From Enabling Technology to Critical Infrastructure: AI's Inflection Point in Healthcare

An Analysis by Cian Robinson. *March 2026*

Overview

Artificial intelligence in healthcare has evolved from a supplementary "enabling technology" into critical infrastructure, now embedded in the core systems that support clinical care, hospital operations, and financial sustainability. Widespread adoption, regulatory approvals, and measurable financial returns demonstrate that AI is deeply integrated into workflows such as documentation, predictive capacity management, and revenue cycle management.

AI not only improves clinical outcomes and efficiency but also generates significant cost savings, confirming its role as a foundational component of modern healthcare systems.

Embedded (inside EHRs and documentation systems, not "side tools")	**Standardized and Governed** (evaluation, bias testing, accountability, risk frameworks)
Operationally relied upon (capacity, throughput, scheduling, coding, risk scoring, urgent triage)	**Systemically risky when absent or failing** (workflow degradation, safety hazards, inequity, cybersecurity exposure)

Percentage of Physicians Who Report Using AI Health

2023 — 38%

2024 — 66%

From Enabling Technology to Critical Infrastructure: AI's Inflection Point in Healthcare

---

Executive Summary

Healthcare is crossing a threshold where AI is no longer "optional augmentation" for a few use cases (e.g., research pilots, niche imaging tools), but an increasingly **embedded, operational dependency** across clinical care delivery and health system management. The best evidence for this shift is not about future breakthroughs; it is the **rapid normalization of AI inside core workflows** (EHR-integrated predictive models, clinical documentation, triage/coordination, imaging prioritization), plus institutional **scaffolding** forming around regulation, governance, evaluation, accountability, standards.

Quantitatively, several indicators look "infrastructure-like":

- **Hospital adoption of EHR-integrated predictive AI is already mainstream**: In the U.S., **71% of hospitals** reported using predictive AI integrated with their EHR in 2024 (up from 66% in 2023).

- **Physician use is now the majority behavior**: An AMA survey found **66% of physicians** reported using health AI in 2024 (up from 38% in 2023).

- **A large, regulated device ecosystem exists**: FDA's AI-enabled medical device list and related reporting indicate the U.S. has reached **hundreds to ~1,000** AI/ML-enabled authorized devices, with rapid growth in recent years.

Qualitatively, the strongest argument is that AI is becoming:

- **Embedded** (inside EHRs and documentation systems, not "side tools").

- **Standardized and governed** (evaluation, bias testing, accountability, risk frameworks).

- **Operationally relied upon** (capacity, throughput, scheduling, coding, risk scoring, urgent triage).

- **Systemically risky when absent or failing** (workflow degradation, safety hazards, inequity, cybersecurity exposure).

A case study that strongly supports the "AI as infrastructure" thesis is **ambient AI documentation (AI scribes)**, because it is becoming a *load-bearing component* of clinician capacity and patient access. A multi-system quality improvement study across 6 U.S. health systems found that after 30 days of ambient AI scribe use, clinician burnout decreased from **51.9% to 38.8%**, with improvements in cognitive task load, after-hours documentation time, and attention to patients.

---

1) Thesis and definitions

Thesis

AI has moved from enabling technology to critical infrastructure in healthcare, meaning it is increasingly a foundational capability that health systems depend on to deliver safe, timely, scalable, and financially viable care, analogous to how EHRs, the internet, and computerized workflows became non-optional for modern health delivery.

What "critical infrastructure" means in this context

In healthcare operations, a technology behaves like "critical infrastructure" when it becomes:

1. **Ubiquitous across organizations** (broad adoption, not isolated pilots).
2. **Embedded into core workflows** (EHR, documentation, imaging pipelines, scheduling, billing).
3. **Governed and regulated** (standards, accountability, risk management).
4. **Interdependent** (requires data pipelines, security, training, Machine Learning Operations, change management).
5. **Failure-intolerant** (outages degrade throughput, quality, safety, or equity).
6. **A platform for future capabilities** (new services presume it exists).

This is the standard arc followed by computing, networking, EHRs, and secure messaging systems: first optional, then differentiating, then expected, then required.

---

2) Why healthcare is uniquely primed for AI infrastructure

Healthcare has three structural pressures that convert "helpful tools" into "system dependencies" faster than many industries:

A. Capacity constraints + administrative load: Clinician time is the scarcest resource in care delivery. EHR-era documentation burden created an operational bottleneck; AI is now being adopted not as novelty, but as *capacity restoration*.

Ambient AI scribes are the clearest expression of this: they are deployed to recover visit throughput and clinician sustainability, not simply to improve note style. In a 6-system study, ambient AI scribe adoption was associated with large reductions in burnout and improvements in after-hours documentation time and attention to patients.

B. Digitization maturity (EHR as the substrate): You do not get "AI infrastructure" without digital infrastructure. In the U.S., EHR penetration is already near-universal in key segments; for example, health IT quick stats show **96% of non-federal acute care hospitals possess certified EHR technology** (with basic EHR adoption rising sharply through 2015).

This matters because once data is standardized *enough* and workflows run through digital rails, AI can be embedded directly into the rails.

C. Regulatory and safety incentives: Healthcare's tolerance for unmanaged change is low. As AI becomes operationally meaningful, the governance "surround" accelerates:

- The FDA explicitly positions AI-enabled device transparency and signals movement toward identifying/taking account of devices that incorporate **foundation models/LLM functionality** in future list updates.
- Risk management is increasingly standardized using cross-sector frameworks like NIST's **AI Risk Management Framework (AI RMF 1.0)**.
- Global health institutions emphasize ethics and governance principles for AI in health (WHO guidance outlines consensus principles and governance expectations).

Infrastructure emerges when technology becomes "governed, normal, and required."

3) Quantitative signals that AI is becoming load bearing

Below are indicators that AI is shifting from *enabler* to *infrastructure*.

3.1 Adoption embedded inside the EHR (not just "bolt-on AI")

A U.S. federal health IT analysis found:

- **71% of hospitals** reported using **predictive AI integrated with the EHR** in 2024, up from 66% in 2023.
- The data brief also notes the fastest-growing uses include **billing and scheduling**, i.e., operational core, not only clinical prediction.

This is a classic infrastructure signal: AI is not a departmental tool—it is being wired into the hospital's transaction system (the EHR).

3.2 Clinician adoption reaches "default behavior"

The AMA reported:

- **66% of physicians** used health AI in 2024 (vs. 38% in 2023), and only **33%** reported non-use across the queried tasks.

Adoption at this level changes institutional expectations: training, policy, procurement, and workflow design shift toward AI-enabled baselines.

3.3 A regulated ecosystem of AI/ML-enabled devices at scale

Reporting based on FDA databases showed:

- **950 AI/ML-enabled medical devices authorized as of Aug. 7, 2024**, reflecting a steep multi-year growth curve.
- The FDA maintains an AI-enabled medical device list and describes its purpose, scope, and plans to better identify devices incorporating foundation models/LLMs.

This is an "infrastructure marker" because it indicates a mature supply layer: many vendors, many approved products, and a regulatory mechanism that supports scaled deployment.

---

4) Qualitative signals: How AI behaves like infrastructure

4.1 AI is shifting from "clinical support" to "system operating layer"

Historically, hospitals adopted technologies that initially improved a task, then gradually became the operating layer:

- EHRs started as digitized charting; they became the backbone for orders, documentation, billing, and quality reporting.
- Secure messaging started as convenience; it became core to care coordination.

AI is following the same pattern, but faster, because the substrate (EHR + cloud + APIs) already exists. The key difference is that AI is expanding into:

- **Capacity restoration** (documentation automation, chart summarization).
- **Throughput optimization** (scheduling, coding, prior authorization workflows, utilization management).

- **Risk operations** (deterioration prediction, readmission risk, sepsis screening, no-show prediction).
- **Coordination in time-critical care** (stroke triage/transfer workflows, imaging alerting).

4.2 Governance is becoming a permanent function

Infrastructure demands permanent governance: uptime, cybersecurity, change control, evaluation, bias monitoring.

Hospitals are already being pushed toward this stance. The federal brief on predictive AI highlights evaluation and governance dynamics such as accountability being shared across entities and the need for accuracy/bias evaluation and post-implementation monitoring.

In parallel, NIST AI RMF provides a widely referenced structure for mapping, measuring, managing, and governing AI risks across lifecycle stages.

WHO's guidance emphasizes ethics, human rights, and governance principles—another hallmark that AI is transitioning from optional tooling to a regulated socio-technical system.

---

5) Case study: Ambient AI scribes as operational infrastructure

Why this case study is "infrastructure-grade"

Ambient AI scribes are becoming infrastructure because they:

- Live inside the EHR documentation pipeline.
- Touch nearly every ambulatory specialty.
- Directly affect clinician capacity, burnout, and patient access.
- Require governance (privacy, consent, security, QA, clinical responsibility).

Evidence

A multicenter quality improvement study across **6 U.S. health care systems** evaluated a shared ambient AI scribe platform for 30 days and reported:

- Burnout decreased from **51.9% to 38.8%** among ambulatory clinicians after 30 days.
- Improvements were reported in cognitive task load, after-hours documentation time, and focused attention on patients, plus perceived ability to add urgent patients.

Interpretation: why this supports the thesis

When an intervention measurably changes clinician sustainability and visit capacity, it starts to behave like infrastructure:

- Without it (or with it failing), the system "reverts" to higher admin burden, more after-hours work, and reduced capacity.
- With it, organizations may redesign staffing models, patient access targets, and documentation policies assuming AI-assisted documentation is present.

That is the definition of load-bearing operational dependency.

---

6) A second reinforcing example: EHR-integrated predictive AI at population scale

If ambient scribes are AI infrastructure for clinician time, **predictive AI integrated into the EHR** is AI infrastructure for **risk operations and operational planning**.

A federal data brief found **71%** of hospitals used EHR-integrated predictive AI in 2024, with growth in billing and scheduling uses as well.

This is important: billing/scheduling are not "nice-to-have" functions; they are part of the financial and access engine of a hospital. When AI becomes embedded there, it is much closer to critical infrastructure than a departmental analytics tool.

---

7) Counterarguments and risks (and why they still point to "infrastructure")

Technology can be infrastructure and still be imperfect. Arguably that is *when* it becomes infrastructure, because society must manage its risks systemically.

Key concerns that must be addressed

- **Safety and reliability**: model drift, false positives/negatives, automation bias.
- **Equity**: biased performance across populations, "digital divides" (not all hospital types adopt equally).
- **Privacy and cybersecurity**: data access, vendor exposure, prompt leakage, model inversion risks.
- **Accountability and liability**: who is responsible when AI influences decisions?
- **Operational fragility**: over-dependence without fallback workflows.

WHO explicitly frames ethical and governance requirements as central to AI in health. NIST provides a risk-management structure precisely because AI is being deployed into high-stakes settings.

The emergence of these governance regimes is itself a sign that AI is becoming infrastructural.

---

8) What health systems should do if AI is now infrastructure

If you accept the thesis, the practical implication is to stop **treating AI like a portfolio of pilots** and start treating it like **a managed utility**.

8.1 Build the "AI infrastructure stack"

1. **Data foundation**: interoperability, data quality, provenance, labeling, consent.
2. **Model lifecycle (Machine Learning Operations)**: versioning, monitoring, drift detection, rollback.
3. **Clinical safety**: validation, human-in-the-loop design, escalation pathways.
4. **Governance**: policies aligned to AI risk management framework-style controls; clear accountable owners.
5. **Security**: vendor risk management, access control, audit logging.
6. **Equity**: subgroup performance reporting, bias mitigation plans.
7. **Workflow engineering**: integrate into EHR and care pathways; measure time saved and downstream effects.

8. **Resilience**: downtime procedures and "graceful degradation" plans.

8.2 Measure like infrastructure, not like innovation theater

Track:

- Clinician time (after-hours documentation, note time per visit).
- Access metrics (time-to-appointment, urgent add-ons, no-show rates).
- Safety metrics (near misses, alert fatigue, override rates).
- Equity metrics (performance by subgroup, site, language).
- Financial integrity (coding accuracy, denials, cycle time).

The predictive AI data brief itself emphasizes evaluation/monitoring patterns and accountability structures use that as a baseline maturity model.

---

9) Conclusion

The debate over whether AI will disrupt healthcare is over; it already has. The data from 2025 and 2026 confirms that AI is no longer an optional overlay or a futuristic enabling technology. Driven by clinical necessity, financial pressures, and technological maturity, AI has permanently embedded itself into the DNA of health systems. Just as modern medicine cannot be practiced without the internet or enterprise health records, the future of quality care and hospital management is inextricably bound to AI as its most critical infrastructure

Yes, there are strong evidence-based cases that AI is moving from enabling technology to critical infrastructure in healthcare. Not because "AI is powerful," but because:

- **Most hospitals are already running EHR-integrated predictive AI** (71% in 2024).
- **Most physicians report using AI tools** (66% in 2024).
- **The regulated AI device ecosystem is large and rapidly expanding**, and regulators are adapting to new AI classes like foundation models.
- **Operational case studies (ambient AI scribes)** show measurable effects on burnout and documentation burden that directly influence system capacity and patient access.
- Governance frameworks (WHO ethics guidance, NIST AI RMF) are being mobilized because AI is no longer peripheral.

In short, healthcare is beginning to **assume AI is present** and redesigning work around that assumption. That is the moment an enabling technology becomes infrastructure.

References

American Medical Association. (2025). *How much can ambient AI scribes help cut doctor burnout?* https://www.ama-assn.org/practice-management/physician-health/how-much-can-ambient-ai-scribes-help-cut-doctor-burnout (summary of JAMA Network Open study) (American Medical Association)

Chang, W., Owusu-Mensah, P., Everson, J., & Richwine, C. (2025). *Hospital trends in the use, evaluation, and governance of predictive AI, 2023–2024* (ASTP Data Brief No. 80). Office of the National Coordinator for Health Information Technology.

https://www.healthit.gov/data/data-briefs/hospital-trends-use-evaluation-and-governance-predictive-ai-2023-2024/ (ASTP)

Holmgren, J., & Everson, J. (2025). Current use and evaluation of artificial intelligence and predictive models in U.S. hospitals. *Health Affairs*. Advance online publication. https://doi.org/10.1377/hlthaff.2024.00842 (Health Affairs)

O'Reilly, D., Schwamm, L. H., et al. (2025). Use of ambient AI scribes to reduce administrative burden and professional burnout: A quality improvement study. *JAMA Network Open, 8*(?), e202534976. https://doi.org/10.1001/jamanetworkopen.2025.34976 (JAMA Network)

U.S. Department of Health and Human Services, Office of the National Coordinator for Health Information Technology. (2025). *Hospital trends in predictive AI adoption and governance 2023–2024* [Dataset]. https://www.healthit.gov/data/data-briefs/hospital-trends-use-evaluation-and-governance-predictive-ai-2023-2024/ (ASTP)

World Health Organization. (2023). *Ethics and governance of artificial intelligence for health* (WHO Publication No. ___). World Health Organization.

National Institute of Standards and Technology. (2023). *Artificial intelligence risk management framework (AI RMF 1.0)* (NIST Special Publication No. ___). National Institute of Standards and Technology.

U.S. Food and Drug Administration. (n.d.). *AI-enabled medical devices.* U.S. Department of Health and Human Services, FDA.

Murphy, H. (2025, December 14). Dozens of new AI-powered devices make FDA's list of approvals. *Radiology Business*. https://radiologybusiness.com/topics/artificial-intelligence/dozens-new-ai-powered-devices-make-fdas-list-approvals

NVIDIA. (2026, February 24). *Survey reveals AI is delivering clear return on investment in healthcare*. NVIDIA Blog. https://blogs.nvidia.com/blog/ai-in-healthcare-survey-2026/

Premier Inc. (2025, December 11). *Redefining AI ROI in healthcare: The new framework that puts clinical use cases first*. https://premierinc.com/newsroom/blog/redefining-ai-roi-in-healthcare-the-new-framework-that-puts-clinical-use-cases-first

U.S. Food and Drug Administration. (2025, January 6). *FDA issues comprehensive draft guidance for developers of artificial intelligence-enabled medical devices* [Press release]. https://www.fda.gov/news-events/press-announcements/fda-issues-comprehensive-draft-guidance-developers-artificial-intelligence-enabled-medical-devices