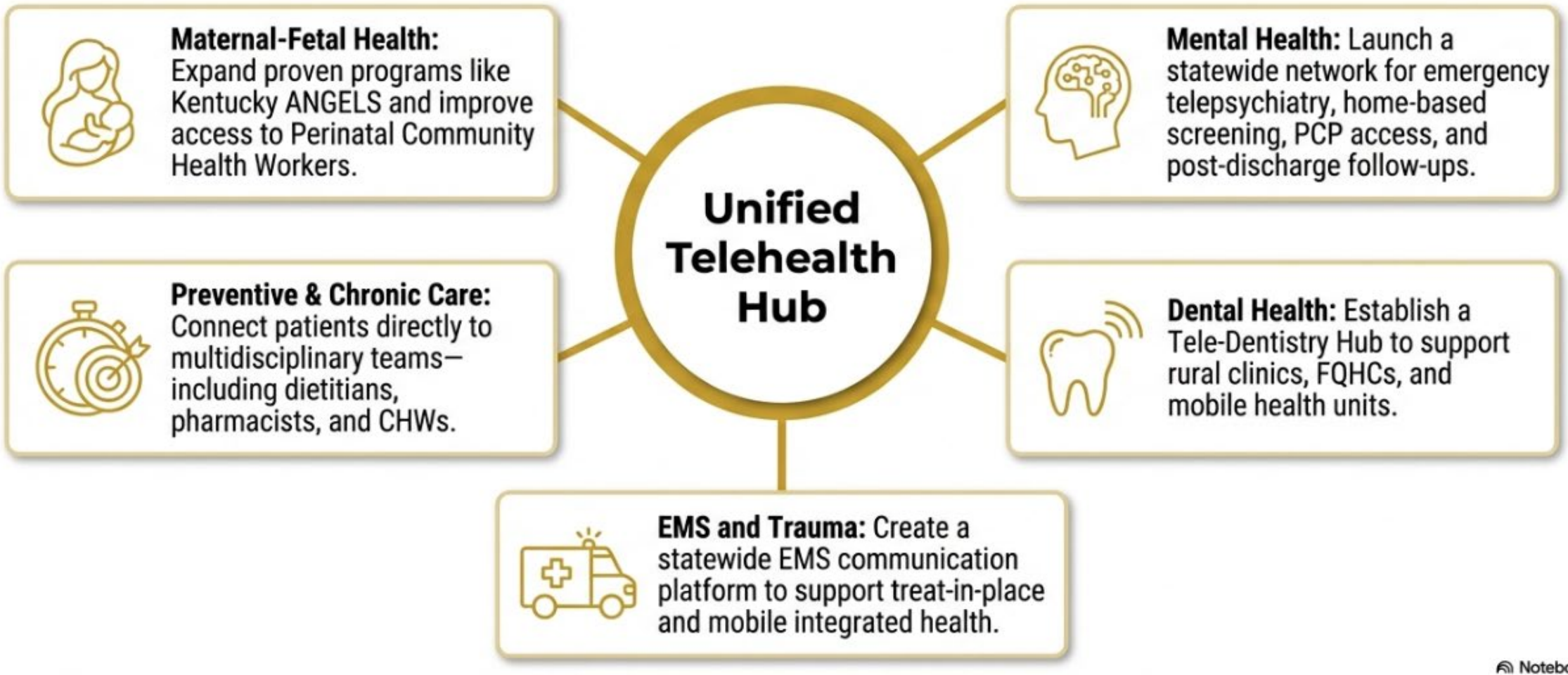
Moving the frontline of medicine from the clinic into the home

Democratizing Advanced Intelligence

Closing the gap between urban and rural outcomes with AI

1. Unified Statewide Telehealth Platform

Eliminating redundant infrastructure to enable rapid scaling of virtual service lines.



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A Unified Platform for Connected Care

An EMR-agnostic, patient-centric "digital front door" that coordinates care across systems, specialties, and conditions.

EMR-Agnostic Interoperability:
Bidirectional access to all modern EMRs. Epic, NextGen, etc. Epic Community Connect is an option, not a requirement.

Rural Hospital:
Direct connection to the platform, enabling access to advanced tools and data.

Proactive AI Safety Net:
Predictive models analyze streaming data to flag clinical deterioration (e.g., heart failure, eclampsia) days in advance.

Algorithmic Bias Mitigation:
Models are validated on Kentucky-specific data.

Amplifying the Patient Voice:
Captures new data streams like NLP analysis of patient journals and home-based symptom reporting.

Wearable health sensor:
Integrates continuous data from consumer health devices.

Community Health Worker:
Empowered with real-time data and alerts to support patients.

Automated SDOH Integration:
System flags social needs (food insecurity, transportation) and triggers autonomous connections to kynect and Kentucky Homeplace.

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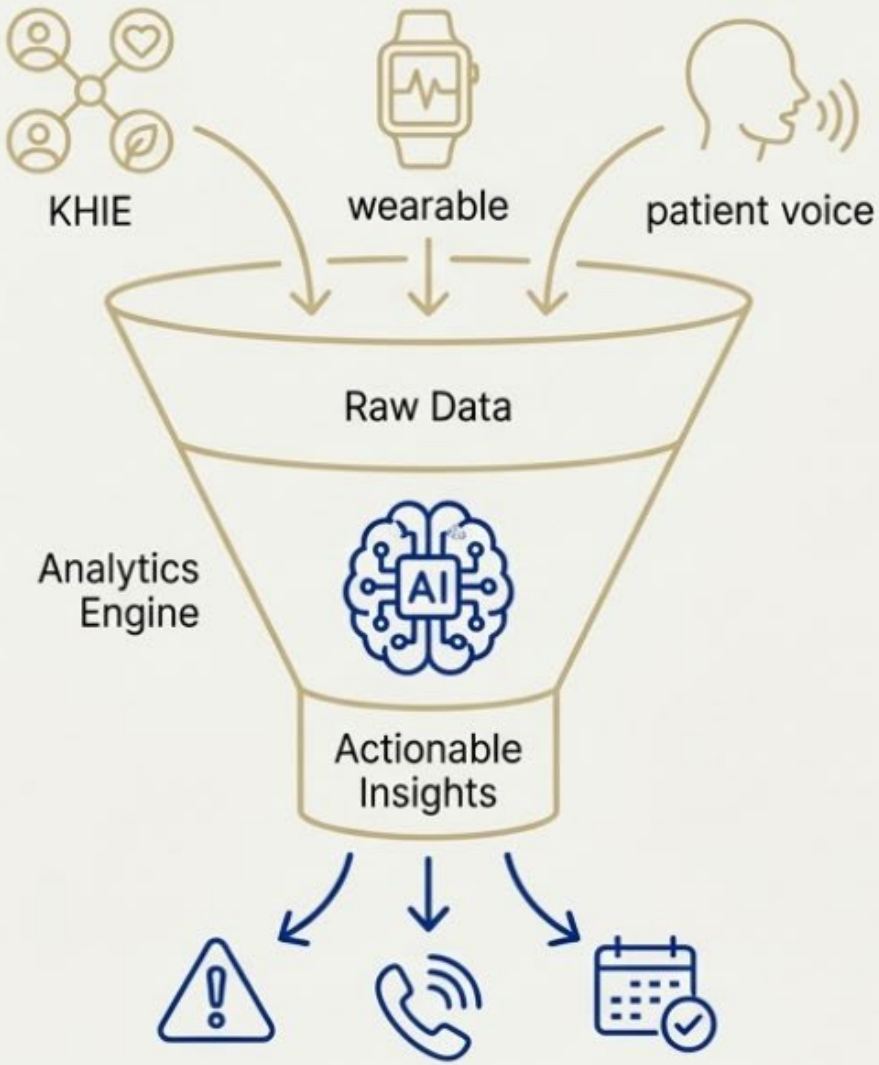
Turning Data Into Proactive, Preventive Well Care



Kentucky Data for Kentucky AI

Risk prediction calibrated to Kentucky populations. A novel language model tuned to how Kentuckians actually speak.

Turns Text Into Actions

Converts notes, messages, and conversations into actionable data. Flags SDOH needs and routes referrals.

Automates Proactive, Preventive Well Care

Finds care gaps and early warning trends. Automates outreach and escalates when necessary.

Built for All of Kentucky

Empowers independent rural hospitals as a shared statewide service and delivers next steps inside existing EMR workflows.

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Some Examples of AI Powered Insights

For Rural Hospitals & Clinics

Reducing CHF Readmission Risk

Question: Show my CHF discharges at highest 7/30-day readmission risk.
Output: A unit-level dashboard with a prioritized follow-up list and recommended interventions.

Identifying ED Frequent Utilizers

Question: Which patients have 3+ ED visits in 90 days and no PCP visit?
Output: An outreach worklist identifying likely drivers (e.g., transportation, housing) and suggesting referral pathways.

Providing COPD Early Warning

Question: Flag COPD patients with rising rescue inhaler fills and recent sterold bursts.
Output: An at-risk roster with suggestions for telehealth check-ins or RPM enrollment.

For Medicaid MCOs & Payers

Preventing Abnormal Lab Results Without Follow-up

Question: All members with ANC > 9 who didn't get follow-up or are due for a recheck.
Output: A member list with attributed PCP/clinic information to enable outreach scripting and scheduling prompts.

Closing Post-Discharge Gaps

Question: Discharges with no follow-up appointment within 7 days.
Output: A daily gap-closure queue with auto-escalation for high-risk patients.

Calculating Preventive Screening ROI

Question: Find overdue colorectal screening patients most likely to complete if contacted.
Output: A targeted outreach cohort with channel recommendations (text/call/CHW) and a projected impact.

For Commonwealth & Public Health

Visualizing County-Level Risk

Question: Where are avoidable admissions clustering, and what's driving them?
Output: A heatmap showing drivers (e.g., chronic disease, SDOH) with suggested investments.

Targeting Maternal Health Risk

Question: Identify pregnant patients at highest risk for missed prenatal care or hypertension complications.
Output: A care navigation list with referral routing and monitoring triggers.

Detecting Outbreaks & Trends

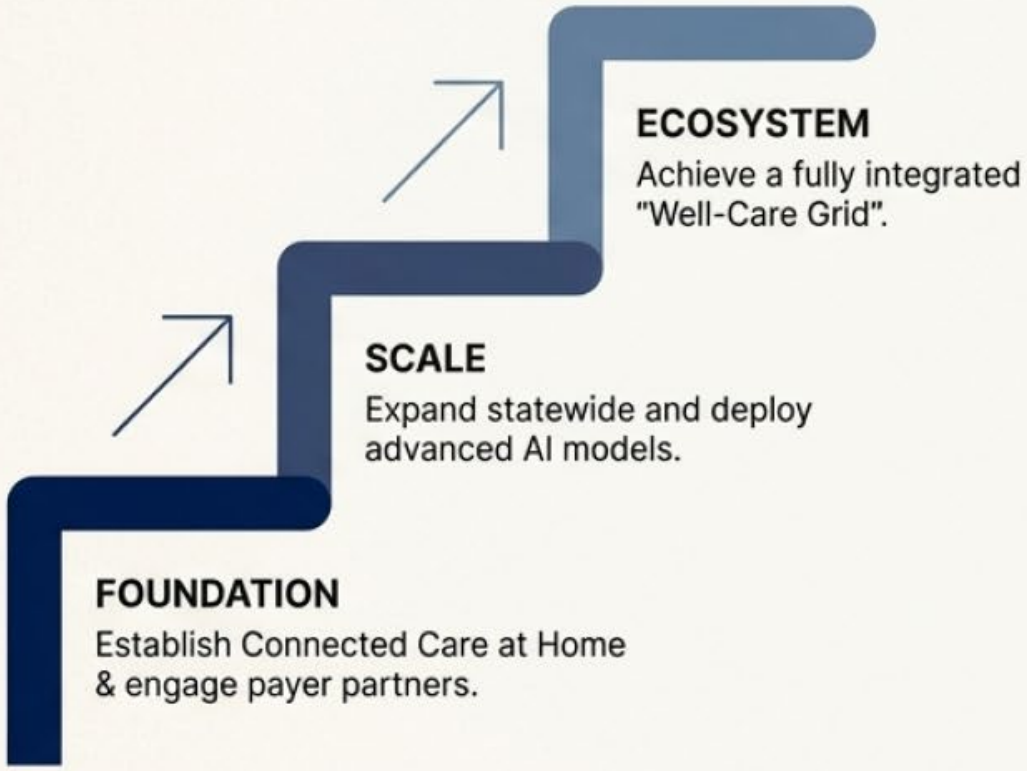
Question: Detect unusual spikes in GI illness, flu-like illness, or overdoses by region.
Output: An early warning dashboard with recommended response actions.

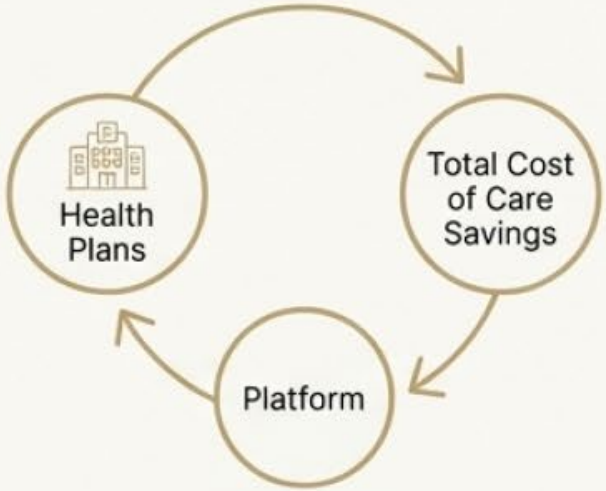
A Proactive Check-in:

"Hi Brenda, this is the Kentucky Wellness AI agent checking in. Are your headaches getting better? Did you take your Labetalol? We noticed you're due for an A1c, can I schedule that for you?"

Implementation

Backed by **enthusiastic** major global partners, we are ready to fundamentally transform rural healthcare with a disciplined, phased approach and a self-sustaining model.





An initial investment launches the platform. Reductions in the total cost of care (fewer ER visits, readmissions) generate savings for health plans.

A shared-savings model reinvests a portion of these savings back into the platform, ensuring long-term growth and sustainability.

Similar programs have paid for themselves in two years.

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Intelligence Built By Kentucky, For Kentucky

"Off-the-shelf AI fails to understand our communities. By building our own intelligence, we ensure technology serves every Kentuckian equitably and creates a valuable, sovereign state asset."


Microsoft

Campus News

University of Kentucky among nation's 1st institutions to partner with Microsoft on responsible AI innovation

By Tiana Thé Nov. 25, 2025

Video produced by UK Public Relations and Strategic Communications and UK Marketing and Brand Strategy. To view captions for this video, push play and click on the CC icon in the bottom right-hand corner of the screen. If using a mobile device, click

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CONTACT

TIANA THÉ
tiana.the@uky.edu
859-562-1624

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Warhol Foundation supports UK Art Museum

119TH CONGRESS
1ST SESSION

H. R. 238

To amend the Federal Food, Drug, and Cosmetic Act to clarify that artificial intelligence and machine learning technologies can qualify as a practitioner eligible to prescribe drugs if authorized by the State involved and approved, cleared, or authorized by the Food and Drug Administration, and for other purposes.

IN THE HOUSE OF REPRESENTATIVES

JANUARY 7, 2025

Mr. SCHWEIKERT introduced the following bill; which was referred to the Committee on Energy and Commerce

THE WHITE HOUSE

Winning the Race

AMERICA'S AI ACTION PLAN

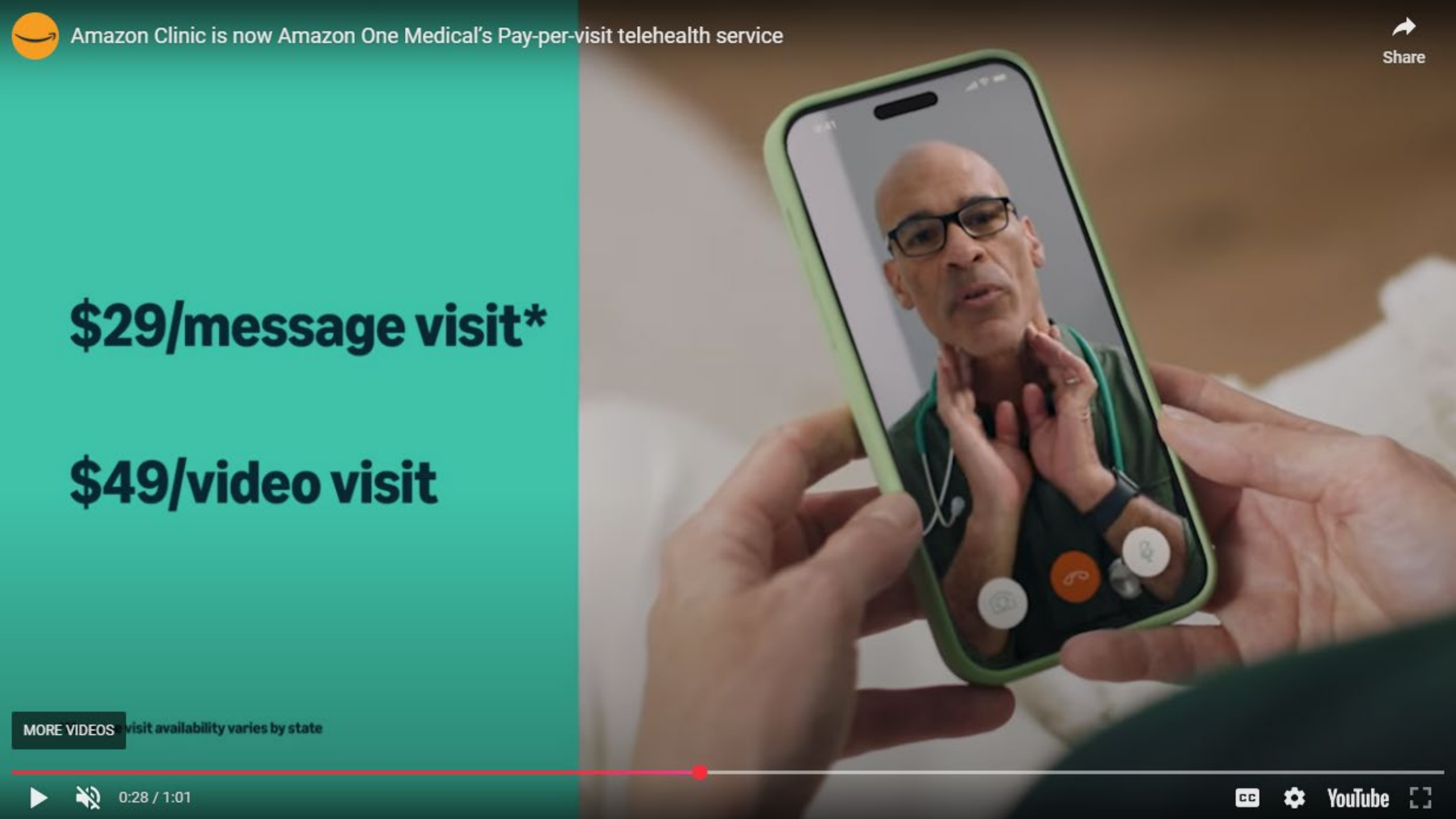
JULY 2025

Enable AI Adoption

Today, the bottleneck to harnessing AI's full potential is not necessarily the availability of models, tools, or applications. Rather, it is the limited and slow adoption of AI, particularly within large, established organizations. Many of America's most critical sectors, such as healthcare, are especially slow to adopt due to a variety of factors, including distrust or lack of understanding of the technology, a complex regulatory landscape, and a lack of clear governance and risk mitigation standards. A coordinated Federal effort would be beneficial in establishing a dynamic, "try-first" culture for AI across American industry.

Recommended Policy Actions

- Establish regulatory sandboxes or AI Centers of Excellence around the country where researchers, startups, and established enterprises can rapidly deploy and test AI tools while committing to open sharing of data and results. These efforts would be enabled by regulatory agencies such as the Food and Drug Administration (FDA) and the Securities and Exchange Commission (SEC), with support from DOC through its AI evaluation initiatives at NIST.
- Launch several domain-specific efforts (e.g., in healthcare, energy, and agriculture), led by NIST at DOC, to convene a broad range of public, private, and academic stakeholders to accelerate the development and adoption of national standards for AI systems and to measure how much AI increases productivity at realistic tasks in those domains.
- Led by the Department of Defense (DOD) in coordination with the Office of the Director of National Intelligence (ODNI), regularly update joint DOD-Intelligence Community (IC) assessments of the comparative level of adoption of AI tools by the United States, its competitors, and its adversaries' national security establishments, and establish an


Amazon Clinic is now Amazon One Medical's Pay-per-visit telehealth service
Share
$29/message visit*
$49/video visit
visit availability varies by state
MORE VIDEOS
0:28 / 1:01
YouTube

< Back to Roles

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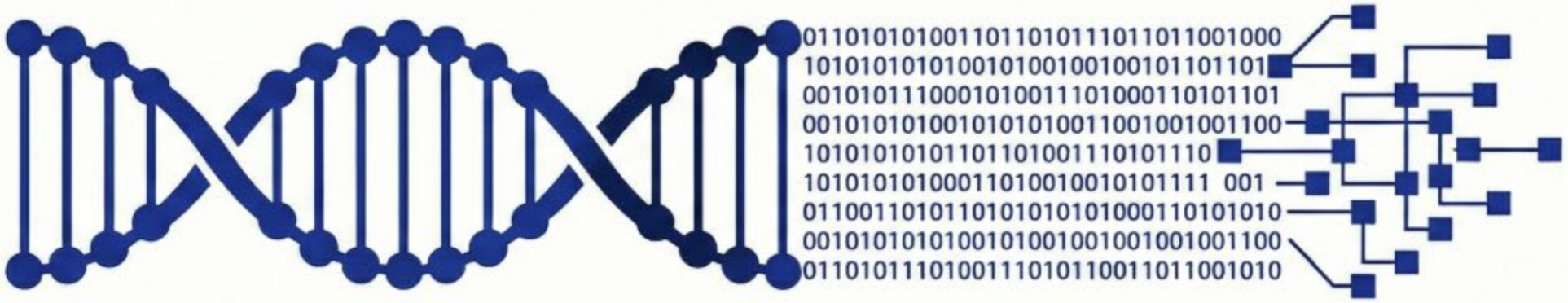
DETECT.AI:
Intelligence Beyond the Clinic



$10 MILLION AI-POWERED ONCOLOGY STUDY

Funded by Stand Up To Cancer (SU2C) to advance 'Precision Medicine 2.0.'

DIGITAL EVALUATION OF TREATMENT AND TOXICITY

Known as DETECT.AI, focusing on treatment effects and cancer toxicity using digital tools.

CAPTURING DATA FROM 'LIFE BETWEEN VISITS'

Closing care gaps by monitoring patient health outside of traditional clinical workflows.

MULTICENTER COLLABORATION LED BY UC SAN DIEGO

Directed by Dr. Sandip Patel

University of Kentucky

The Future of Precision Intelligence

From the virtual tumor board to statewide screening, AI is shifting healthcare from reactive treatment to predictive precision.”

The technology is ready.
The imperative is scale.