WELCOME *To the*

2026 SYMPOSIUM

Artificial Intelligence Will Save the Day (or Not)



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Learning Objectives

01

Describe evolution and evidence of AI applications in Healthcare/Vascular Access

02

Summarize AI tools and its Risks in Healthcare/ Vascular Access

Disclosures

None Relevant to this talk

-Except AI was used in part in developing this talk ☺

PART 1: THE HYPE

What AI promises — and why vascular access specialists need to pay attention



AI IN MEDICINE: THE NUMBERS — 2026 SNAPSHOT

1,000+

FDA-authorized AI/ML devices (Q1 2026)

Radiology leads; nephrology & vascular rising

41%

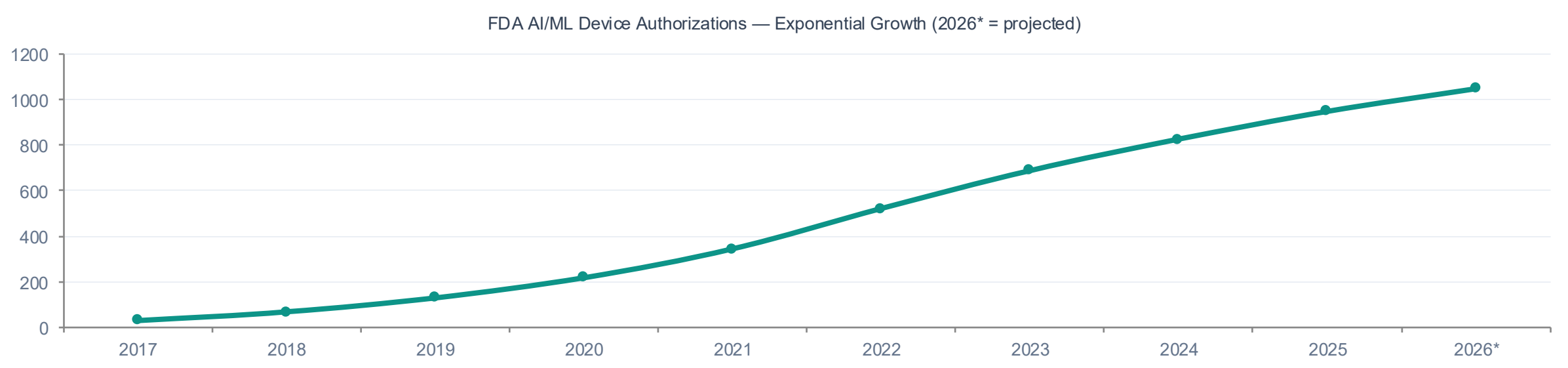
Year-over-year growth in AI health tools

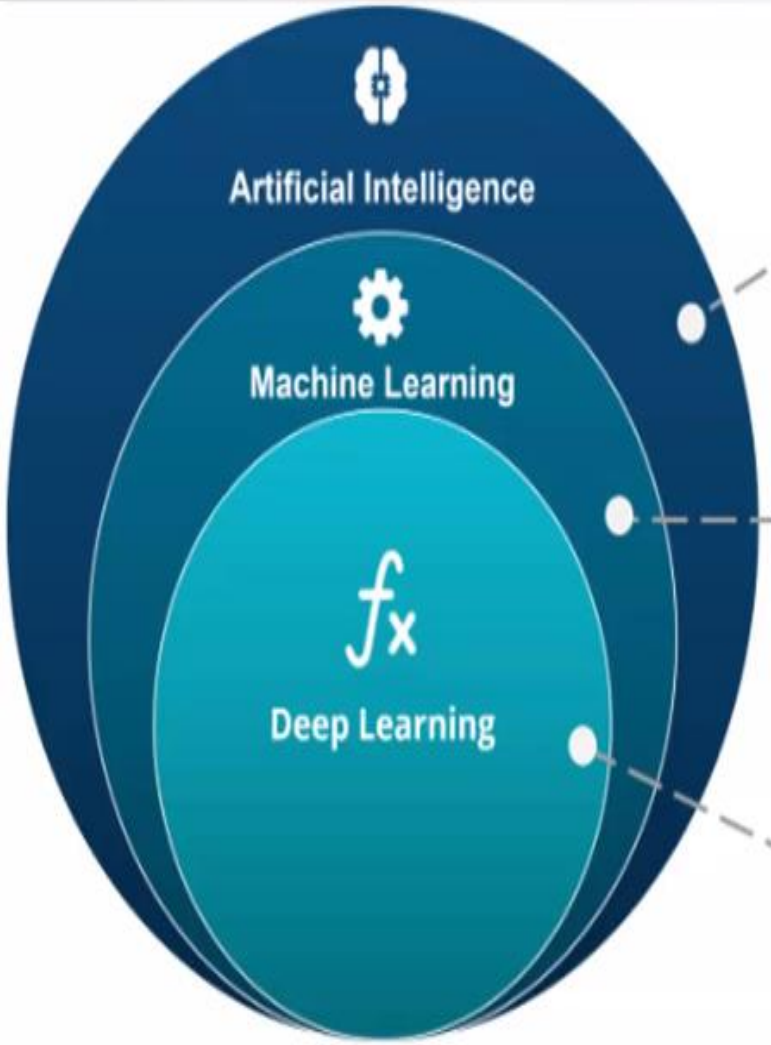
Fastest: clinical decision support & documentation

73%

Clinicians report AI in their workflow

Only 31% say they fully trust it





ARTIFICIAL INTELLIGENCE

A program that can sense, reason, and adapt, enabling machines to approximate human processes

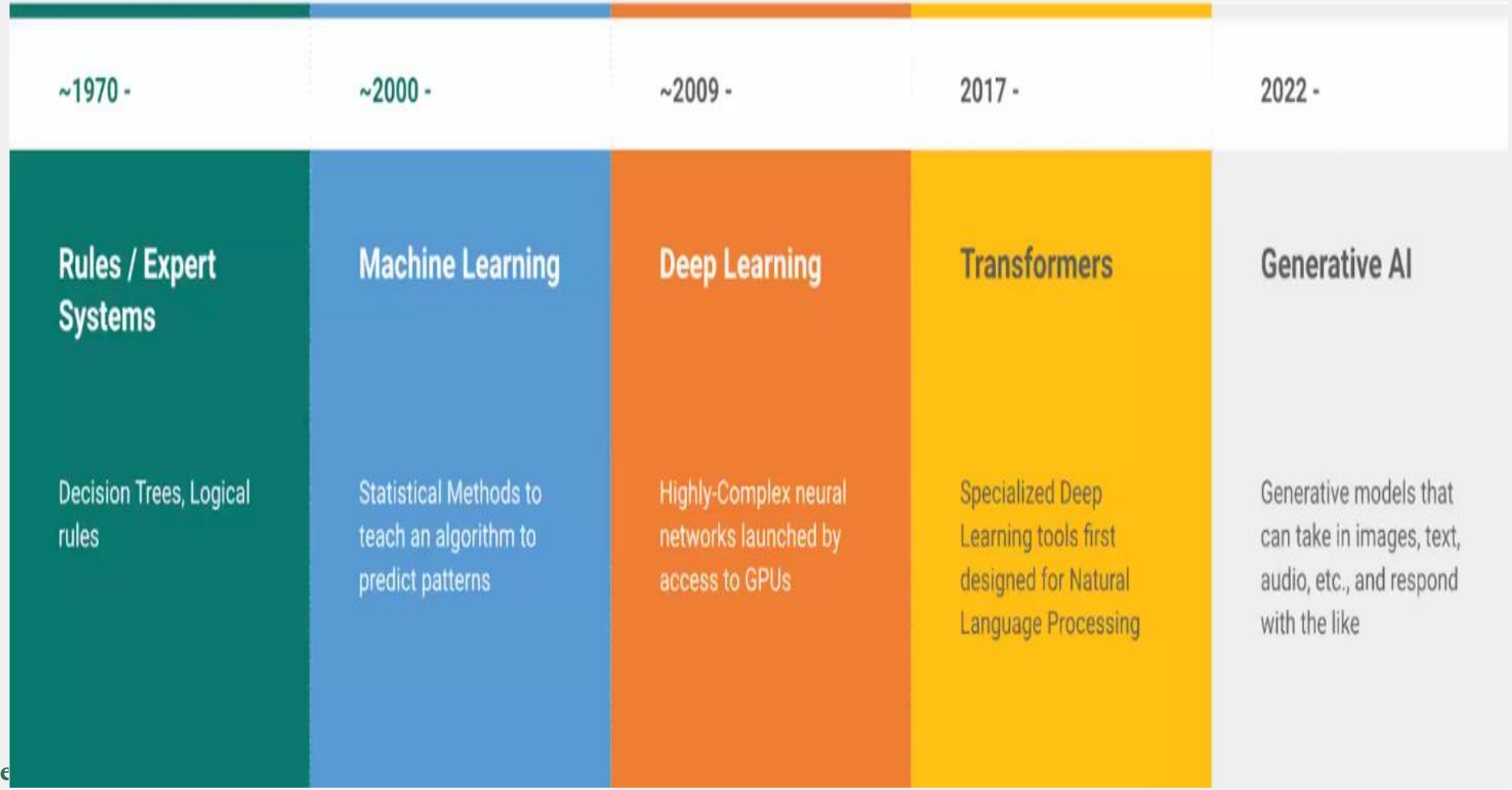
MACHINE LEARNING

A subset of AI using algorithms and statistical methods that improve with exposure to more data

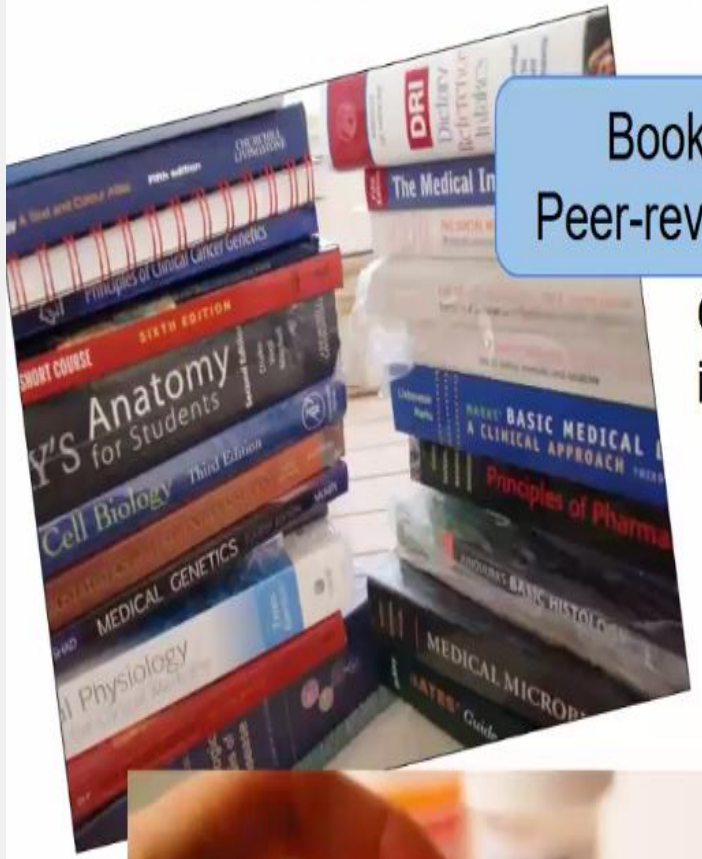
DEEP LEARNING

A subset of ML in which multilayered neural networks learn from vast amounts of data

Evolution of Natural Language Processing



Abundance of Text Data in Health



Books, Journals,
Peer-reviewed literature

Over 37M citations
indexed by PubMed
(2025)



Medical Records

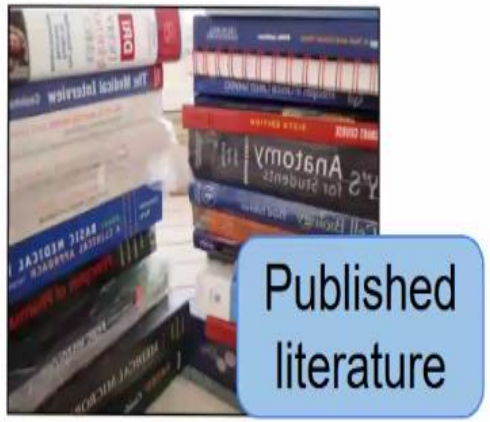
Over 500M “documents”
within Michigan Medicine!
(2024)



Prescriptions

6.7B retail prescriptions filled
at U.S. pharmacies in 2022

Medical Natural Language Processing



Published literature



EHRs



Prescriptions





What is a Language Model?

Language Model (LM): Predicting the next word

Learn from lots and lots of data

Single word models: What word follows "Mayo" most often?

Mayo recipes

Mayo sandwich

Mayo Clinic

Mayo Bowl

A language model is a probabilistic model that, give a sequence of words, predicts the next word

Mira Paul met Dr . Jones at Mayo ___?___

Where have you seen this before?

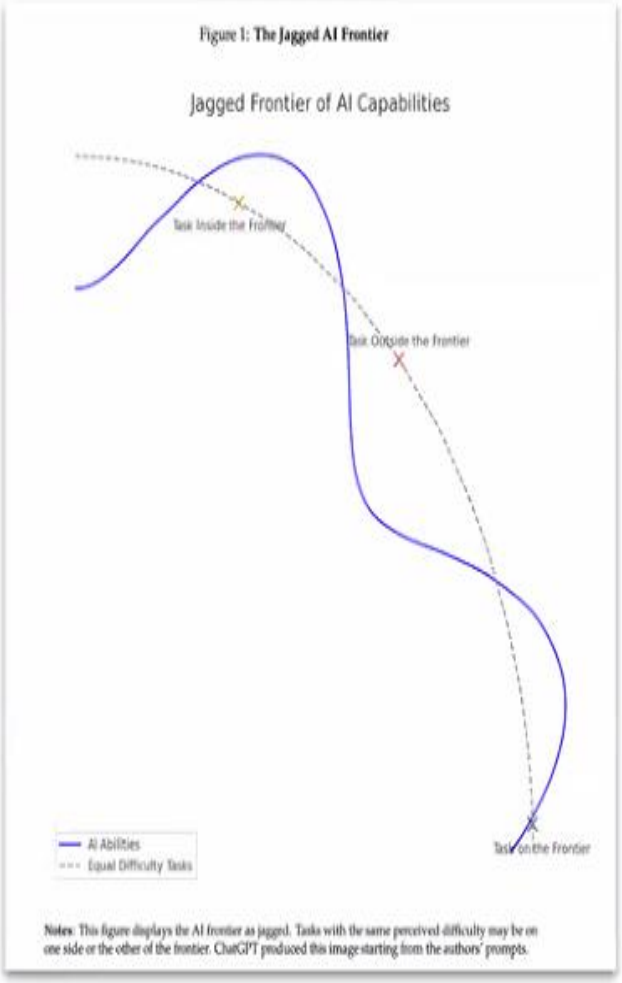
Think of an LLM as a probability engine:

- Trained on billions of clinical notes, journals, and text
- Learns statistical relationships between words & concepts
- Predicts the most likely next word — not necessarily the most correct
- Emergent ability: tasks no one explicitly programmed



Key insight: LLMs recognise patterns — they do not 'know' medicine.

What can generative AI do right now?



No one is completely sure, and it changes frequently.

The "jagged frontier of AI" refers to the uneven and unpredictable impact of artificial intelligence across different domains, where AI demonstrates highly variable performance depending on the context in which it is applied. This is one of the reasons many people get frustrated when they first use generative AI.

Insight: Tracking and leveraging the jagged frontier as it relates to your competitive differentiation is a critical activity in the run-up to AGI.

PART 2: THE EVIDENCE

Where AI actually works — and where the evidence falls short



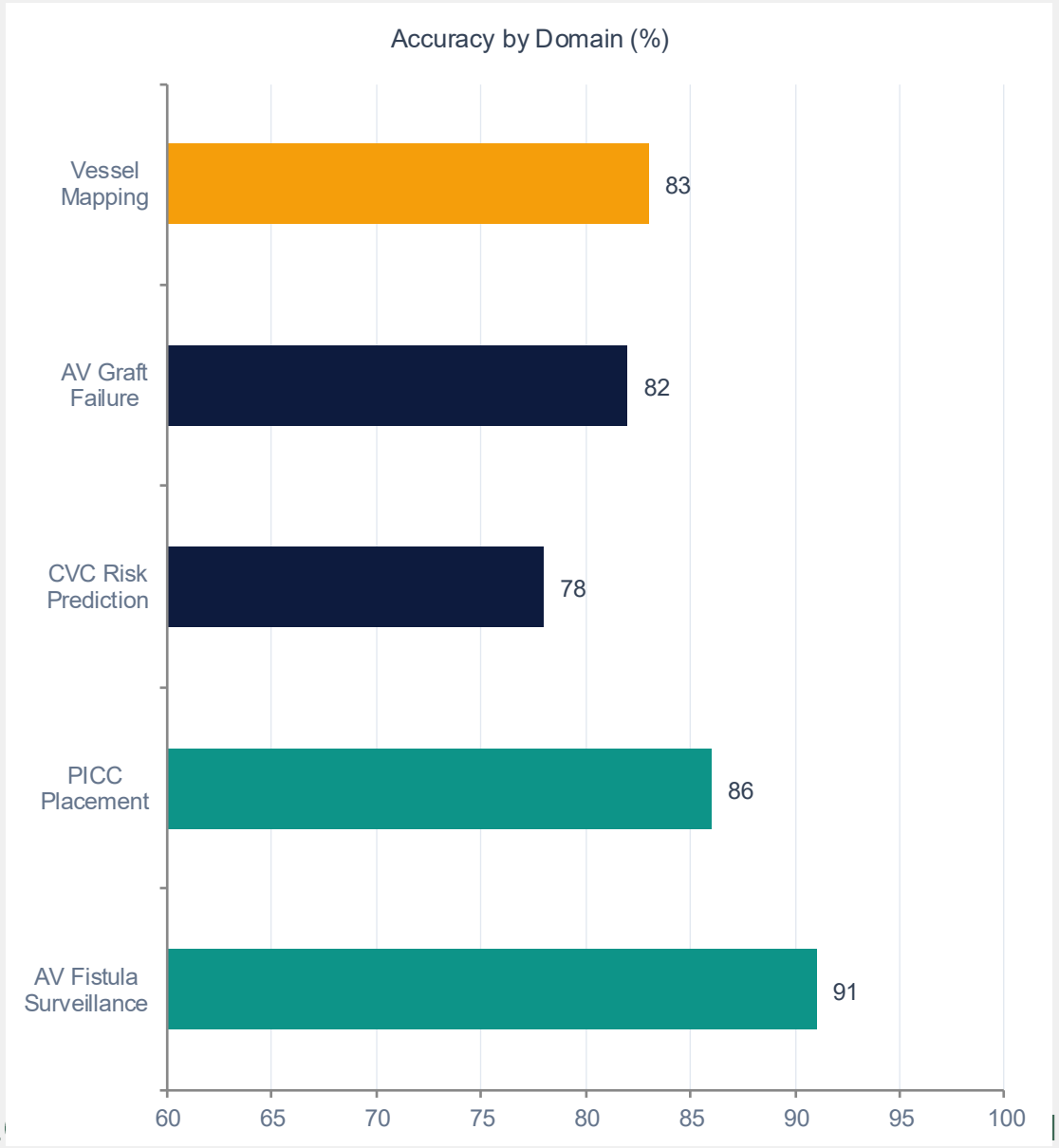


AI tools that directly influence Health/Health care delivery

	Clinical	Direct to consumer	Business operations	Hybrid
Description	AI tools used by a clinician to support diagnostic or treatment decisions	AI tools used by a person with health or wellness concerns, without necessarily engaging with any health care system or professional	AI tools used by a health care system or professional to optimize aspects of health care delivery	AI tools that serve multiple purposes (eg, clinical and business operations)
Opportunity	Improve patient outcomes via: Better access to care, diagnostic accuracy, and compliance with best practice guidelines More personalized care	Improve patient and population health via: Improved disease surveillance and management Helping individuals adopt healthy lifestyles and prevention strategies More prompt, more personalized, and/or less costly access to care	Improve health care delivery via: Automating labor-intensive processes Reduced administrative burden Reduced waste Improved revenue generation	Improve health care delivery via: Reduced administrative burden on health care professionals Helping health care professionals execute care tasks Helping patients navigate health care delivery options
Examples	• AI software for autonomous screening of diabetic retinopathy • Embedded software in portable cardiac ultrasonography machine that provides automated diagnosis • EHR-based algorithm that generates sepsis alerts with treatment prompts	• Smartphone app that diagnoses and treats skin conditions • Chatbot that offers mental health support • Algorithm that uses biosensor data from smartwatch to detect falls or arrhythmias	• Algorithm that uses EHR data to optimize coding for billing • Software to optimize supply chain management • Software to optimize patient and staff scheduling	• Ambient AI that transcribes patient-clinician conversations to generate notes, bills, and treatment plans • Large language model that replies to patient secure messages • Web-based patient navigator that helps schedule appointments based on patient concerns

AI IN VASCULAR ACCESS: EVIDENCE SUMMARY WITH ACCURACY METRICS

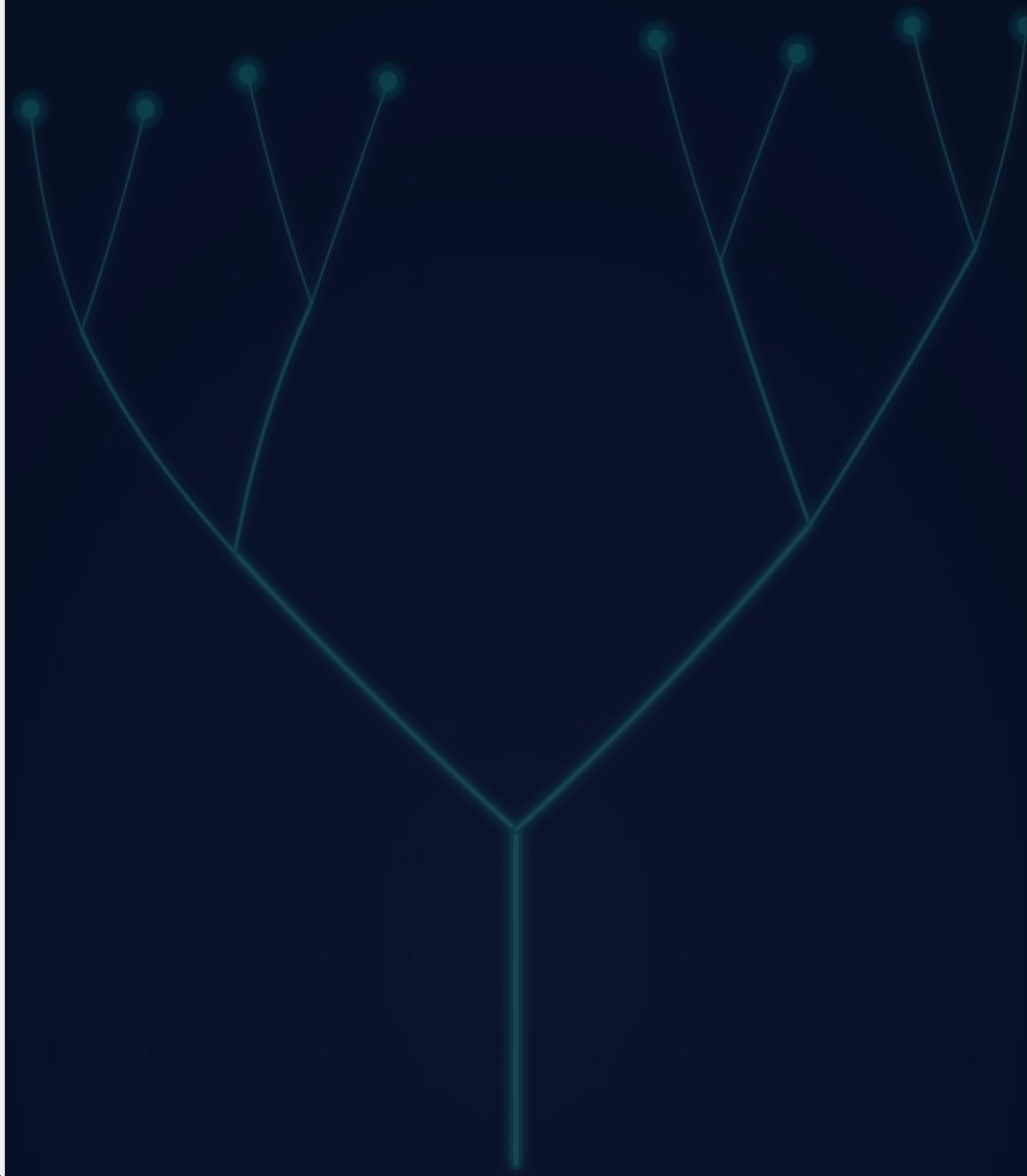
Domain	Sensitivity	Specificity	LOE
AV Fistula Surveillance	91%	87%	II
PICC Placement AI	86%	81%	II
CVC Risk Prediction (NLP)	78%	84%	II
AV Graft Failure (ML)	AUC 0.82	—	II
Vessel Mapping (DL)	83%	79%	III



LOE = Level of Evidence | Sources: JASN 2024, AJKD 2024, J Vasc Interv Radiol 2023

PART 3: THE VASCULAR REALITY

AI tools your patients and practice could encounter — right now



AI Agents on the Job

Agents can assist providers and patients at every stage of the healthcare journey.

An agent listens in on the appointment so the physician can focus on the patient, not the computer screen.

The physician gets the patient information they need before entering the exam room.

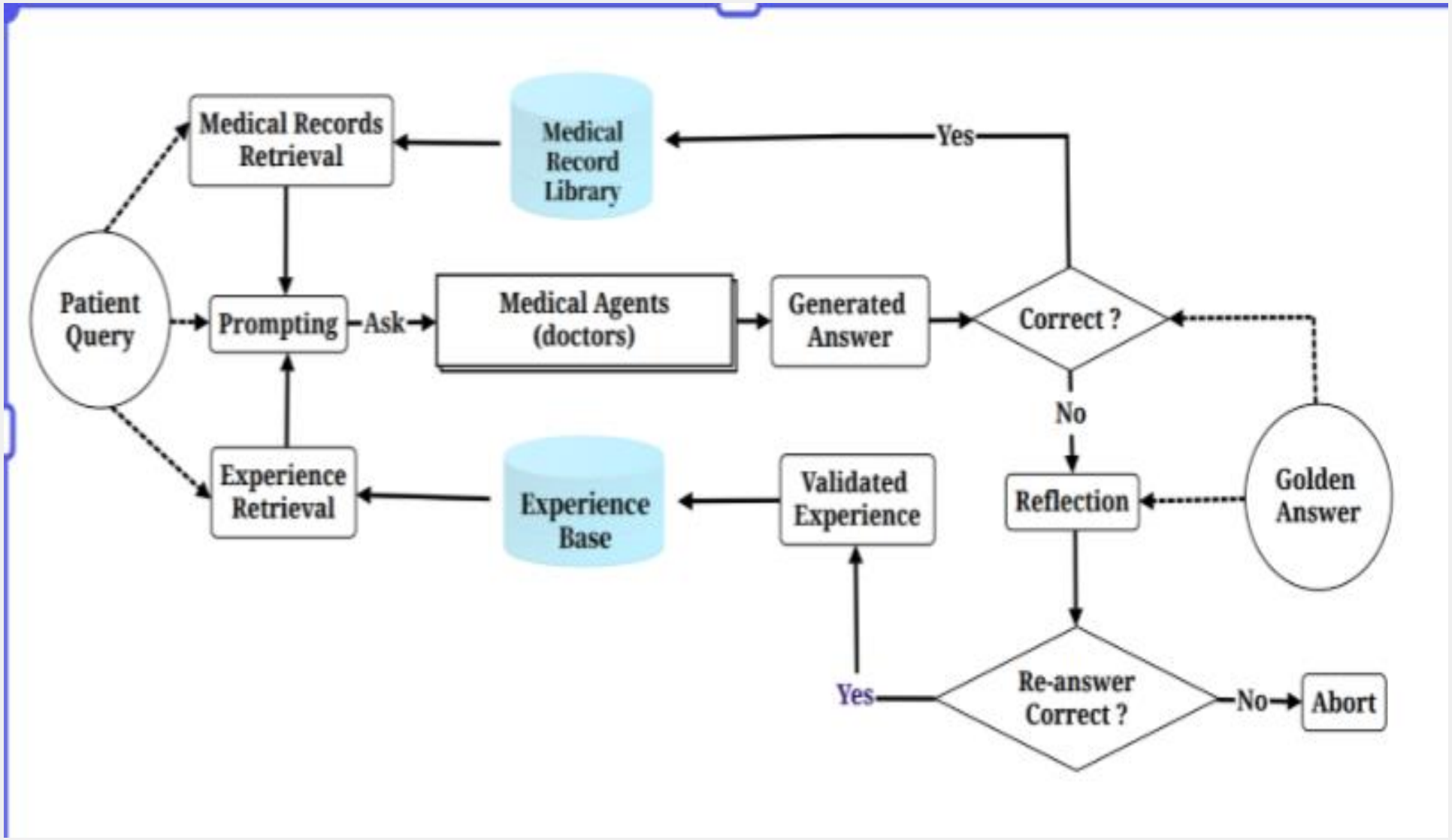
An agent can help save the patient valuable time by helping with preregistration.



An agent pulls from a data library to give the physician the most recent research on the patient's condition and details about the patient's history.

An agent follows up with the patient to help provide monitoring, care support, and lifestyle advice.

AI Agent Flow Map



THE AGENTIC AI CLINICAL ECOSYSTEM — DEPLOYED SYSTEMS IN 2026

Imaging & Triage Agents

Viz.ai

FDA-cleared stroke, PE & hemorrhage detection — auto-routes alerts to specialists

Aidoc

Always-on radiology AI — monitors all imaging for critical findings 24/7

Nanox.AI

Chest X-ray AI deployed across 50+ countries for cardiopulmonary triage

Documentation Agents

Nuance DAX Copilot

Ambient AI listens to clinical encounters, generates structured SOAP note

Abridge

Visit summary AI — UPMC, Duke, Kaiser, Stanford, Mayo Clinic partnerships

Nabla

AI clinical scribe deployed in 45+ health systems across the US

Clinical Decision & Access

Strive Health

CKD AI identifies ESKD risk 2+ years early; manages access planning triggers

Somatus

AI-powered CKD care management with access surveillance coordination

Epic Cosmos AI

280M patient AI network; sepsis prediction, prior auth agent, patient messaging

NephroAI — AI Assistant for Kidney Care

Empowering clinicians and patients with data-driven insights

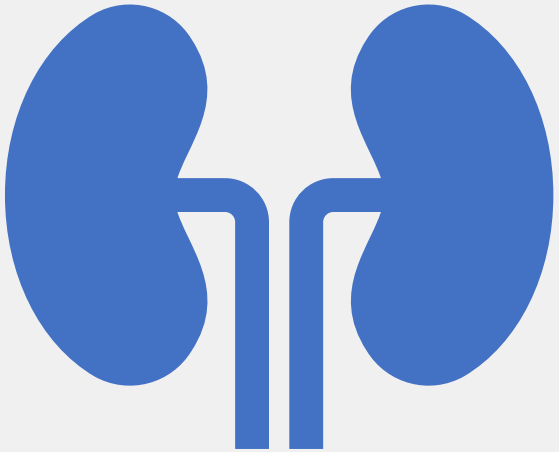
Kidney Care Challenge & MVP Solution

37M Americans have CKD; 9/10 unaware

CKD management is complex: labs, dialysis, meds, imaging

Rural/underserved populations lack nephrologists

Clinicians face data overload; risk of delayed interventions



MVP Solution:

- Synthesizes EHR, labs, imaging, dialysis data
- Predicts CKD progression and alerts clinicians
- Evidence-based recommendations
- Patient education via AI chat

NephroAI — Clinician Dashboard

Patients (Pilot Unit)

John D.
AKI Alert • Creatinine ↑ 0.8

Maria S.
CKD 3b • eGFR 42

Lee C.
Stable • Dialysis day

Aisha R.
Access Alert • High venous pressure

Carlos M.
CKD 4 • Albuminuria +

Patient: John D. • 68 y/o • Admitted for heart failure

AKI Stage 2

Recent Labs

Cr: 2.0 (baseline 0.9)
eGFR: 28 mL/min/1.73m2
K+: 4.8 mEq/L
BUN: 38 mg/dL

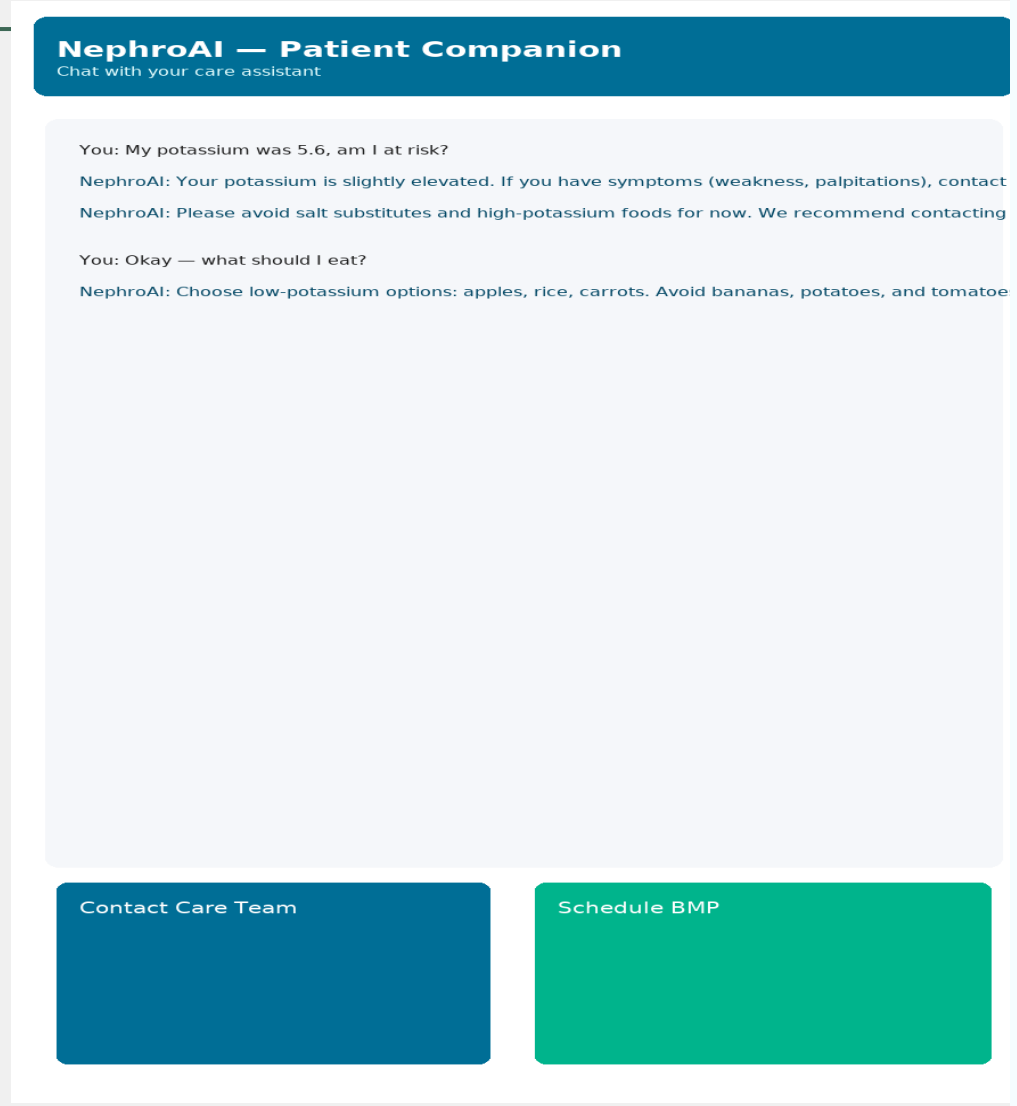
Agent Recommendations (High confidence)

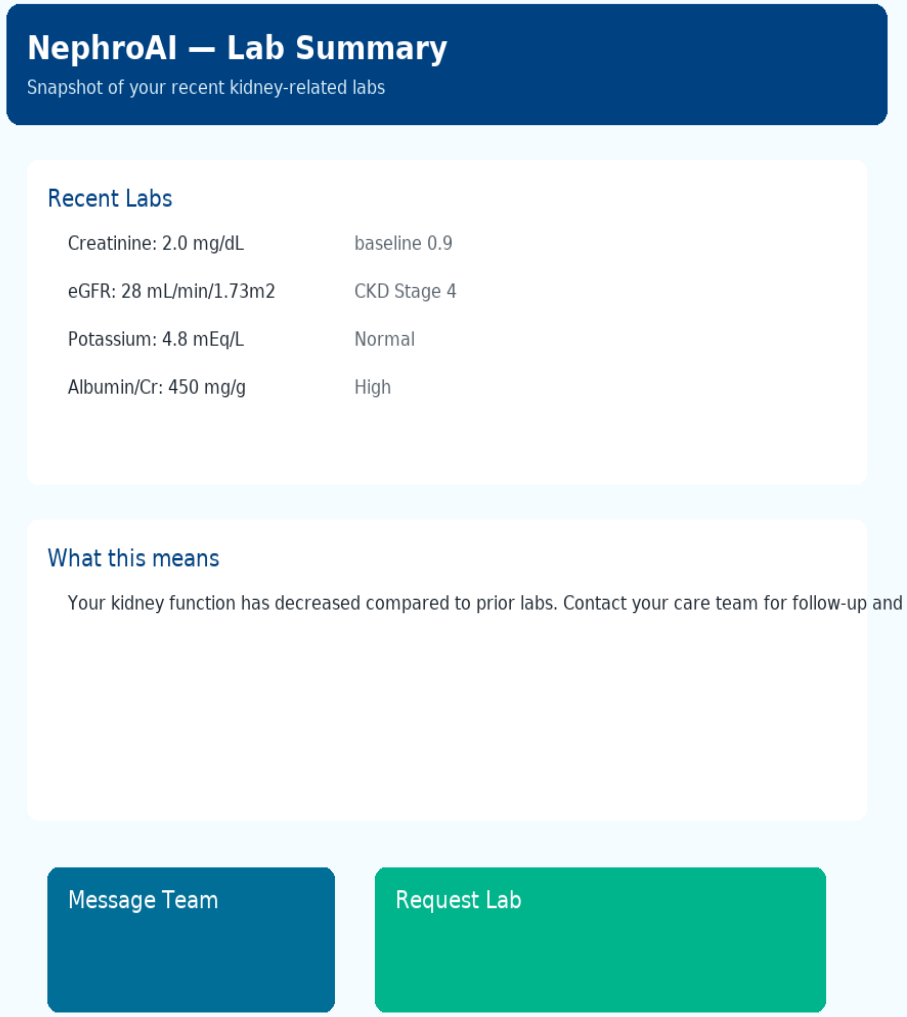
1. Hold IV vancomycin and consider alternative.
2. Order BMP q6h and strict I&O monitoring.
3. Consult nephrology if no improvement in 12 hours.

Recent Activity & Explanation

AKI staged using KDIGO: Cr rise > 2x baseline within 48h.
Recommendation rationale: nephrotoxic meds can worsen AKI.

Clinician view: patient alerts, lab trends, and AI recommendations





Patient view: chat assistant, lab summaries, plus detailed card for clinician insight

Patient: John D. — NephroAI Detailed Card

Summary

Age: 68

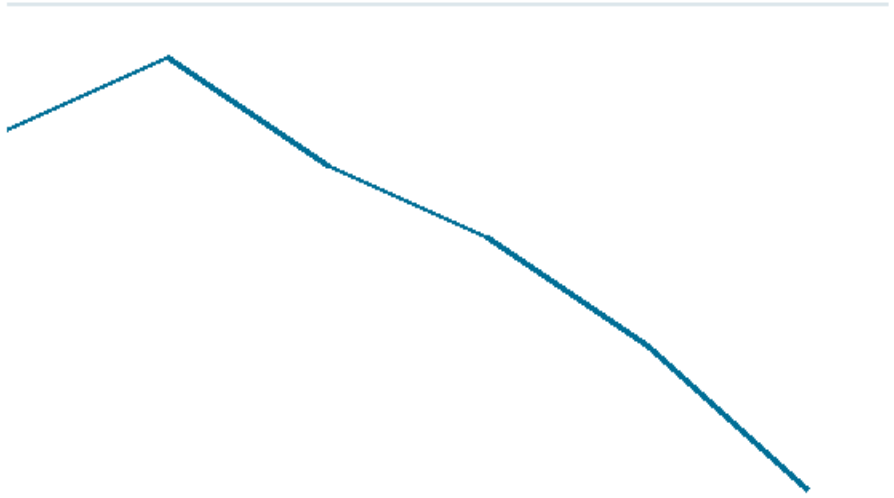
Admission: HF exacerbation

Current issue: AKI Stage 2

Baseline Cr: 0.9

Current Cr: 2.0

Timeline & Trends

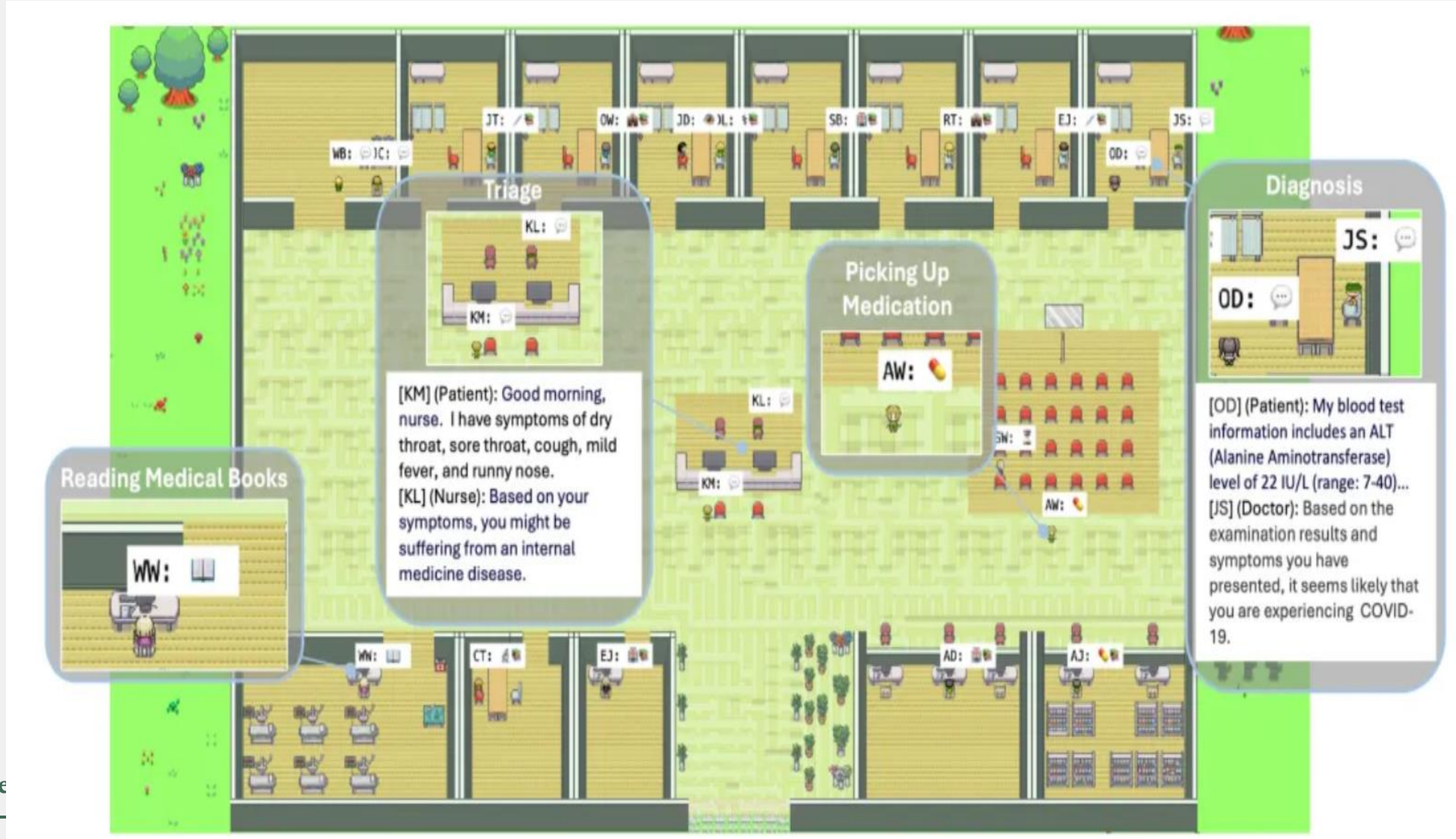


Creatinine trend (days)

Suggested Actions: Hold nephrotoxic meds • Order BMP q6h • Strict I&O • Consider nephrology consult

A Hospital Without Doctors? -Inside the AI-Run Virtual Healthcare Ecosystem

Inside the World of AI Agents Simulating Real-life Medical Scenarios and Ecosystems



PART 4: THE RISKS

When AI gets it wrong — and the clinical stakes in vascular access



AI HALLUCINATIONS & BIAS — THE CLINICAL STAKES

❌ Factual Hallucination

AI confidently cites a non-existent study or wrong Qb target. No warning signs — it sounds authoritative.

⚖️ Training Data Bias

Models underperform for Black & Hispanic patients — the populations with highest ESKD burden.

🕐 Temporal Drift

AI knowledge is frozen at training cutoff. Access guidelines evolve; the model doesn't automatically update.

⚠️ Automation Complacency

Clinicians accept AI output without scrutiny. A miscalibrated model flags a critical stenosis as low-risk.

Mitigation: Retrieval-Augmented Generation (RAG) + human-in-the-loop validation + bias auditing are current best practices.

RESPONSIBLE AI IN VASCULAR ACCESS PRACTICE

Reliability

Validate AI outputs against your center's data before deploying. No black-box tools in clinical pathways.

Fairness

Audit for biases(racial,gender etc.) in access outcome predictions. ESKD disproportionately affects Black patients.

Accountability

AI recommends; the physician decides. Document AI involvement. Malpractice frameworks are actively evolving.

Privacy

De-identified training data only. HIPAA compliance non-negotiable. Watch for re-identification risk.

Security

Adversarial attacks on AI clinical tools are documented. Ensure model integrity checks in procurement.

PART 5: THE VERDICT

Not utopia. Not dystopia. A pragmatic path forward.



THE HONEST SCORECARD: AI IN VASCULAR ACCESS

	✅ SAVES THE DAY	✖ NOT SO FAST
Stenosis detection (AI duplex)	Sensitivity 91% — clinically actionable	Still requires expert confirmation
Access failure prediction	AUC 0.82 — real 30-day alert window	False positives burden workflow
PICC placement optimization	−34% failed first-attempt rate	Limited data in obese/pediatric
NLP: note extraction	Saves ~60% chart review time	Hallucination risk in free text
Equity in access care	AI surfaces underserved populations	Training bias worsens disparities

KEY TAKEAWAYS

01

AI is real, deployed, and inside your EHR right now

1,000+ FDA-cleared tools. Epic, DaVita, Fresenius are all running AI on your patients' data. Ignorance is no longer safe.

02

The evidence in vascular access is clinically meaningful

91% sensitivity for stenosis, AUC 0.82 for access failure, 52% faster stroke treatment times. These are real outcomes.

03

The risks are documented — and manageable with governance

Hallucination, automation bias, training bias are patient safety concerns. RAG, human-in-the-loop, and bias auditing are mitigations.

04

The physician–AI partnership defines the next era

AI augments your expertise. The interventionalist who governs AI wisely will outperform those who ignore it or blindly trust it.

So — will AI save the day?

*Yes — if we use it **wisely.***

AI is not a replacement for the expert interventionalist/surgeon.

It is the most powerful clinical decision support tool we have ever had — if governed with rigor and equity.



Appendix

FDA CLEARED · 1,200+ HOSPITALS

Viz.ai — How the Agent Works

CT Scan Acquired

Patient imaging captured — Viz.ai reads within 60 seconds

AI Detection

Deep learning flags: LVO stroke, ICH, PE, aortic dissection, STEMI

Instant Alert

Push notification sent to on-call specialist's iPhone with annotated images

Team Coordination

Cath lab, stroke team, or surgery activated — without a phone chain

Response Tracking

AI logs response times, escalates if no acknowledgment within threshold

Published Clinical Outcomes

52%

Reduction in door-to-treatment time for LVO stroke

Stroke Journal, 2021

38%

Faster PE treatment initiation across 5 hospitals

Chest Journal, 2023

6

FDA-cleared indications in 2026

FDA AI/ML Device Database

<2m

AI read-to-alert time for critical findings

Viz.ai Clinical Report 2024

Vascular relevance: Viz.ai's architecture is now being adapted for AV access failure & tunneled CVC infection detection.

CASE STUDY: AMBIENT AI DOCUMENTATION — DAX COPILOT & ABRIDGE

MICROSOFT · NUANCE DAX COPILOT

Nuance DAX Copilot

550+	Hospitals deployed (2026)
70%	Documentation time reduction
50%	Reduction in after-hours 'pajama time'
95%	Physician satisfaction in published study
$19.7B	Microsoft acquisition (2022) — commitment signal

How it works: AI listens to patient encounter → generates SOAP note → physician reviews & approves before EHR entry

CARNEGIE MELLON SPINOUT

Abridge

- UPMC, Duke, Kaiser, Stanford, Mayo Clinic — 50+ health systems
- 45+ language support — critical for diverse dialysis populations
- Generates dual output: clinical SOAP note + patient-friendly visit summary
- HIPAA compliant; data never used for model training without consent
- Specifically trained on nephrology and complex chronic disease encounters

Vascular access impact: Reduces time spent documenting dialysis adequacy notes, access assessments & procedure reports by 40-60%.

AI AGENTS IN DIALYSIS & VASCULAR ACCESS — DEPLOYED TODAY

DaVita — AI Treatment Planning

- Analyzes 10M+ patient-dialysis treatment records
- Predicts fluid overload & unexpected hospitalizations
- Reduced unplanned hospitalizations by 12% in deployed cohorts
- Deployed across 2,700+ US dialysis clinics (2026)

DaVita AI Clinical Report 2025

Fresenius Medical Care — EMEAPP

- ESRD Predictive Analytics Platform — 4,000+ clinics
- Predicts vascular access failure, infection events 30 days early
- Integrates with NxStage & 5008 machines for real-time data
- FDA registered as clinical decision support software

Strive Health — CKD AI Platform

- Identifies CKD patients 2+ years before ESKD diagnosis
- Manages care team alerts: nephrologist referral, access planning
- Reduced hospitalizations 25% in value-based care contracts
- Partners: United, Cigna, Humana, state Medicaid programs

Strive Health Outcomes Data 2025

EPIC AI ORCHESTRATION — AI AGENTS INSIDE YOUR EHR TODAY

Epic Cosmos Network

280M Patient records in Cosmos AI dataset

220+ Healthcare organizations in the network

2023 First EHR to integrate GPT-4 clinically

100% Of US News Top 20 hospitals run Epic

AI Agents Inside Epic — Available Now

Live · GPT-4

In Basket AI (GPT-4)

Drafts responses to patient messages. Physician reviews before sending. 70%+ of responses used as-is.

Live · FDA-registered

Prior Authorization Agent

AI auto-completes and submits PA requests to payers. Reduces PA burden by 65% in early deployments.

Live · Level II evidence

Sepsis Prediction Model

Identifies sepsis 12 hours before clinical recognition. Sensitivity 72%, deployed in 300+ hospitals.

Live · Opt-in

Ambient Documentation (DAX)

Direct Epic-DAX integration. AI-generated note appears in Epic for physician review within 2 minutes.

Live · CPOE integrated

Medication AI Assistant

Flags drug interactions, dose adjustments for CKD/ESKD — critical for dialysis patients on complex regimens.

Pilot · 2026

Predictive Scheduling

AI optimizes access center scheduling based on predicted no-shows, acuity, and procedure complexity.

ROADMAP FOR VASCULAR ACCESS LEADERS — ASSESS · PILOT · SCALE

ASSESS

Now — 3 months

- Audit what AI is already in your EHR
- Map high-volume, high-risk access decisions
- Survey your team's AI literacy and concerns
- Define outcome metrics before you start

PILOT

3 — 12 months

- Select 1 use case: AV fistula surveillance AI
- Run prospective pilot with outcome tracking
- Establish human-in-the-loop validation protocol
- Measure: time saved, accuracy, clinician trust

SCALE

12+ months

- Expand proven pilots with governance framework
- Continuous bias monitoring & model drift detection
- Build patient-facing tools with equity lens
- Publish your outcomes — advance the evidence

Now — 2026 · 12 months · 3 years+

Computable Phenotyping

- Phenotypes
  - Signs and symptoms
  - ICD and CPT codes
  - Medications
  - Lab values



- Computable Phenotyping
  - The process of applying computer-executable algorithms to clinical data to derive cohorts of patients with and without a specific disease, characteristic, or phenotype of interest. (Callahan et al., 2023)

BERT vs. GPT

BERT: Bidirectional Encoder Representations from Transformers

(and its variants – BioBERT, PubMedBERT, TweetBERT, ...)

Pre-rained on large corpus of "generic" data

\+ Fine-tuned on Task A

= Works pretty well on Task A



GPT: Generative Pre-trained Transformers

(and its variants – GPT-2, GPT-3, ChatGPT, GPT-4, ...)

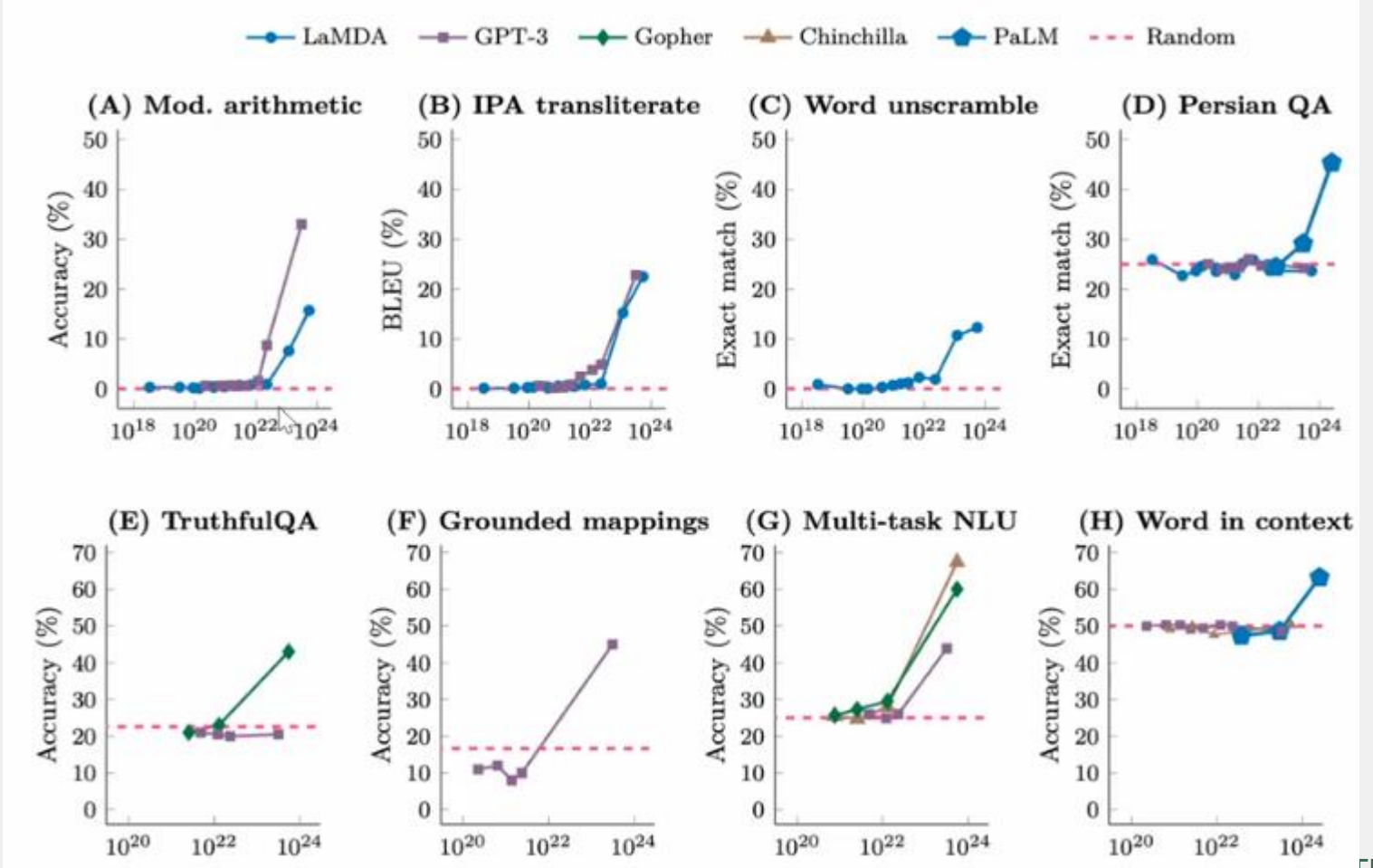
Pre-trained on large corpus of "generic" data

\+ Scaling up (more parameters)

= Works pretty well on **many** tasks!

Why are LLMs different from previous AI models

An Ability is "Emergent" if it is not present in smaller models but is present when the model size increases



When AI gets it wrong –AI hallucinations and Bias.

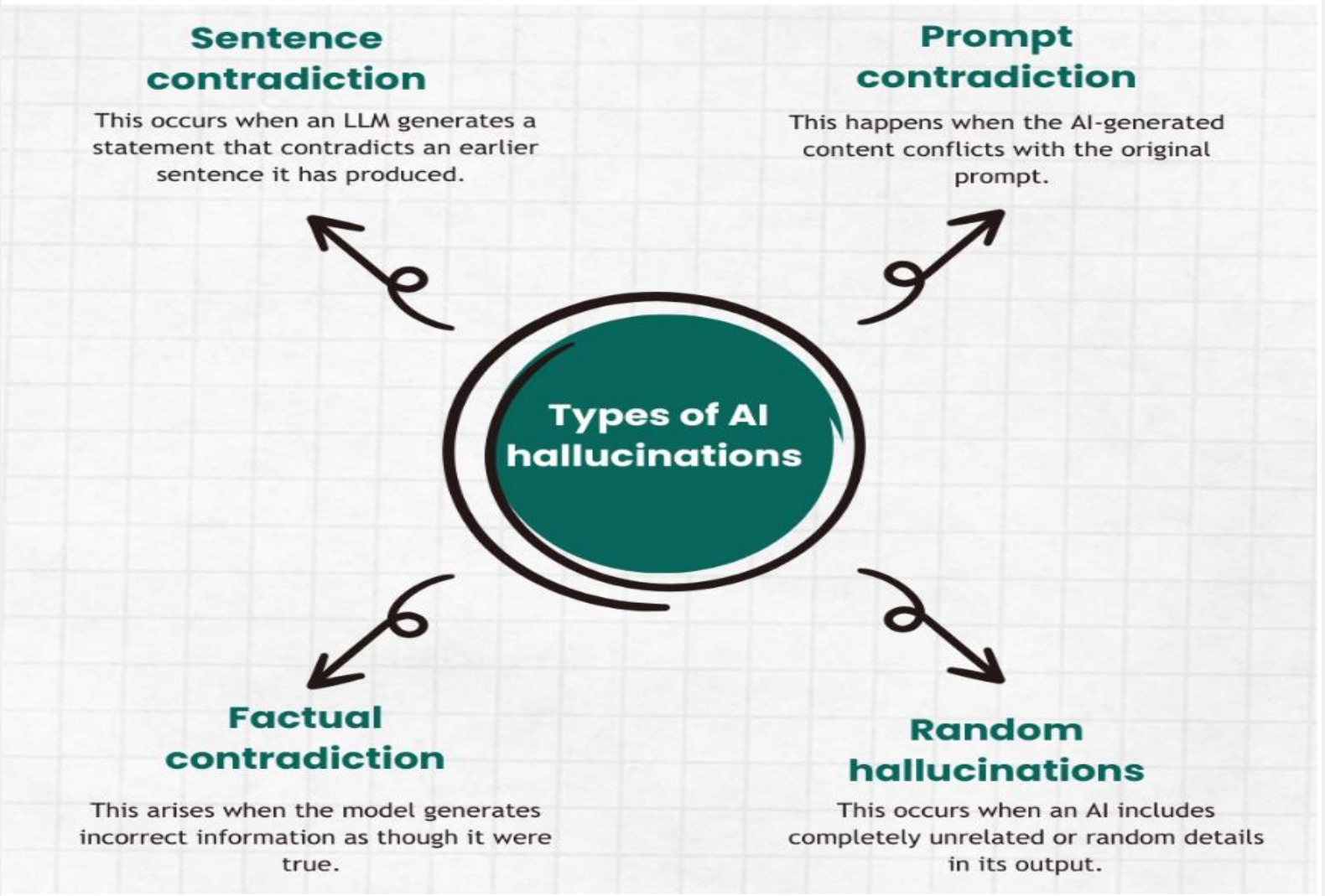


Figure 1. Four common types of AI hallucinations. (Image: Signity)

Methods to prevent AI errors ?

