

AI in Healthcare

A Comprehensive Dive

Real-World Applications • Specialty Deep-Dives • Sub-Specialty Details • Future Roadmap

45 Minutes

Duration

**Healthcare
Providers**

Audience

2026

Year



Paryus Patel MD



Presentation Agenda — 45 Minutes

01

The AI Revolution in Medicine

0–5 min • Slides 3–6

Slides
3–6

02

Real-World AI: Diagnostics & Imaging

5–10 min • Slides 7–10

Slides
7–10

03

Drug Discovery & Genomics

10–14 min • Slides 11–13

Slides
11–13

04

Specialty Deep-Dives (6 areas)

14–28 min • Slides 14–24

Slides
14–24

05

Sub-Specialty Clinical Details

28–34 min • Slides 25–29

Slides
25–29

06

Near-Future Roadmap 2026–2030

34–39 min • Slides 30–33

Slides
30–33

07

Governance, Ethics & Equity

39–42 min • Slides 34–36

Slides
34–36

08

Action Framework & Closing

42–45 min • Slides 37–38

Slides
37–38

Why AI, Why Now

Workforce shortages

Clinical complexity

Data explosion

Quality & safety expectations

SECTION 01

The AI Revolution in Medicine

What Is AI in Healthcare? Definitions & Taxonomy

Machine Learning (ML)

Algorithms that learn patterns from data without explicit programming. Powers predictive models for sepsis, readmission, and deterioration risk scoring.

Deep Learning / CNNs

Multi-layer neural networks excelling at image analysis. Foundation of radiology, pathology, and dermatology AI tools achieving radiologist-level accuracy.

Natural Language Processing

AI that reads, interprets, and generates clinical text. Powers ambient documentation, EHR summarization, and clinical decision support alerts.

Foundation Models & LLMs

Large language models (GPT-4, Med-PaLM 2, Claude) trained on vast medical text. Emerging for differential diagnosis, patient Q&A, and clinical note drafting.

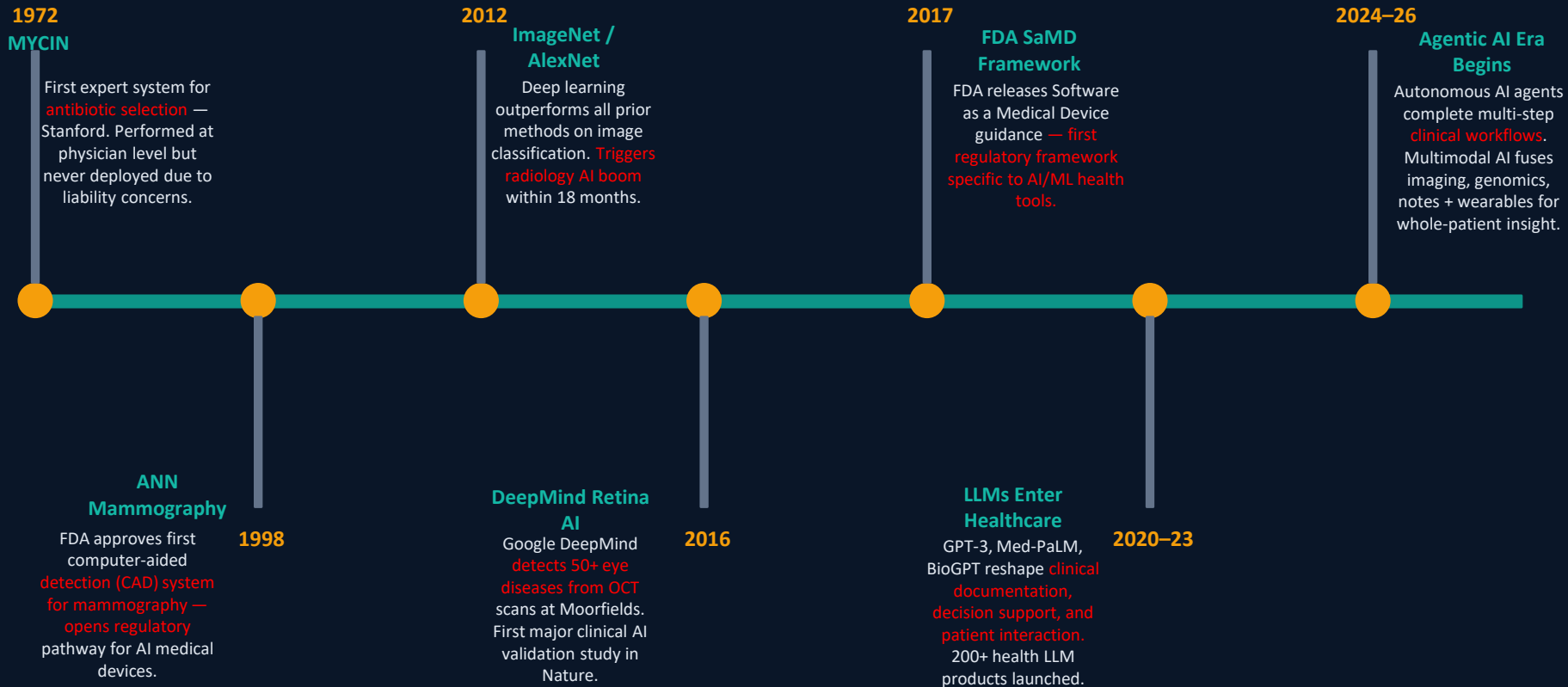
Computer Vision

AI interpretation of images, videos, and scans. Enables real-time surgical guidance, wound monitoring, and fall detection from hospital cameras.

Reinforcement Learning

AI learns via reward/penalty feedback. Used in adaptive radiotherapy dose optimization, robotic surgical training, and treatment personalization engines.

AI in Healthcare: A Brief History & Acceleration



Top AI Market Industries Worldwide

Market size share by Industry in the Artificial Intelligence market



Theoretical capability and observed usage by occupational category

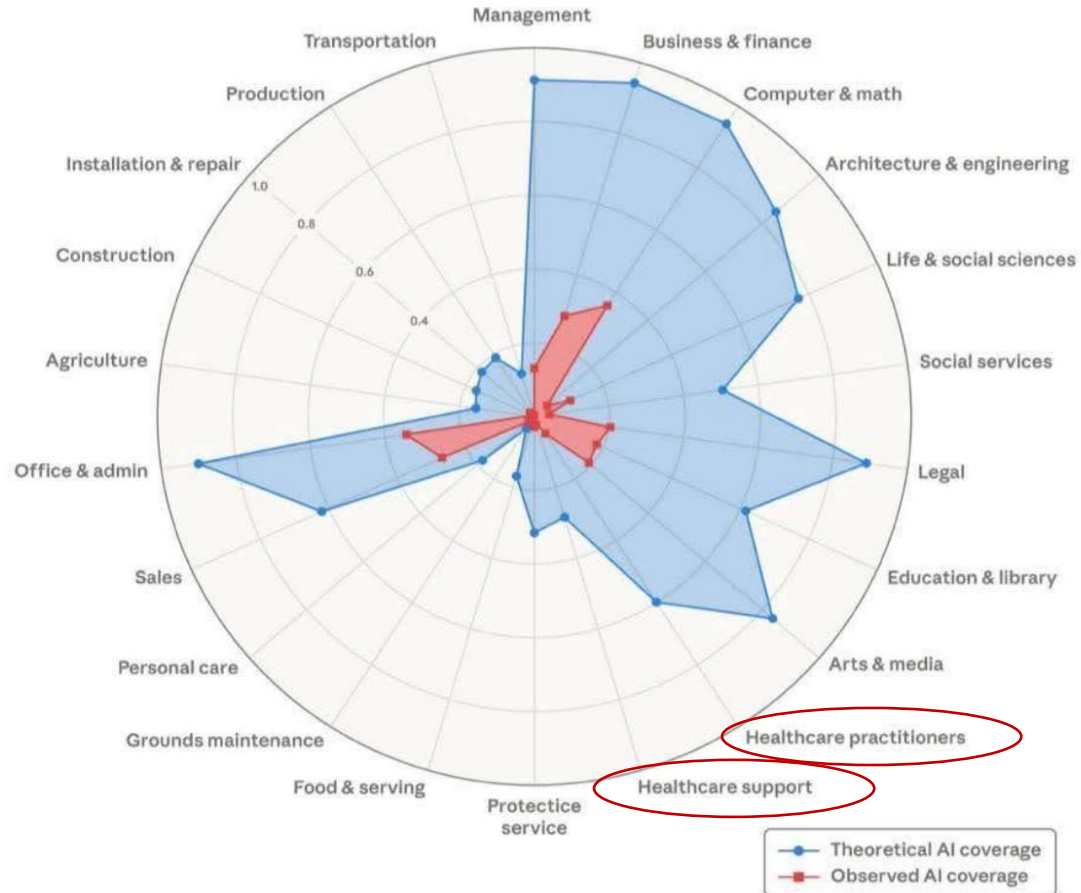


Figure 2. Theoretical capability and observed exposure by occupational category.

AI in Healthcare — Market Scale & Impact (2026)



\$188B

Global AI healthcare
market by 2030



521+

FDA-cleared AI
medical devices (2025)



45%

Reduction in
diagnostic errors



~\$150B

Annual savings from
AI efficiency (est.)

▶ 10× increase in FDA AI device approvals from 2015–2025 (51 → 521+), with radiology comprising 75% of cleared devices

▶ WHO estimates AI could address 57% of global healthcare workforce shortages in low/middle-income countries by 2030

SECTION 02

Real-World AI: Diagnostics & Imaging

Slides 7–10 • 5–10 Minutes

Applications of AI in Healthcare



Rare Disease Diagnostics
& Treatment



Drug
Development



Virtual Nursing
Assistance



Medical Diagnosis



Fraud Detection



Error Reduction



Cybersecurity



Cancer Research



Gene Editing



Personalized
Healthcare Plans



Health Monitoring
& Wearables



AI Robot
Assisted Surgery



Data Science Important Applications

in the Healthcare Sector



Predictive Analytics:

Build predictive models that can identify patients who are at high risk for certain conditions.

Disease Diagnosis:

Develop algorithms that can help in the early detection and diagnosis of diseases.



Personalized Medicine:

Tailor treatments using individual genetic and medical data.

Clinical Trials:

Design and conduct clinical trials more efficiently.



Healthcare Operations:

Improve the efficiency and effectiveness of healthcare operations.

AI in Radiology — Real-World Clinical Deployments

Aidoc | FDA De Novo — 12 findings

- 'Always-on' AI flags critical **findings (PE, ICH, aortic dissection, DVT) on ALL CT scans 24/7**
- Deployed in 1,000+ hospitals across 30 countries; processes 3M+ studies/month
- **Reduced time-to-treatment for PE by 68 minutes; ICH by 47 minutes** in published studies

Nuance PowerScribe AI | CE Mark + FDA 510(k)

- Ambient AI auto-generates **draft radiology reports from voice in real time**
- Integrated into Epic, Cerner — **reduces dictation and editing time by 50%**
- Used by 750,000+ clinicians globally; part of Microsoft's \$19.7B acquisition thesis

GE HealthCare AIR Recon DL | FDA 510(k) Cleared

- Deep **learning image reconstruction boosts MRI SNR by up to 2x** without longer scan times
- **Cuts MRI scan times by 30–50%** — critical for claustrophobic and pediatric patients
- Deployed on 7,000+ MRI scanners worldwide since 2020 launch

RapidAI (iSchemaView) | FDA + 60+ Country Clearances

- Processes CT perfusion in **<3 minutes for large vessel occlusion (LVO) detection**
- **Automated vessel analysis, lesion quantification, and triage alert to stroke team**
- Published DAWN trial data: AI-selected patients had 73% improved outcomes

AI in Pathology & Laboratory Medicine

Paige.AI — Prostate Cancer Detection

First FDA-approved AI for cancer pathology (2021)

Paige Prostate detects cancer in 70% of biopsy specimens initially cleared by pathologists. **Reduces false-negative rate from 15% to <2%**. Deployed at Memorial Sloan Kettering, Karolinska Institute, and 200+ labs.

PathAI — Multimodal Pathology Platform

Partnership: AstraZeneca, Bristol Myers Squibb, Lilly

AI identifies immunotherapy biomarkers (PD-L1, TMB, MMR) directly from H&E slides — **avoiding expensive IHC add-ons**. Improves **immunotherapy patient selection by 40%**, preventing futile treatment.

Proscia Concentriq Dx

CE Marked | ISO 13485 Certified

End-to-end AI digital pathology platform. AI pre-screens WSIs for findings, routes urgent cases, and auto-generates structured reports. **Reduces time-to-diagnosis by 35% across 200+ global pathology labs**.

Tempus AI — Multiomics Interpretation

NASDAQ: TEM | 7M+ patient records

Integrates genomic sequencing, RNA expression, and pathology imaging **to identify optimal targeted therapies**. Partners with 70% of U.S. academic medical centers; active in 15+ cancer types.

AI at the Point of Care — Dermatology, Ophthalmology & Wearables

DERMATOLOGY

Google DermAssist / SkinVision

AI app screens 288 skin conditions from **smartphone photos with 83% sensitivity for melanoma**. FDA breakthrough device designation. Used by 13M+ users.

Ibex Medical Analytics

AI reviews skin punch biopsies, detecting melanoma missed by pathologists. Deployed in 30+ labs; **reduces turnaround by 40%**.

OPHTHALMOLOGY

IDx-DR (Digital Diagnostics)

First autonomous FDA-cleared AI diagnostic — screens for **diabetic retinopathy without an ophthalmologist**. Used in 400+ primary care clinics.

Optina Diagnostics — Retinal Alzheimer's Detection

AI identifies **amyloid plaques in the retina 6 years before cognitive symptoms**. Deployed in 18 neurology centers globally.

WEARABLES & REMOTE

Apple Watch ECG + AFib History

FDA-cleared AI detects **atrial fibrillation with 97% sensitivity**. 200M+ active cardiac monitors worldwide. Published HEART study: **34% of new AF detected by watch first**.

Eko CORE Digital Stethoscope

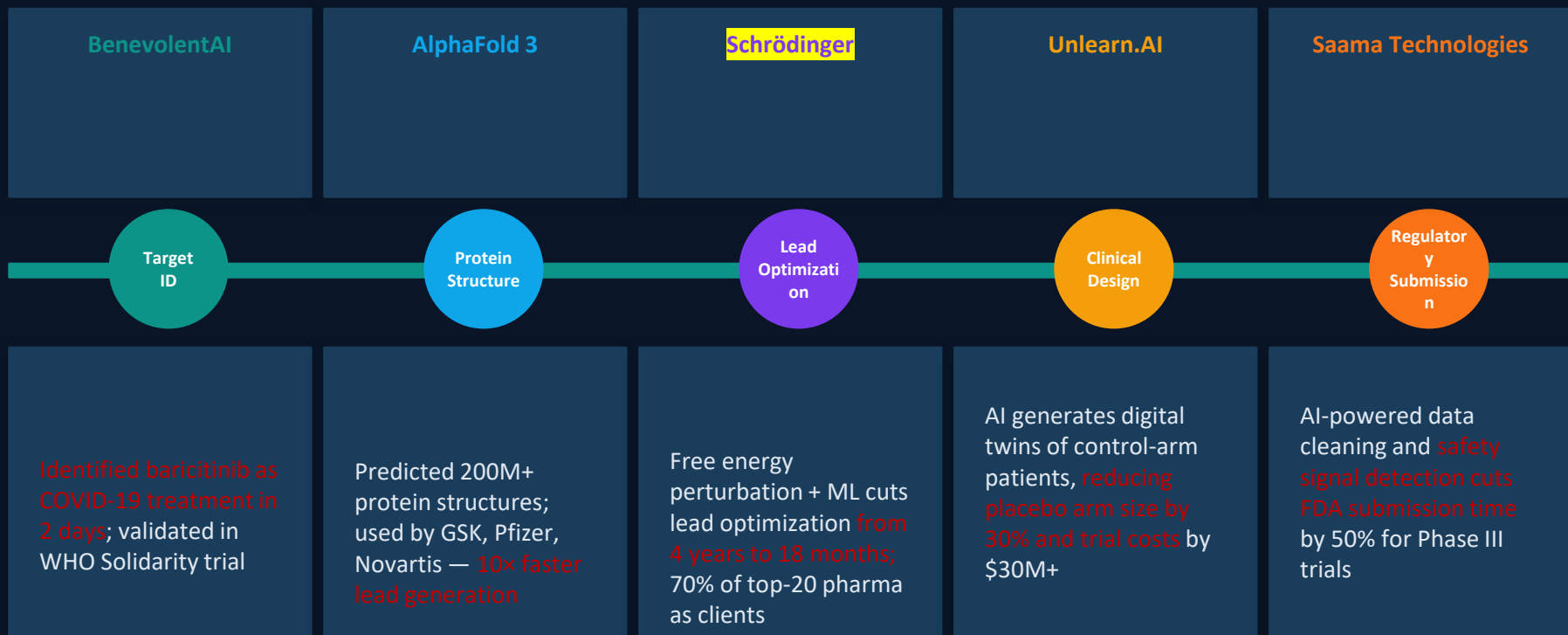
AI murmur detection with **96% sensitivity for aortic stenosis** — 3× better than standard auscultation. Integrated into 1,500+ ERs and rural clinics.

SECTION 03

Drug Discovery & Genomics

Slides 11–13 • 10–14 Minutes

AI-Accelerated Drug Discovery — From Target to Trial



AI in Genomics & Precision Medicine

ILLUMINA + GRAIL — MCED (Multi-Cancer Early Detection)

Galleri test uses AI to analyze cell-free DNA methylation patterns from a single blood draw. **Screens 50+ cancer types with 99.5% specificity**. Detects Stage I cancers with no existing screening standard. NHS pilot: 140,000 participants, 2023–2025.

DEEP GENOMICS — SPLICER AI

AI predicts pathogenic variants missed by traditional genomic analysis. Identified 40,000+ new disease-causing mutations. Used to identify antisense oligonucleotide targets for rare diseases in 12 months vs. 5+ years.

FABRIC GENOMICS — NICU RAPID WGS

AI interprets whole-genome sequencing results in <24 hours for critically ill neonates. **Reduces time to rare disease diagnosis from 4 years to 24 hours**. UCSF and Stanford deployed; **reduces NICU stay by 5–7 days**.

HELIX — POPULATION GENOMICS + EHR INTEGRATION

Largest genomic sequencing network in the U.S. (500K+ genomes). AI surfaces **actionable pharmacogenomic alerts (e.g., clopidogrel non-responders, statin myopathy risk) directly in EHR at point of prescribing**.

SECTION 04

Specialty Deep-Dives

6 Specialties • Slides 14–24 • 14–28 Minutes

Cardiology • Oncology • Neurology • Radiology • Primary Care • Mental Health



Cardiology AI — Deep Dive

Apple Watch Series 10 + AliveCor KardiaMobile

FDA De Novo | 200M+ devices

Continuous 1-lead ECG. AI detects **AFib (97% sensitivity)**, atrial flutter, bradycardia, tachycardia, PVCs. Classified as Class II medical device. Published HEARTLINE trial: 34% of all new AF diagnoses came from watch-first detection.

HeartFlow FFRCT — Coronary AI

FDA, CE, MHLW Cleared | 70,000+ analyses/yr

Creates patient-specific 3D coronary artery model + blood flow simulation from CT angiography. Diagnoses **hemodynamically significant blockage without invasive catheterization**. PLATFORM trial: 12% reduction in 1-year MACE, **reduced unnecessary cath by 61%**.

EchoGo Pro (Ultramics)

FDA 510(k) | 45+ Countries

AI quantifies ejection fraction, GLS, diastolic function from routine echo — even sonographer-acquired studies. **Detects HFpEF 2.5x earlier than standard clinical review**. Deployed at NHS, Mayo Clinic, Cleveland Clinic.

Tempus ECG Analysis + Cardiology LLM

CE Mark | EHR Integrated

AI reads 12-lead ECGs and identifies 30+ conditions including LBBB, QT prolongation, and prior silent MI. LLM layer generates structured cardiologist-style report with **risk stratification within 45 seconds**.

Medtronic Micra AV + AI Pacing

FDA Approved | Leadless Pacemaker

World's smallest pacemaker uses AI to detect atrial contractions mechanically **and synchronize dual-chamber pacing without a lead**. AI adapts pacing rate to physical activity in real time.

Caption AI (Caption Health)

FDA De Novo — First AI echo guidance

Real-time AI guidance enables non-cardiologists to acquire diagnostic-quality echocardiograms. Deployed on U.S. Navy ships, rural African clinics, and 200+ telehealth platforms. Acquired by GE HealthCare 2023.

Oncology AI — Deep Dive

SCREENING & EARLY DETECTION

Grail Galleri MCED

Single blood draw detects 50+ cancers. 99.5% specificity; detects Stage I-II cancers with no prior screening standard. NHS rolls out to 1M patients 2025.

iCAD PowerLook (Mammography AI)

FDA-cleared AI reads mammograms **with 8% higher cancer detection rate, 7% fewer false** positives than standard double-reading. Deployed in 8,000+ sites.

Guardant360 CDx (Liquid Biopsy AI)

AI analyses ctDNA for 74 cancer-associated genes in one blood draw. FDA-approved companion diagnostic for 8 targeted therapies. **Replaces tissue biopsy in 40% of NSCLC cases.**

TREATMENT & PRECISION ONCOLOGY

Roche NAVIFY Tumor Board

AI synthesizes genomics, pathology, imaging, and treatment history to generate **personalized therapy recommendations** for MDT tumor board review.

RayStation Adaptive RT AI

AI auto-segments tumors and organs-at-risk in <2 minutes (vs. 4+ hrs). **Enables daily adaptive radiotherapy.** CE/FDA cleared in 80+ countries.

Flatiron Health (Roche AI)

Real-world evidence platform uses AI to extract structured outcomes from 280+ U.S. cancer clinics. Powers FDA drug approvals via EHR-derived evidence.



Neurology AI — Deep Dive

Viz.ai LVO — Stroke

CT-to-alert in <6 min. 500+ hospitals. 52-min faster treatment. Published in NEJM: 15% mortality reduction.

Empatica Embrace2 — Epilepsy

Wrist wearable detects generalized tonic-clonic seizures with 88% sensitivity. FDA De Novo cleared. Smart Alerts notify caregivers.

BrainScope TBI AI

4-minute EEG + AI detects concussion and TBI biomarkers. Deployed in 1,500+ ERs and NFL medical teams.

Mediaware mdstriker — MS Lesion AI

Quantifies MS lesion load and tracks volume change between MRI scans with radiologist-level accuracy. NICE-endorsed for NHS use.

Optina Diagnostics — Alzheimer's Retinal AI

Detects amyloid in retinal vasculature 6 years before cognitive symptoms. Non-invasive. Used in 18 neurology centers.

Rune Labs — Parkinson's

Apple Watch-based passive digital biomarkers (tremor, gait, bradykinesia) quantify symptom burden between clinic visits. Parkinson's outcomes platform.

Surgery & Interventional Procedures AI — Deep Dive

Intuitive Surgical da Vinci 5 + AI Insights

Next-gen robotic platform with built-in force feedback and AI performance scoring. 10M+ robotic procedures logged. **AI Tissue Identification layer identifies critical structures (ureters, nerves) in real time during prostatectomy and colectomy.**

Activ Surgical ActivSight Intraoperative AI

Clip-on AR overlay identifies tissue perfusion, bleeding vessels, and critical anatomical structures during laparoscopic and open surgery. **Reduces accidental bile duct injury (most costly surgical complication) by 40%.**

Touch Surgery Enterprise (Medtronic)

OR video AI captures and analyzes every surgical step. **Identifies protocol deviations, measures operative efficiency,** and delivers performance coaching. Deployed in 100+ hospital systems for quality assurance.

Caresyntax OR Intelligence Platform

Sensor fusion (video, biometrics, equipment data) combined **with AI reduces average case duration by 12%, SSI by 28%, and OR turnover time by 18 minutes.** 3,000+ operating rooms globally.

Philips Azurion + AI Guided Procedures

AI-powered cathlab platform provides real-time guidance for PCI, TAVI, and EP ablation. **Vessel tracking AI reduces contrast usage by 35%.** Deployed in 5,000+ catheterization laboratories worldwide.

Stryker Mako Robotic Total Hip/Knee


CT-based AI surgical plan with intraoperative haptic feedback **ensuring implant positioning within 1mm of plan. Reduces revision surgery rates by 50%.** 1.2M+ Mako procedures completed.

Critical Care / ICU Example

- Deterioration prediction (respiratory failure, shock)

- Ventilator management decision support

- Mortality and length-of-stay prediction



Case Vignette 1: Preventing Sepsis Progression

- A 68-year-old admitted with pneumonia triggers an AI alert for rising sepsis risk 6 hours before clinical deterioration, prompting early antibiotics and ICU consult.



Case Vignette 2: Reducing Readmissions

- A CHF patient flagged as high risk at discharge receives remote monitoring and early follow-up, preventing a 30-day readmission.



Case
Vignette 3:
Population
Health
Impact

- AI identifies a cohort of diabetic patients with rising A1c levels, enabling targeted outreach and medication adjustments before complications occur.

Critical Care & Emergency Medicine AI — Deep Dive

Dascena / Sepsis Sentry

ML detects sepsis 6 hours before clinical criteria met. 95 hospital deployments. Published: 18% reduction in sepsis mortality, \$1.1M annual savings per ICU. Integrates with Epic and Cerner Sepsis Core Measure workflows.

GE Mural Virtual ICU

AI monitors 150+ patients simultaneously from remote command center. Predictive deterioration alerts with 90-minute lead time. Reduces ICU mortality by up to 26% in published outcome studies at Mayo Clinic.

Philips eICU Program

Tele-ICU platform uses AI to flag patient deterioration, RASS monitoring, and ventilator optimization. Covers 11% of all U.S. ICU beds. 15-18% mortality reduction in CHEST-published studies.

Infermedica AI Triage

NLP symptom checker + AI triage processes 10M+ interactions/month. Deployed in 110+ health systems globally. Reduces non-urgent ED visits by 32%; integrates with 911 dispatch in 3 U.S. states.

Eko CORE + Murmur AI

AI digital stethoscope detects murmurs, AFib, S3 gallop in real time. 96% sensitivity for aortic stenosis. Deployed aboard U.S. Navy ships, rural health posts in sub-Saharan Africa. \$70M Series D raised 2024.

Clew Medical — ICU Readmission AI

Predicts ICU readmission 24 hours before step-down decision with 85% AUC. Allows proactive intervention to prevent bounce-back. Reduces ICU readmission by 38% in 4 published studies.

Primary Care & Documentation AI — Deep Dive

Nuance DAX Copilot (Microsoft)

Ambient AI listens to the patient-physician conversation and auto-generates a structured SOAP note in seconds. **Physicians report 70% reduction in documentation burden and 40+ minutes saved per day.** Deployed at 200+ U.S. health systems including Kaiser, Intermountain, and 200+ Atrium Health sites.

Suki AI Clinical Voice Assistant

Voice-activated EHR commands, note dictation, and smart structured data capture. **Reduces time per note by 72%.** 200+ health systems deployed. AI learns individual physician preferences. \$70M Series D (2023).

Babylon Health + AI Triage

AI-powered symptom assessment and GP consultation platform with 24M+ users in 15+ countries. Published GP MRCGP equivalence study (Royal College). Partnered with NHS 111 online for 3M triage interactions/year.

K Health — AI Primary Care

AI matches patient symptoms against 2B+ data points from physician diagnoses. **Provides treatment recommendations and prescription generation.** Used by Cedars-Sinai, Maccabi, and Anthem as primary care front door.

Ada Health — Symptom Assessment AI

Medical-grade AI assessment engine. 14M+ users. 60+ peer-reviewed validations. Class IIa CE-marked medical device. Powers first-contact triage in Bupa, Allianz, and 40+ national health systems globally.

Abridge — Medical Conversation AI

LLM-powered ambient scribe generates specialty-specific SOAP notes from visit recordings. Integrates into Epic. Piloted at UPMC, Stanford, and Duke. 8-second note generation post-visit. \$30M Series B 2024.

Mental Health & Behavioral Health AI — Deep Dive

Woebot Health — Conversational CBT

FDA Breakthrough Device for MDD and PPD. 150+ randomized controlled trials. Published 22% PHQ-9 reduction in 2 weeks. 1M+ users. Deployed at 40+ employer and health plan partners including Johnson & Johnson.

Kintsugi — Voice Biomarker AI

Detects depression and anxiety from 20 seconds of free speech with 80%+ accuracy for each. Integrates into telehealth calls silently. Flags high-risk patients for immediate provider follow-up. FDA breakthrough device.

Limbic Access — NHS Mental Health

AI referral and assessment platform for IAPT services. Cuts waiting list time by 40%. NICE evidence reviewed. 110+ NHS trusts deployed. Assessment accuracy equivalent to trained clinician IAPT workers.

Spring Health — Mental Health Matching AI

AI matches patients to optimal therapist, modality (CBT, DBT, EMDR), and care intensity within 48 hours. Used by 450+ employers. Published: 63% symptom remission vs. 40% industry average.

Ellipsis Health — Voice Analytics

3-minute voice assessment for depression (PHQ-9) and anxiety (GAD-7). Validated against clinical gold standards in 4 peer-reviewed studies. Integrates into annual wellness visits and call center triage.

Headspace Health / Ginger AI

AI matches users to peer coaches, therapists, or psychiatrists based on acuity scoring. 2,700+ employer partners. AI coaching chat reduces acute symptom burden within 2 weeks in 65% of users.

SECTION 05

Sub-Specialty Clinical Details

OB/GYN • Pediatrics • Gastroenterology • Nephrology • Infectious Disease

Slides 22–26 • 28–34 Minutes

OB/GYN & Maternal-Fetal Medicine AI — Sub-Specialty Details

Sonio AI — Fetal Anomaly Ultrasound

CE-marked AI analyzes fetal anatomy scans, **detecting 33 structural anomalies with 96% sensitivity**. Auto-generates ISUOG-compliant structured reports. Deployed at 200+ sites in France, UK, Germany, and U.S. Reduces missed congenital defects by 45%.

Preeclampsia AI (Lifelight / Third Star Medical)

Camera-based AI measures blood pressure, heart rate, and SpO2 without contact. **Identifies preeclampsia risk at 11–13 weeks with 90% sensitivity** using combined markers (uterine artery pulsatility + PLGF + MAP). Deployed in 30+ NHS maternity trusts.

Gauss Surgical — Blood Loss AI

iPad-based AI analyzes surgical sponges and suction canisters via computer vision **to quantify blood loss in real time during childbirth**. FDA 510(k) cleared. Reduces under-estimation of hemorrhage by 50%, preventing delayed transfusion.

Teal Wand — At-Home Cervical Cancer AI

Self-collected cervical sample at home analyzed by AI pathology platform. Equivalent accuracy to clinician-collected Pap smear. Targeting the 50% of cervical cancers occurring in women without recent screening.

Cognoa Canvas Dx — Autism in Pediatrics

FDA De Novo authorized AI diagnostic aid for ASD in children 18 months–6 years. Parents record behaviors at home; algorithm analyzes against 2M+ behavioral data points. Delivers diagnosis in weeks vs. 18-month national average wait.

Nuvation Bio / neoSCORE — Neonatal Risk

ML risk stratification model for preterm neonates predicts sepsis, NEC, and IVH with 78% AUC using routine NICU vitals. Integrated into bedside monitors at 45 NICUs. Published in Pediatrics 2024.

Gastroenterology & Endoscopy AI — Sub-Specialty Details

Medtronic GI Genius™ — Polyp Detection

FDA De Novo cleared **real-time AI detects colorectal polyps during colonoscopy with 14% higher adenoma detection rate (ADR)** vs. standard colonoscopy. Published in Lancet 2020. 200+ sites globally; reduced interval colon cancer rate by 28%.

Olympus EndoBRAIN — AI Polyp Characterization

NBI endoscopy AI distinguishes adenomatous from hyperplastic polyps with **98% specificity** — enabling 'resect and discard' strategy for diminutive polyps. Estimated \$1B annual savings in unnecessary pathology costs in the U.S. alone.

Fujifilm CAD EYE — Dual AI (Detection + Characterization)

Combined real-time polyp detection AND tissue characterization AI in a single integrated system. CE marked for clinical use. First dual-function AI endoscopy system approved in Japan, EU, and U.S.

AI Capsule Endoscopy (Given Imaging / Medtronic)

AI reads 50,000-frame small bowel capsule videos in 10 minutes vs. 45 min+ for manual review. **Detects bleeding, ulcers, Crohn's lesions, and angioectasias with 95% sensitivity.** Deployed at 2,000+ GI labs worldwide.

Nephrology, ID & Pulmonology AI — Sub-Specialty Details

NEPHROLOGY

Renalytix AI — KidneyIntelX

FDA Breakthrough Device. **Blood biomarker AI predicts 5-year kidney failure risk with 74% AUC.** Changes CKD management for 37M Americans. Integrated into Epic for 400K+ NYU patient panel.

Proton Medical / AKI AI

AI flags acute kidney injury onset 48 hours early from routine labs + vitals. Published NEJM 2019 — **9.4% reduction in AKI-related ICU admissions** at Royal Free London.

INFECTIOUS DISEASE

BioMérieux MYLA Platform

AI interprets antimicrobial susceptibility testing results and recommends optimal antibiotic therapy. Deployed in 2,400+ clinical labs; reduces time-to-optimal-therapy by 18 hours.

BlueDot / Metabiota — Outbreak AI

BlueDot AI first flagged COVID-19 on Jan 6, 2020 — 9 days before WHO alert. Real-time infectious disease surveillance using NLP + airline data + climate models.

PULMONOLOGY

Respira Labs & Continuum — Lung AI

AI spirometry analysis from standard microphone detects COPD with 90% AUC. Eliminates need for dedicated spirometer in primary care and telemedicine settings.

Siemens AI-Rad Companion (Chest CT)

Fully automated chest CT analysis: lung nodule detection, liver volume, bone density — all from one CT scan. **Reduces radiologist workload per study by 35 minutes.**

Orthopedics, Ophthalmology & ENT AI — Sub-Specialty Details

ORTHOPEDECS

Imagen OsteoDetect

FDA De Novo: AI detects distal radius fractures in wrist X-rays with 90%+ sensitivity in the ED. 800+ emergency departments. Reduces missed fracture rate by 70%.

Stryker Mako SmartRobotics

CT-based AI surgical plan + haptic robotic execution. ≤1mm accuracy for hip and knee replacement. 50% lower revision rate. 1.2M+ procedures completed.

OPHTHALMOLOGY

Google DeepMind / Moorfields

AI detects 50+ eye diseases from OCT scans with 94% accuracy matching world-leading ophthalmologists. Analyzes 10,000 patients/day at Moorfields. Nature Medicine validated.

IDx-DR Diabetic Retinopathy

First fully autonomous FDA-cleared AI diagnostic — screens for diabetic retinopathy without an ophthalmologist. Used in 400+ primary care clinics, reaching 1.5M underscreened diabetics.

ENT & OTOLARYNGOLOGY

Cochlear / MED-EL AI Mapping

AI-powered cochlear implant programming maps individual electrode-to-frequency assignments automatically, reducing audiologist sessions from 10 visits to 2-3 for new implant recipients.

Thirona LungQ / Hearing AI

AI audiogram interpretation and hearing aid fitting adjustment. Reduces specialist clinic bottleneck. Deployed in 300+ audiology centers in EU and Australia.

SECTION 06

Near-Future Roadmap 2026 – 2030

Slides 27–30 • 34–39 Minutes

Near Future: 2026 — What's Happening Now & Imminent

Multimodal LLMs Embedded in EHR

GPT-4o, Med-Gemini, and Claude integrated directly into Epic/Cerner workflows. Physicians ask natural language questions, get drug interaction alerts, and receive differential diagnoses contextual to the full patient record — at the point of care.

AI Digital Twins for Surgical Simulation

Patient-specific 3D organ models built from CT/MRI enable surgeons to rehearse complex procedures pre-operatively. Siemens Healthineers, EchoPixel, and Surgical Theater have working platforms. Expected to be standard for high-risk surgery by 2027.

FDA Continuous Learning AI Framework

FDA's Predetermined Change Control Plan (PCCP) framework allows AI models to retrain on new data without re-submission. First approvals expected Q3 2026 — removes biggest regulatory barrier to adaptive clinical AI.

Ambient AI in Every Exam Room

Microsoft/Nuance DAX, Abridge, and Suki project >500,000 clinicians using ambient documentation AI daily by end of 2026. Structured data capture replaces free-text notes, enabling population health analytics at scale.

AI Formulary & Utilization Management

Prior authorization AI (Cohere Health, Olive AI) processes 40M+ requests/year with 92% instant approvals, eliminating weeks of delay for specialty drugs, imaging, and procedures.

Real-Time Sepsis Prevention Bundles

Epic Sepsis Prediction Model (in 1,000+ hospitals) + Dascena + PeraHealth combine **AI alerts with automated nursing order sets**, targeting zero preventable sepsis deaths in enrolled hospitals by Q4 2026.

Near Future: 2027–2028 — Medium-Term Transformations

2027

- **Liquid biopsy** MCED panels (Grail Galleri, Guardant, Foundation Medicine) approved for population screening by CMS — joins mammography and colonoscopy as standard preventive care
- AI-driven drug repurposing cuts Phase I trial failures by 30% via virtual patient populations and AI-predicted **toxicity profiles** (Insilico, Schrodinger, Exscientia)
- WHO Digital Health Strategy milestone: 50+ countries deploy AI-powered diagnostic tools for TB, malaria, and maternal health in low-resource settings
- Autonomous **AI ECG interpretation in ICU** replaces manual review — continuous rhythm monitoring with alarm prioritization reduces alert fatigue by 60%

2028

- Autonomous AI agents coordinate multi-specialty care episodes end-to-end: **referral, scheduling, pre-authorization, care plan generation**, and outcome tracking — without physician data entry
- **Wearable micro-biosensor arrays** (glucose, lactate, cortisol, creatinine) feed continuous AI chronic disease models — replaces quarterly clinic visits for 70% of stable chronic conditions
- AI-designed personalized **mRNA therapeutics for rare diseases**: 18-month discovery-to-IND cycle becomes standard for orphan drug development (Moderna AI, Deep Mind, BioNTech AI)
- Surgical robotics achieve **Level 3 autonomy** (conditional autonomous execution of routine sub-tasks with surgeon oversight) — FDA framework for autonomous surgery expected

Near Future: 2029–2030 — The AI-Native Healthcare System

Closing the Global Health Gap

WHO projects AI will close 50% of global specialist shortage gap via telepathology, AI diagnostics, and autonomous triage. A rural clinic in Sub-Saharan Africa will have access to radiologist-level imaging AI, genomic sequencing interpretation, and oncology decision support.

Predictive + Preventive Medicine at Scale

Polygenic risk scores + AI lifestyle modeling = population-level precision prevention. 10-year disease risk calculated at birth. Personalized prevention plans update dynamically with wearable data. Reactive medicine becomes the exception.

Semi-Autonomous Surgical Systems

AI-powered surgical robots perform routine procedures (cholecystectomy, hernia repair, cataracts) semi-autonomously in under-resourced or rural settings with remote physician oversight. Expands surgical access to 5 billion people currently without safe surgical care.

AI-Orchestrated Continuous Care

Every patient has a personalized AI health agent monitoring vitals, labs, behavior and automatically coordinating care interventions. Hospitalizations for CHF, COPD, and diabetic complications reduced by 60%+ via continuous remote monitoring + proactive AI outreach.

SECTION 07

Governance, Ethics & Equity

Slides 31–33 • 39–42 Minutes

Regulatory Landscape — FDA, EU AI Act & Global Frameworks

US USA (FDA)

- **521+ AI/ML-based devices cleared by end of 2025 — 75% in radiology**
- Predetermined Change Control Plan (PCCP): allows AI models to retrain without re-submission — effective 2026
- Total Product Life Cycle (TPLC): ongoing post-market surveillance required for all AI devices
- SaMD (Software as a Medical Device) classification: Class I–III risk-based tiering from De Novo to PMA

EU EU AI Act (2024)

- Healthcare AI classified as 'High Risk' — Article 6 mandatory requirements apply
- Conformity assessment, CE certification, and algorithmic transparency disclosures required
- Prohibited: emotion recognition AI in clinical settings without explicit consent
- National competent authorities must maintain public database of all high-risk AI systems by 2026

UK / Global

- NICE Evidence Standards Framework: clinical and economic evidence requirements for AI medical devices
- MHRA AI Roadmap 2023–2025: automated approval pathway for AI modifications that stay within approved parameters
- WHO AI Ethics Principles (2021): human oversight, transparency, accountability across 194 member states
- G7 Hiroshima AI Process: international interoperability standards for AI health device evidence by 2027

AI Bias, Equity & Clinical Integration Challenges

Algorithm Bias & Disparities

- Pulse oximeter AI: NEJM 2020 — 3× higher error rate in darker skin tones. Now triggers FDA labeling change for all sold in U.S.
- Epic Sepsis Model: independent audit found 63% false positive rate in minority populations vs. 48% in White patients
- NIH BRIDGE-AI program: \$130M to build fairness testing frameworks and diverse training dataset repositories
- Mandatory bias auditing required for all high-risk EU AI Act devices — coming to U.S. via proposed CMS rule 2026

Clinical Integration Failures

- **Alert fatigue:** AI systems generating 100+ alerts/day result in 95% override rates — signal drowns in noise without smart prioritization
- 60% of AI deployments fail due to poor EHR integration, not algorithm performance (JAMIA 2024 systematic review)
- Workflow friction: AI that requires a separate login, screen, or tab has <10% sustained adoption at 6 months
- The 3 keys to successful AI adoption: embedded EHR integration, clinical champion, and pre/post outcome measurement

Liability, Privacy & Trust

- AMA + CMS working group on AI adverse event liability — no consensus framework yet; individual state tort law varies
- HIPAA-compliant federated learning: multi-site AI training without data leaving institutions (key for rare diseases)
- Patient trust gap: Accenture survey shows 57% of patients uncomfortable with AI making primary diagnosis without physician review
- Synthetic data generation (Google SynthID, Synthetiq) enables AI training at scale without real PHI — FDA accepted 2025

SECTION 08

Action Framework & Closing

Slides 34–38 • 42–45 Minutes

Action Framework for Healthcare Providers — Phase 1 & 2

PHASE 1: ASSESS

Now — Month 2

Conduct AI Readiness Audit

Map current AI tools in use (often 15+ undiscovered tools). Identify top 3 clinical pain points where AI ROI is highest: documentation burden, imaging backlog, sepsis detection.

Form AI Governance Committee

Include: CMO, CIO, CNO, Legal, Ethics, frontline clinicians, and patient rep. Define risk tolerance, approval criteria, and post-deployment monitoring requirements.

Baseline Your Metrics

Establish pre-AI benchmarks for target use cases: diagnostic accuracy rates, time-to-treatment, documentation hours, alert override rates. You cannot manage what you cannot measure.

Inventory Regulatory Status

Catalog all AI tools by FDA clearance status, regulatory classification, and evidence level. Uncleared tools in clinical pathways create significant liability

PHASE 2: PILOT

Month 2–8

Select 1-2 Evidence-Backed AI Tools

Choose FDA-cleared tools with prospective clinical validation data. Prioritize EHR-integrated tools — standalone systems have <10% sustained adoption at 6 months.

Design Prospective Clinical Pilots

Pre-define KPIs: time savings, diagnostic accuracy, clinician satisfaction, patient outcomes. IRB review for data collection. Control arm comparison where feasible.

Build Clinical Champion Network

Identify 3-5 peer physician champions per department. Peer-led adoption drives 3x faster deployment and 65% higher sustained use than top-down mandates.

Train and Communicate

All clinical staff need AI literacy basics: what the model does, its limitations, when to override, how to report concerns. Embed in onboarding and CME/CEU

Action Framework for Healthcare Providers — Phase 3 & 4

PHASE 3: SCALE

Month 8–18

EHR Integration & Alert Optimization

Embed AI outputs directly into clinical workflow — no extra logins. Standardize alert thresholds to minimize fatigue. Require AI vendors to provide tiered urgency classification.

Vendor Accountability & Monitoring

Require annual bias audits, performance drift reports, and diverse validation data from all AI vendors. Include AI performance SLAs in all procurement contracts.

System-Wide AI Literacy Training

AI literacy as mandatory CME/CEU for all licensed staff. Curriculum: model basics, limitations, override responsibilities, and reporting. 2-hour annual requirement.

Financial ROI Measurement

Calculate ROI on piloted tools: hours saved × FTE cost + adverse event reduction + imaging cost avoidance. Publish results internally to build institutional

PHASE 4: LEAD

18 Months+

Publish Outcomes — Build the Evidence

Submit results to peer-reviewed journals, FDA MAUDE, and CMS quality registries. Healthcare providers who publish AI outcomes data shape national standards of care.

Academic Partnership for Validation

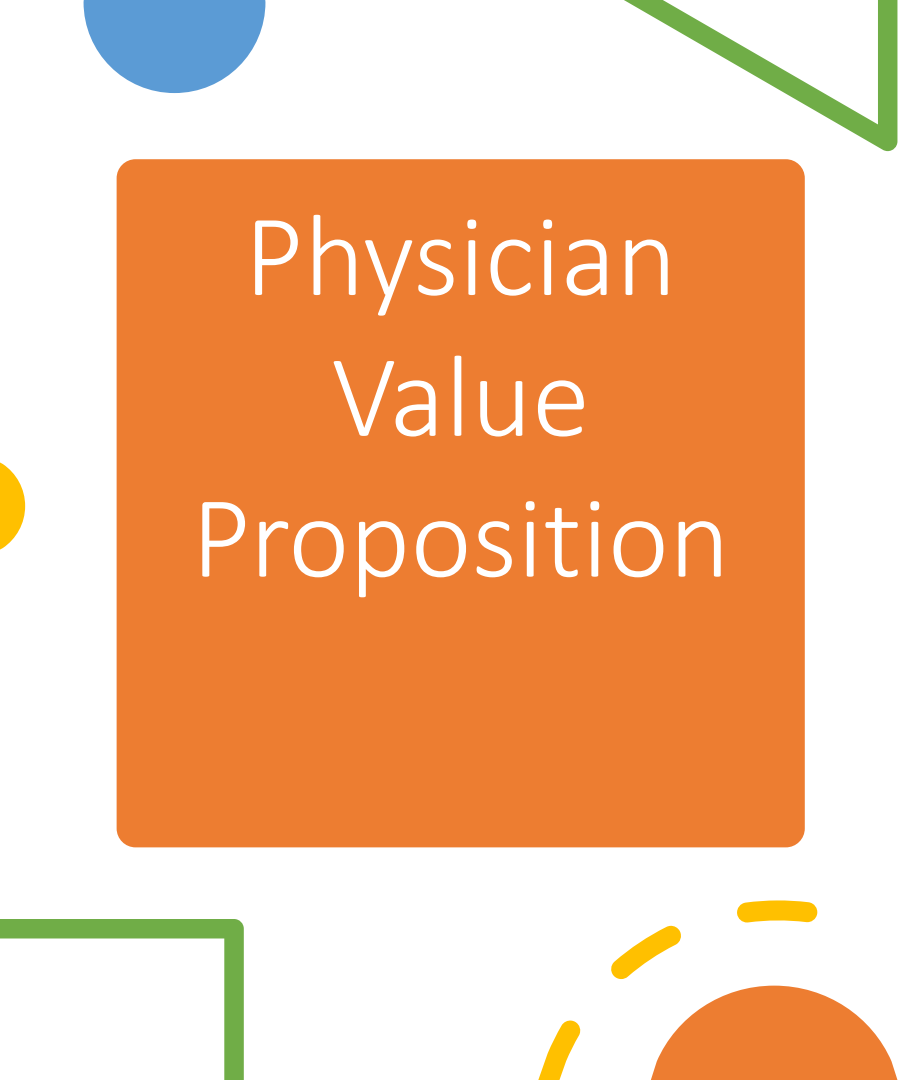
Partner with universities for IRB-approved continuous learning validation studies. Enables model improvement while building publication pipeline and regulatory goodwill.

Equity-First AI Procurement

Mandate diverse training data standards in all new AI RFPs. Require vendors to disclose performance stratified by race, sex, age, and socioeconomic status before final procurement.

Advocate for AI Policy

Engage AMA, specialty societies, and CMS on fair reimbursement models for AI-augmented care. AI that saves time and improves outcomes must be reflected in



Physician Value Proposition

- Earlier intervention
- Fewer preventable adverse events
- Less cognitive burden
- More time for patient care



Key Takeaways

- AI supports physicians at the point of care while improving quality metrics, patient safety, and public health outcomes.

The AI-Powered Future of Medicine

is not coming — it is already here.

- ✓ 521+ FDA-cleared AI tools already in clinical use across all specialties
- ✓ \$188B market by 2030 — largest transformation in healthcare history
- ✓ Ambient AI saves 40+ min/physician/day — deploy documentation AI now
- ✓ AI will close 50% of global specialist shortage gap by 2030 (WHO)
- ✓ Providers who lead AI adoption will define tomorrow's standard of care



Tools

HOW TO USE AI FOR POWERPOINT

Microsoft Copilot vs ChatGPT vs Claude

Tool Links to PowerPoint

Microsoft Copilot:

Lives inside PowerPoint as a chat pane on the Home ribbon. No extra install needed; works within Microsoft 365.



ChatGPT:

Can't create .pptx files natively. Paid ChatGPT Agent can generate downloadable slides, but most users still copy content manually into PowerPoint.



Claude:

Available as a Microsoft 365 add-in through AppSource. Paid users can create, edit, and refine native slides directly inside PowerPoint.



Limitations you should know

1 Microsoft Copilot:

May invent stats; layouts need design tweaks.

2 Claude:

No chat history, limited to current file, no Microsoft 365 integration; still in preview.

3 ChatGPT:

Can't use corporate templates or see existing slides; output is basic.

What each tool can do

Microsoft Copilot:

- Creates slides, headers, bullets, and adds images/SmartArt from a prompt.
- Generates speaker notes and translates slides.
- Agent Mode edits directly and handles multi-step tasks.
- Pulls content from Word or PDF to build slides.
- Explains selected text, tables, or slides instantly.
- Accesses SharePoint for approved, brand-consistent assets.



ChatGPT:

- Creates outlines, persuasive copy, and design ideas in one chat.
- Organizes content with storytelling frameworks (Problem-Solution, Before-After, SCQA).



Who should use what?



Copilot:

Best for Microsoft 365 users needing AI that pulls from emails, Teams, and SharePoint.



ChatGPT:

Ideal for content strategy, outlines, and speaker notes; pair with a design tool.



Claude:

Great for brand-consistent, editable slides; works best for Pro/Enterprise subscribers.

The smartest in 2026

summary

- **AI cannot experience suffering, moral responsibility, or clinical accountability.**
- **- It cannot replace clinician judgment in critical areas such as diagnosis, prognosis, consent, or goals-of-care discussions.**
- **- AI does not own trust, meaning, or professional duty.**
- **The ideal approach is to implement human-centered AI that augments rather than replaces human roles. This involves transparent, supervised, and clinician-governed use, ensuring that humans remain ethically, emotionally, and decisively involved in patient care.**
- **In summary, while AI can help express compassion at scale, the responsibility, trust, and care must always reside with clinicians**

Enjoy
the day



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