

AI as normal healthcare technology.

Danish E-health Observatory

7th October 2026

Niels Peek

Professor of Data Science and Healthcare Improvement,
THIS Institute, University of Cambridge



About the speaker

<https://www.linkedin.com/in/nielspeek>



UTRECHT

1995-2000



AMSTERDAM

2000-2014



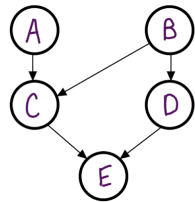
MANCHESTER

2014-2023



CAMBRIDGE

since 2024



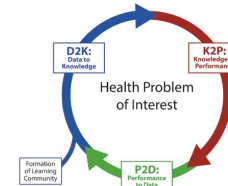
Bayesian
networks



decision support
systems



risk prediction
models



learning health
systems



AI scribes

The Healthcare Improvement Studies Institute

We believe efforts to improve care should always be based on the **highest quality evidence**.

- We generate **high-quality evidence** on what works in improving healthcare, what doesn't, and why.
- We combine **academic rigour** with **multi-stakeholder perspectives**.
- We **bring people together** to understand problems, create shared visions, co-design solutions, and evaluate them.

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This talk

- AI as normal healthcare technology
- Two case studies:
 - ❖ risk prediction models
 - ❖ AI medical scribes
- Diffusion and the “value intersect”
- Recommendations

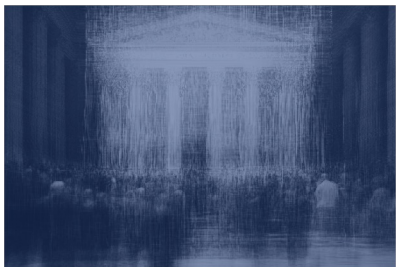
Narayanan & Kapoor: AI as “normal technology”

AI as Normal Technology

An alternative to the vision of AI as a potential superintelligence

By Arvind Narayanan and Sayash Kapoor

April 15, 2025



We articulate a vision of artificial intelligence (AI) as normal technology. To view AI as normal is not to understate its impact—even transformative, general-purpose technologies such as electricity and the internet are “normal” in our conception. But it is in contrast to both utopian and dystopian visions of the future of AI which have a common tendency to treat it akin to a separate species, a highly autonomous, potentially superintelligent entity.¹

The statement “AI is normal technology” is three things: a description of current AI, a prediction about the foreseeable future of AI, and a prescription about how we should treat it. We view AI as a tool that we can and should remain in control of, and we argue that this goal does not require drastic policy interventions or technical breakthroughs. We do not think that viewing AI as a humanlike intelligence is currently accurate or useful for understanding its societal impacts, nor is it likely to be in our vision of the future.²

The normal technology frame is about the relationship between technology and society. It rejects technological determinism, especially the notion of AI itself as an agent in de-

- Articulate a vision of AI as “normal technology”
- Compare AI to transformative, general-purpose technologies such as electricity and the internet
- Contrasts to visions which treat AI as a highly autonomous, potentially superintelligent (and dangerous) species

Narayanan, A. & Kapoor, S. AI as Normal Technology, 25-09 Knight First Amend. Inst. (2025), <https://knightcolumbia.org/content/ai-as-normal-technology>

Benchmarks do not measure real-world utility

PLOS DIGITAL HEALTH

RESEARCH ARTICLE

Performance of ChatGPT on USMLE: Potential for AI-assisted medical education using large language models

Tiffany H. Kung^{1,2}, Morgan Cheatham³, Arielle Medenilla¹, Czarina Sillos¹, Lorie De Leon¹, Camille Elepaño¹, Maria Madriaga¹, Rimel Aggabao¹, Giezel Diaz-Candido¹, James Maningo¹, Victor Tseng^{1,4*}

1 AnsibleHealth, Inc Mountain View, California, United States of America, **2** Department of Anesthesiology, Massachusetts General Hospital, Harvard School of Medicine Boston, Massachusetts, United States of America, **3** Warren Alpert Medical School; Brown University Providence, Rhode Island, United States of America, **4** Department of Medical Education, UWORLD, LLC Dallas, Texas, United States of America

* victor@ansiblehealth.com

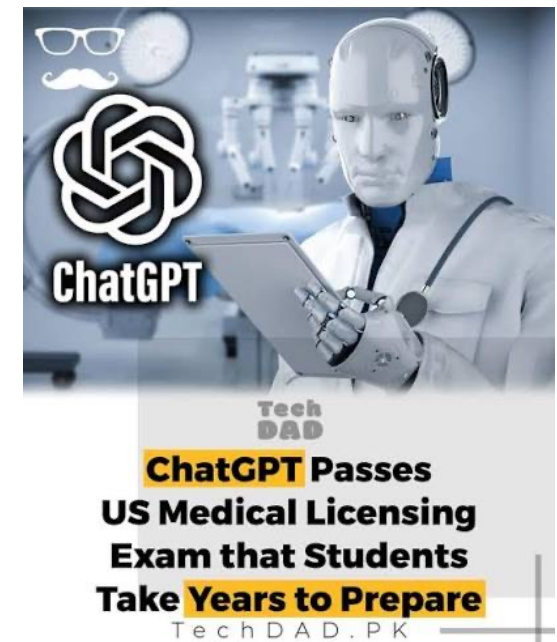


OPEN ACCESS

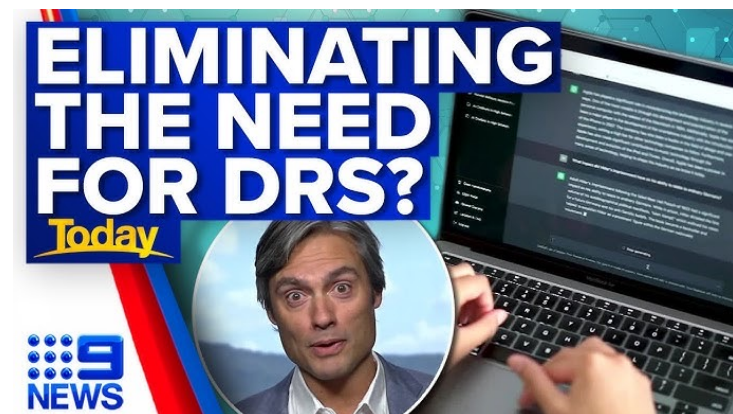
Citation: Kung TH, Cheatham M, Medenilla A, Sillos C, De Leon L, Elepaño C, et al. (2023) Performance of ChatGPT on USMLE: Potential for AI-assisted medical education using large language models. PLOS Digit Health 2(2): e0000198. <https://doi.org/10.1371/journal.pdig.0000198>

Abstract

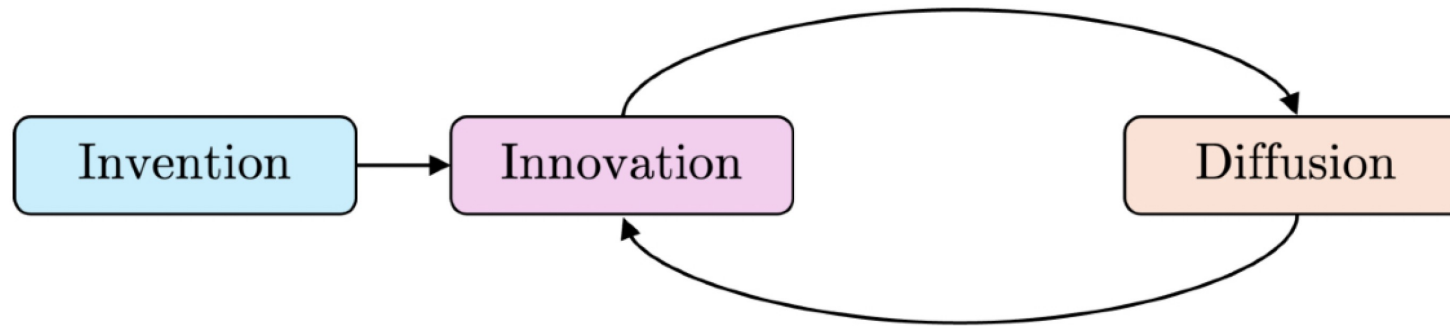
We evaluated the performance of a large language model called ChatGPT on the United States Medical Licensing Exam (USMLE), which consists of three exams: Step 1, Step 2CK, and Step 3. ChatGPT performed at or near the passing threshold for all three exams without any specialized training or reinforcement. Additionally, ChatGPT demonstrated a high level of concordance and insight in its explanations. These results suggest that large language models may have the potential to assist with medical education, and potentially, clinical decision-making.



ChatGPT Passes US Medical Licensing Exam that Students Take Years to Prepare
TechDAD.PK



The innovation-diffusion feedback loop

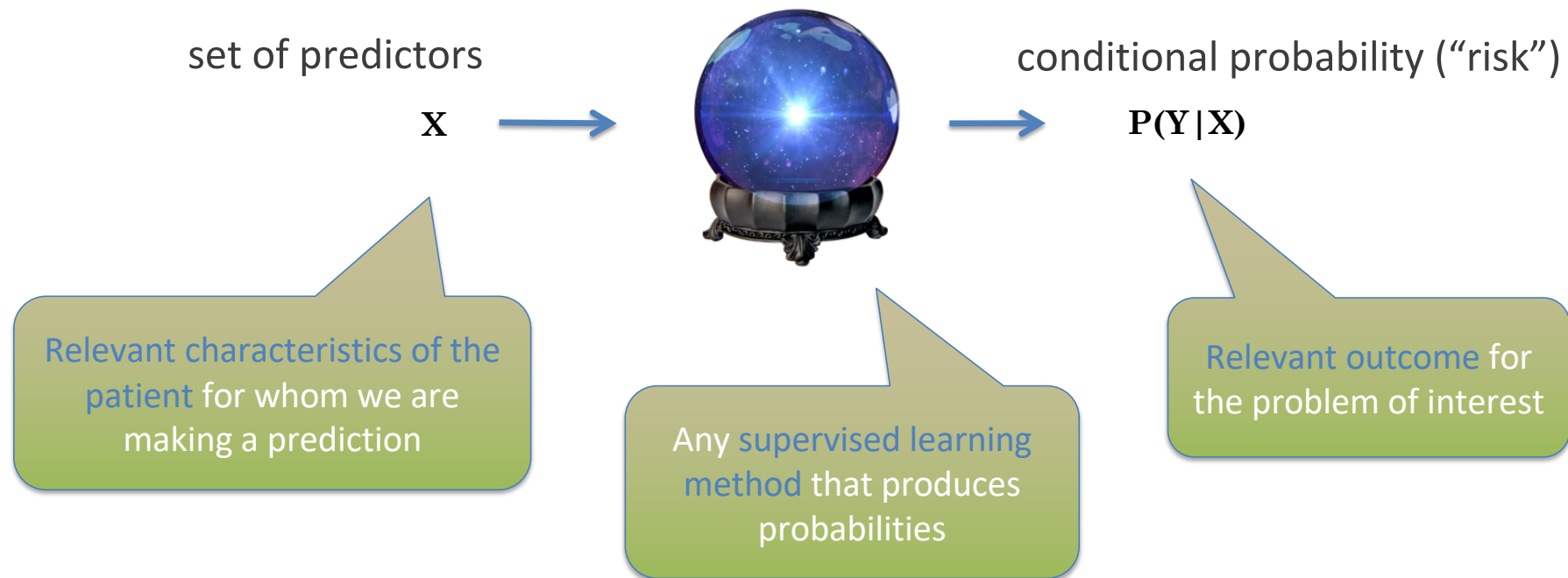


- For disruptive technologies, diffusion requires changes to the structure of organisations, as well as to social norms and laws.
- Diffusion is therefore limited by the speed of human, organisational, and institutional change.
- AI diffusion in safety-critical areas is slow, because the innovation-diffusion feedback loop in those areas is slow.

Case study 1: risk prediction models



Risk prediction models





BOADICEA and CanRisk-Prostate Models

Breast, Ovarian or Prostate Cancer Risks and Pathogenic Variant Probabilities

Welcome

CanRisk Tool

Result 09:08:26 ^x

Result 09:11:37 ^x

Print/Save Report

Save Input

04/10/2026 09:11:37

Breast Cancer

Risk Category (NICE)

Ovarian Cancer

Pathogenic Variant(s)

Inputs

Advisories

Note: when your risks are compared to the risk of the population, this refers to the risk of average individuals of your ethnicity group.

Your Risk of Developing Breast Cancer

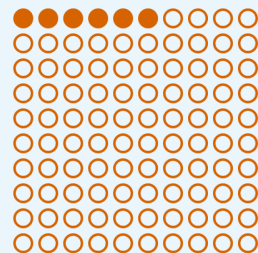
Your risk of developing breast cancer over the next 5 years is 2.5%. In other words, about 3 out of 100 women with the same risk factors will develop cancer over the next 5 year period. This image might help you visualise this information.

- 3 women are likely to develop breast cancer
- 97 women are unlikely to develop breast cancer



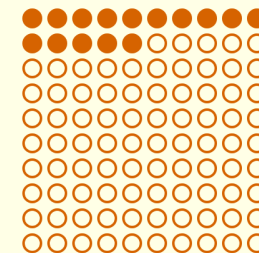
Your risk of developing breast cancer over the next 10 years is 5.7%. In other words, about 6 out of 100 women with the same risk factors will develop cancer over the next 10 year period. This image might help you visualise this information.

- 6 women are likely to develop breast cancer
- 94 women are unlikely to develop breast cancer



Your risk of developing breast cancer between now and when you are 80 years old is 14.9%. In other words, about 15 out of 100 women with the same risk factors will develop cancer by the age of 80. This image might help you visualise this information.

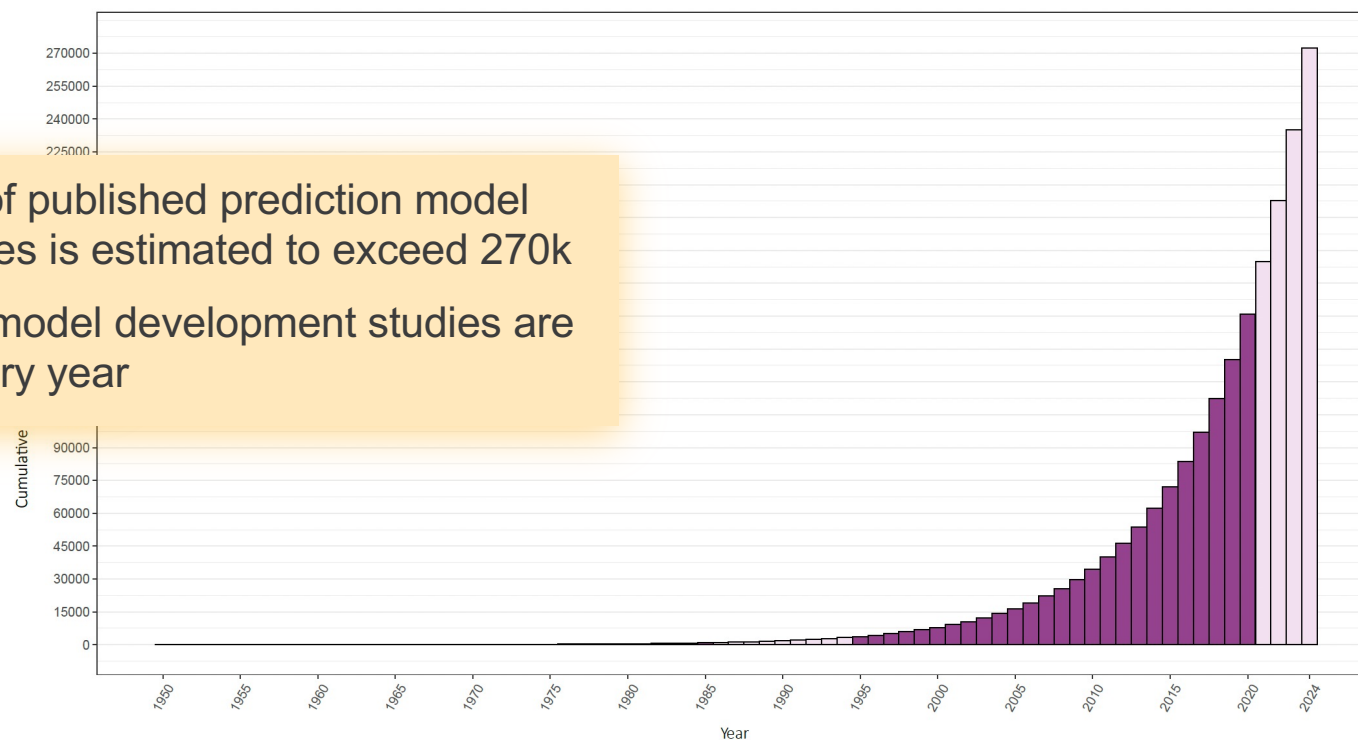
- 15 women are likely to develop breast cancer
- 85 women are unlikely to develop breast cancer



The number of risk prediction models is growing very fast

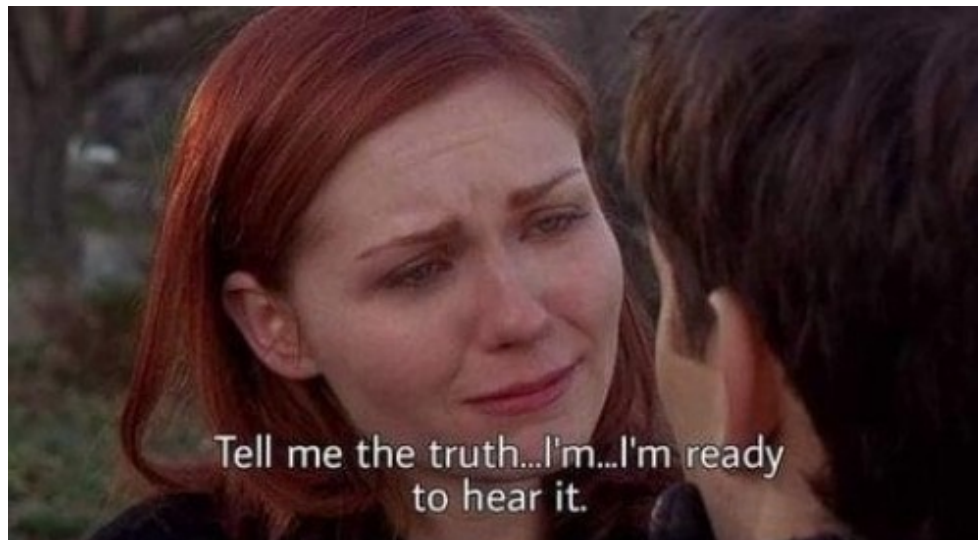
Figure 3. Cumulative estimated number of regression and non-regression-based CPM development articles between 1950 and 2024.

- The total number of published prediction model development studies is estimated to exceed 270k
- An estimated 10k model development studies are now published every year

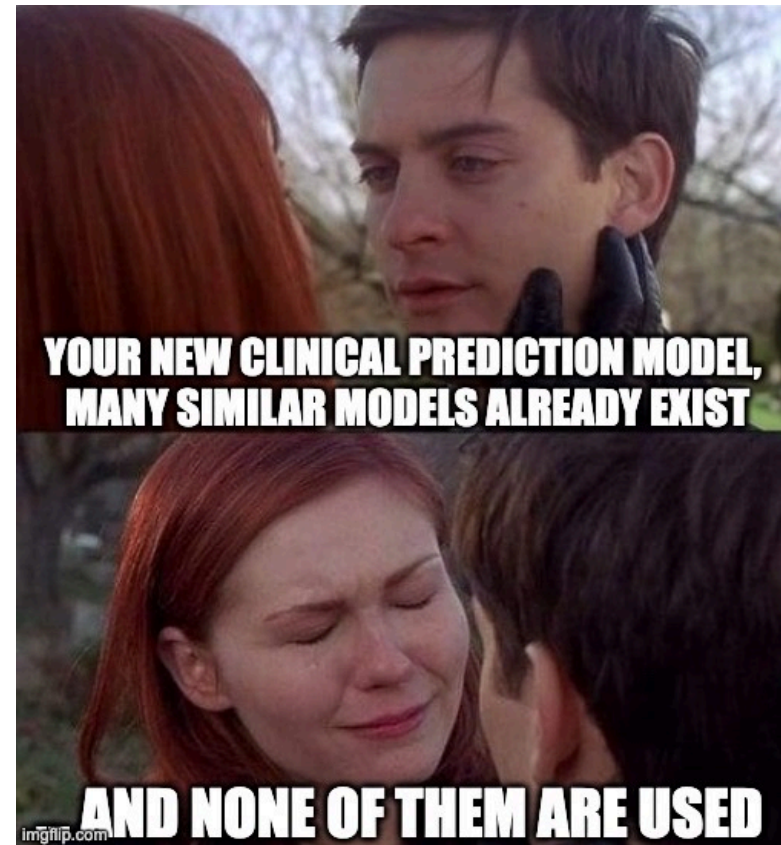


Arshi et al, JMIR Med Inform.
2025;13:e62710.

Few risk prediction models reach clinical practice



Arshi B, et al. JMIR Med Inform. 2025;13:e62710.
Peek N, et al. Yearb Med Inform. 2024;33(1):103-114.



Common diffusion challenges for prediction models

PEOPLE	SYSTEMS	DESIGN	RISK
Overly complex outputs	Lack of integration with EHR & clinical workflows (most cited)	Outputs not clearly visible or immediately available	Algorithmic decision-making lacks transparency ('black box')
Negative impact on physician/patient relationship	Incompatibility with continuity of care	Poor presentation & layout	Input data incomplete & poor quality
End-users lack knowledge and skills	Technical issues & glitches	Not intuitive or user-friendly	Tools not updated & maintained over time
Negative perceptions towards tools			Lack of transparent legal & regulatory frameworks
			Competing vendors for AI platforms

Taylor et al, BMJ Health & Care Informatics 2026;33(1):e101896.

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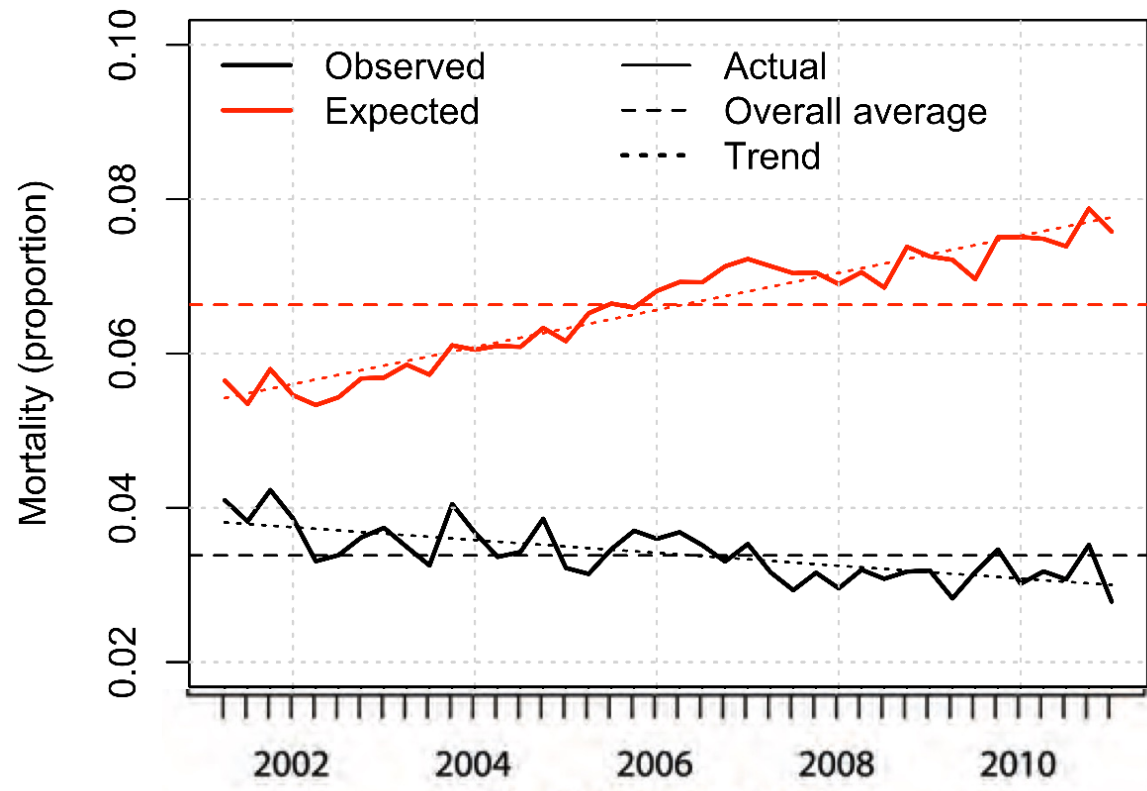
Common diffusion challenges for prediction models

PEOPLE	SYSTEMS	DESIGN	RISK
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Negative impact on physician/patient relationship	Lack of clarity of care need	Poor presentation & layout	Input data incomplete & poor quality
End-users lack knowledge and skills	Technical issues & glitches	No maintenance after academic grant ends	Tools not updated & maintained over time
Negative perceptions towards tools	- Complex, opaque procedures - Need for legal manufacturer - Unclear liability risks		Lack of transparent legal & regulatory frameworks
			Competing vendors for AI platforms

Taylor et al, BMJ Health & Care Informatics 2026;33(1):e101896.

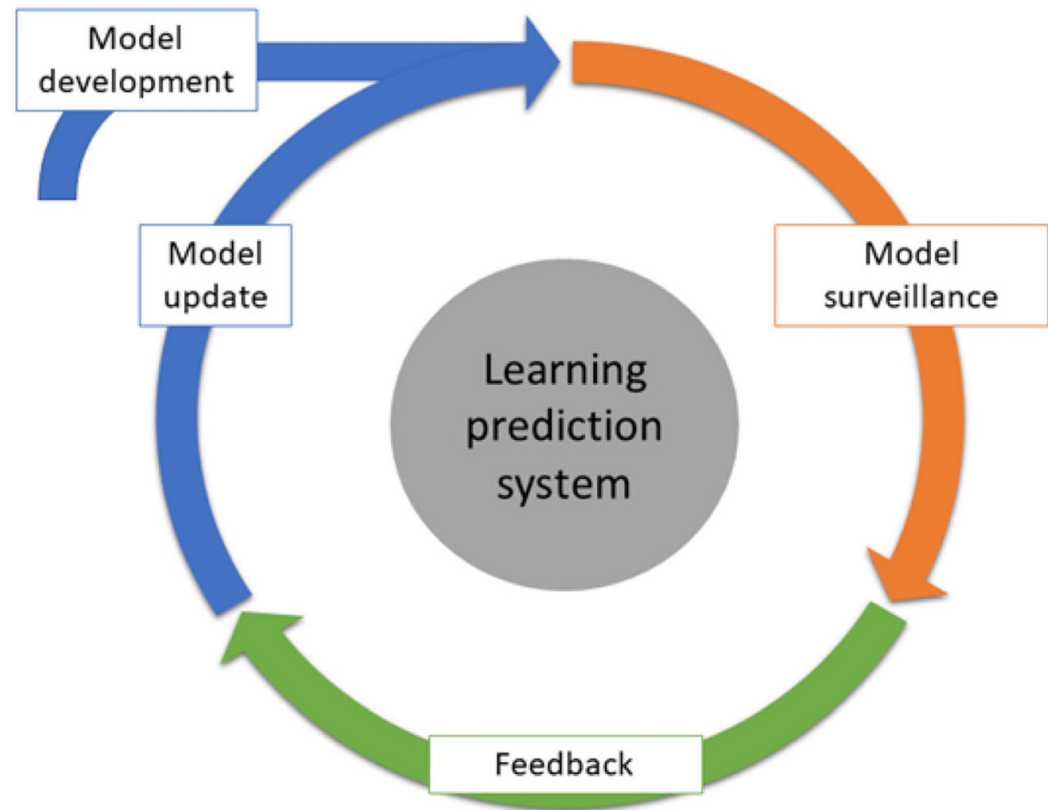
Risk prediction models become outdated over time

- **Calibration drift:** there are constantly changes to populations, treatments, and clinical pathways
- As a result, prediction models become outdated over time, even when initially accurate



Learning prediction systems

- Prediction models need constant surveillance to maintain adequate predictive performance
- Validation then becomes a continuous rather than a discrete effort
- Model revisions may be granular or more radical



Risk prediction tools have a modest effect on clinical decision making

- Provision of cardiovascular risk information to physicians increased prescribing of cholesterol-lowering and blood pressure medication
- Greatest effects were seen in patients with high risk (>20%)
- Provision of risk information to patients improved their risk perception but had little effect on prescribing or lifestyle

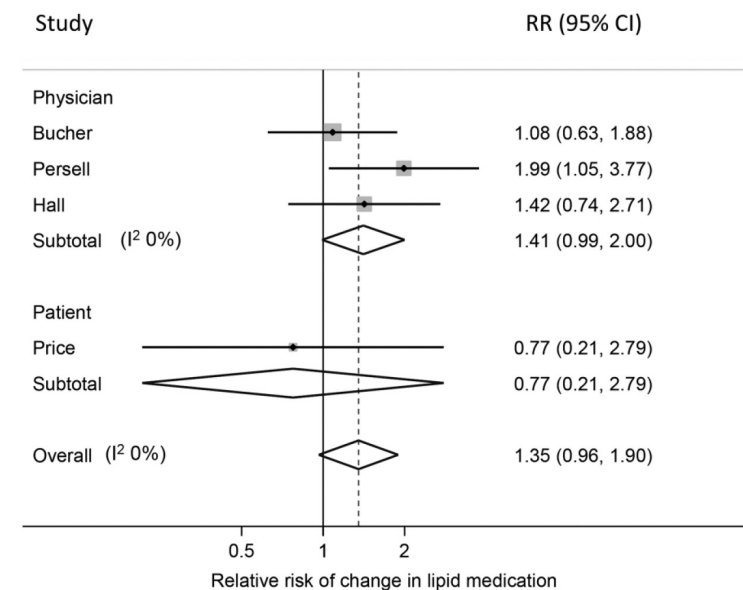


Figure 5 Forest plot showing the effect of provision of cardiovascular disease risk estimates to physicians or patients on the relative risk (RR) of receiving a change in lipid medication.

Resolving barriers for risk prediction: 4 conditions

Early co-production and
cross-sector alignment

A shared deployment
infrastructure

A fit-for-purpose
regulatory pathway

Shared liability and
sustainable funding



Dr Juliet Usher-Smith
University of Cambridge



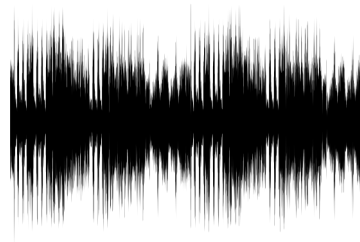
Case study 2: AI medical scribes



AI medical scribes



clinical consultation



digital audio recording



Doctor: Hi [PATIENT NAME], I'm sorry to hear that you've been having a flare-up of your rheumatoid arthritis. How are you feeling today?

Patient: Not too good, doctor. The pain in my joints is really bad, and I'm having trouble sleeping. I've also been feeling more tired than usual.

Doctor: I understand. It sounds like your symptoms have gotten worse since our last appointment.

Patient: Yes, they have. I've been taking the medication you prescribed, but it's not helping as much as it used to.

Doctor: I see. Well, I think it's time to try a different medication. I'm going to prescribe you Humira. It's a newer medication that's been shown to be effective for rheumatoid arthritis.

Patient: Okay, I'll try it.

Doctor: Great. I want you to come back in a few weeks so we can see how you're doing.

Patient: Okay, thank you, doctor.

transcript



12/03/2025 Presented with flare-up of RA (joint pain, sleeping problems, and fatigue). Current medication (Maxtrex) not providing adequate relief. Decided to change medication to Humira and schedule a follow-up appointment in a few weeks.

AI summary for clinical notes

Many, many, many commercial AI scribes

+ Memory, shortcuts & rich text

The AI medical scribe for all clinicians

Try Heidi - it's free

Enjoy care again

The leading ambient AI assistant, freeing clinicians from the documentation burden.

- ✓ 2 hours saved per day per provider
- ✓ Deployed in 85+ health organizations
- ✓ Loved by 45,000+ clinicians

Try it for free →

Clinical note
Fatigue and headache

CHIEF COMPLAINT
Headaches and persistent fatigue

HISTORY OF PRESENT ILLNESS
Mr. Doe, 46 y.o., reports headaches

- Occurs throughout the day
- Located on the right side
- Stopped blood pressure medication last month

PAST MEDICAL HISTORY

- Hypertension
- Type 2 diabetes
- Obesity

ASSESSMENT
Possible sleep apnea or uncontrolled hypertension causing fatigue and headaches

Send to EHR

Automatically document care and streamline workflows with DAX Copilot

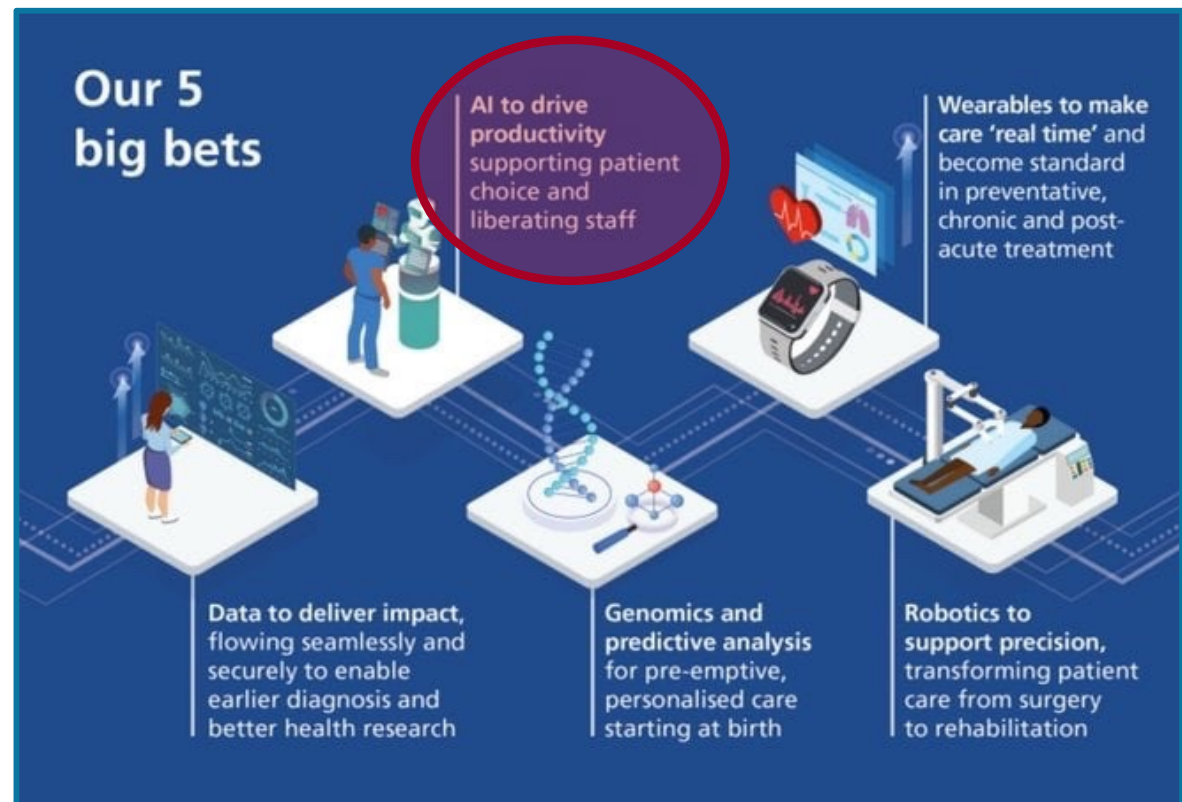
Improve clinician and patient satisfaction, operational efficiencies, and financial outcomes with DAX Copilot. This AI-powered ambient solution automatically documents patient encounters and performs clinical tasks seamlessly.



AI for Every Clinician

TORTUS is a secure, compliant AI platform that interfaces with your EHR and saves you time.

Policymakers are endorsing AI scribes to increase healthcare productivity



AI scribes may achieve a modest time saving, but perhaps not enough to increase productivity

- **Permanente Medical Group:** large implementation of AI scribes, estimated time savings of 18s per appointment
- In a **Dutch study in primary care**, clinical documentation time was reduced by 43s per consultation, while total consultation time did not change
- **Lukac et al. three-arm RCT** in 238 outpatient physicians (14 specialties): Nabla reduced documentation time by 41s (9.5%) while DAX Copilot did not impact documentation time

Tierney AA et al. NEJM Catal Innov Care Deliv 2024;5(3).

Van Linschoten R, et al., NPJ Digit Med. 2026;9(1):299.

Lukac PJ et al. NEJM AI 2025;2(12).

Clinician experiences (general practice)

- AI scribing lessened the cognitive burden during consultations
- GPs were able to look at patients more during consultations
- AI scribe output often needed correction, including errors, duplication or irrelevant detail
- AI scribe output lacks visible clinical reasoning
- Several GPs reported finding it harder to recall patients later when relying on AI scribing

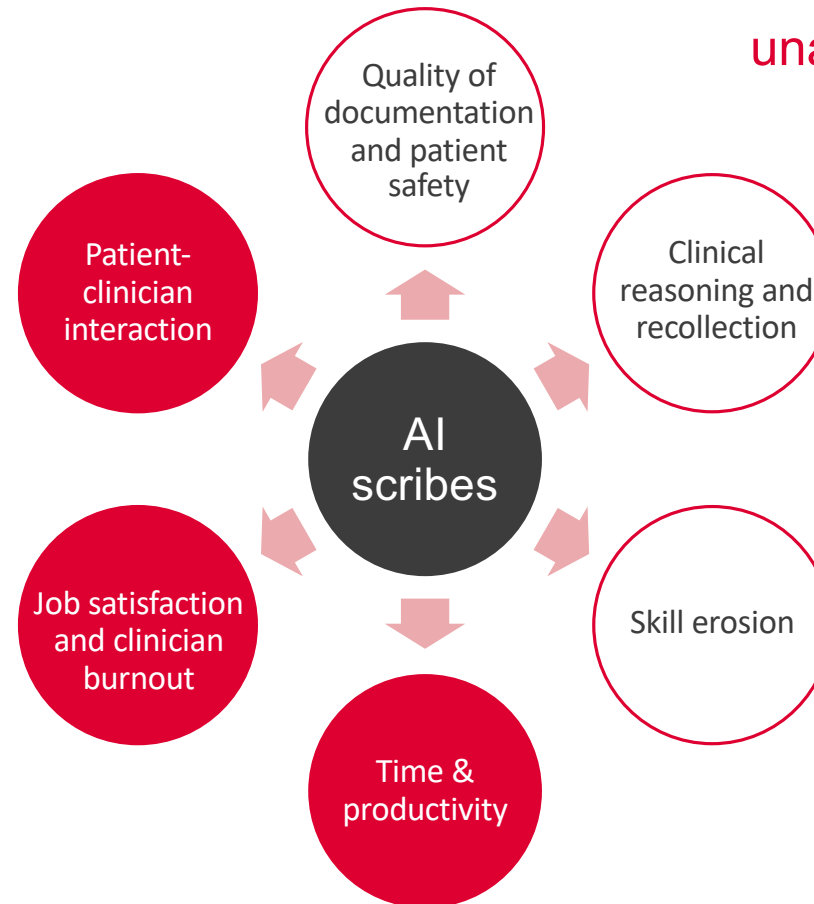
*I don't have to focus on getting the typing right and I am able to really concentrate on what [patients] are saying to me.
(GP45)*

I look back at my own notes from [...] six weeks ago, I think, oh, I don't remember seeing that patient. (GP07)

All new tech has anticipated and unanticipated consequences

anticipated

unanticipated



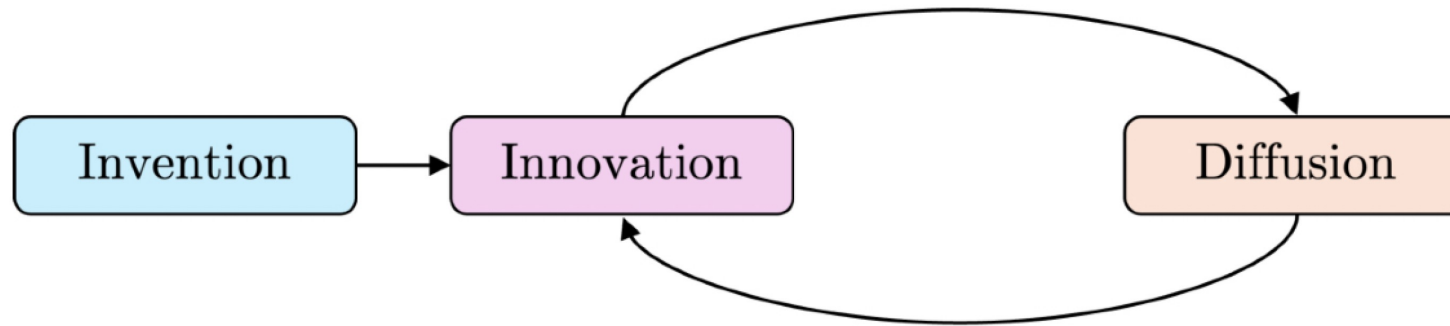
Eccles A, et al. BMJ. 2025;390:e085754.

Peek N, et al. BMJ Digit Health AI. 2026;2(1):e000039.

Diffusion and the “value intersect”



The innovation-diffusion feedback loop



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- Diffusion is therefore limited by the speed of human, organisational, and institutional change.
- AI diffusion in safety-critical areas is slow, because the innovation-diffusion feedback loop in those areas is slow.



Speeding things up



Prof Enrico Coiera
Macquarie University

1. Coordinate to stop duplicated effort
2. Share "last mile" knowledge so each organisation doesn't reinvent it
3. Use beacon sites as a diffusion engine
4. Shift regulation from "certify once" to lifecycle oversight
5. Generate evidence faster
6. Remove friction for local industry and build leadership capacity

The RCT-AI timeline mismatch



4-9 years:

- 2017: Transformer architecture
- 2018: Large-scale language pre-training (BERT, GPT)
- 2020: AlphaFold
- 2021: Foundation models
- 2022: ChatGPT
- 2024: AI medical scribes
- 2025: Agentic AI

Blog

Testing and spreading AI in health care: the case for rapid revolution

Published

23 March 2026

Time to read

 About 6 mins

"We need innovations in the process and methods of evaluation and assurance [of healthcare technology].

[This] must include using credible, standardised methods to test higher volumes of technologies like AI faster, better, more transparently – at scale and under real-world conditions, but initially where the context is more favourable."

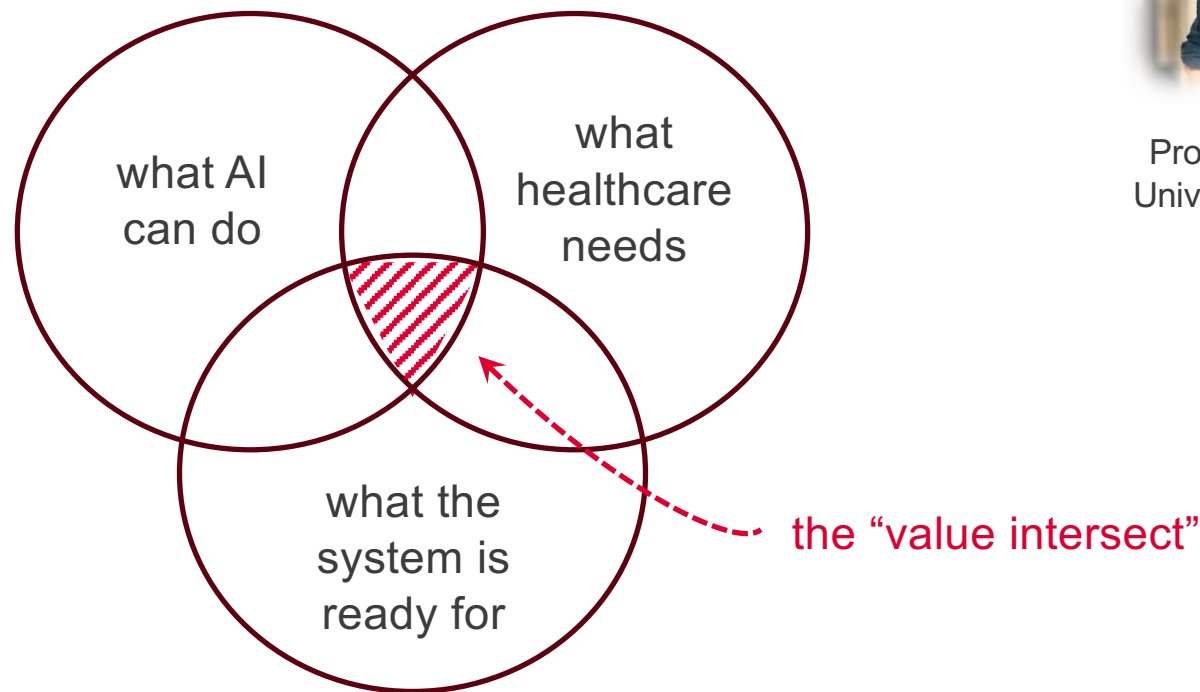


Dr Jennifer Dixon DBE
The Health Foundation

Reducing waste with the “value intersect”



Prof Alastair Denniston
University of Birmingham



“I want AI to do my laundry and dishes so that I can do art and writing, not for AI to do my art and writing so that I can do my laundry and dishes.”

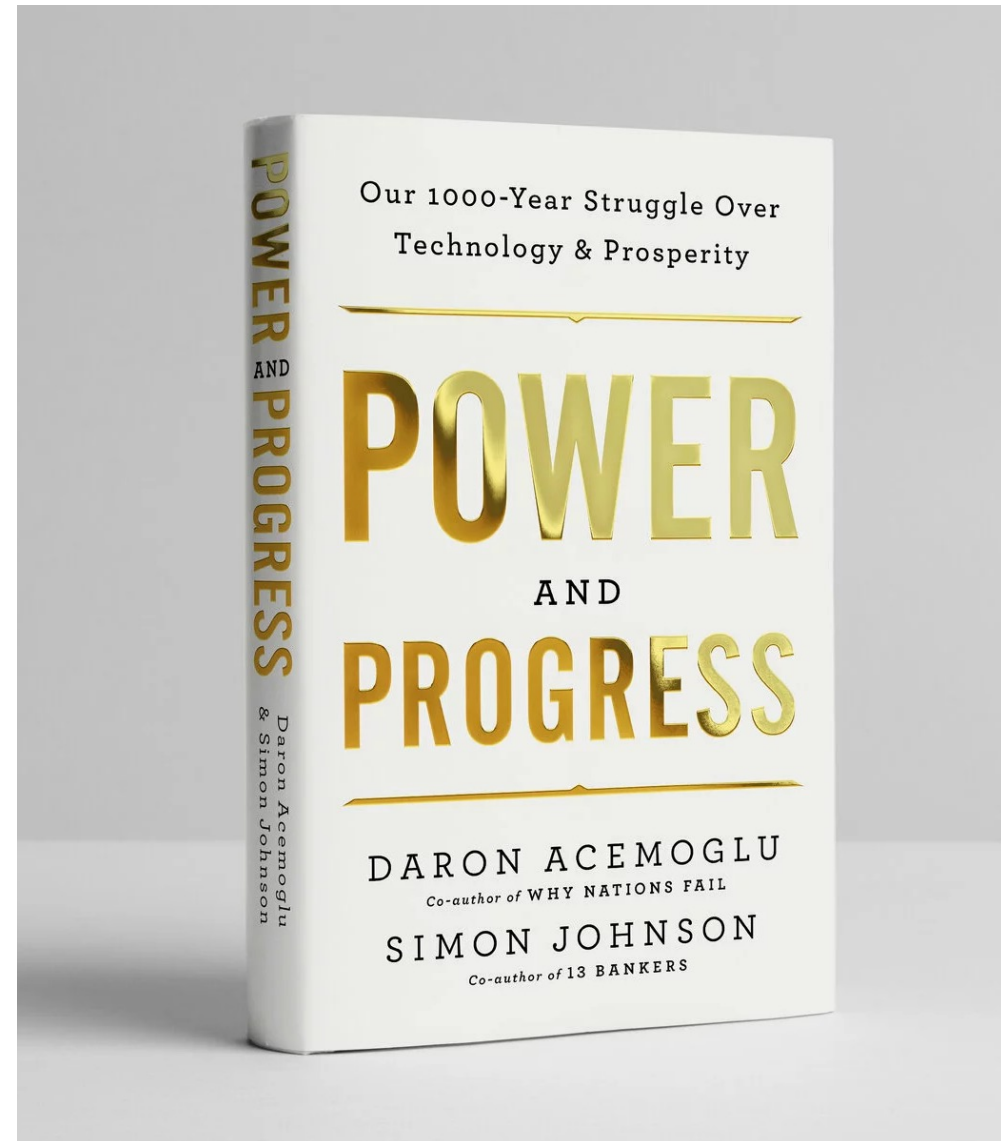
Joanna Maciejewska

THIS.Institute

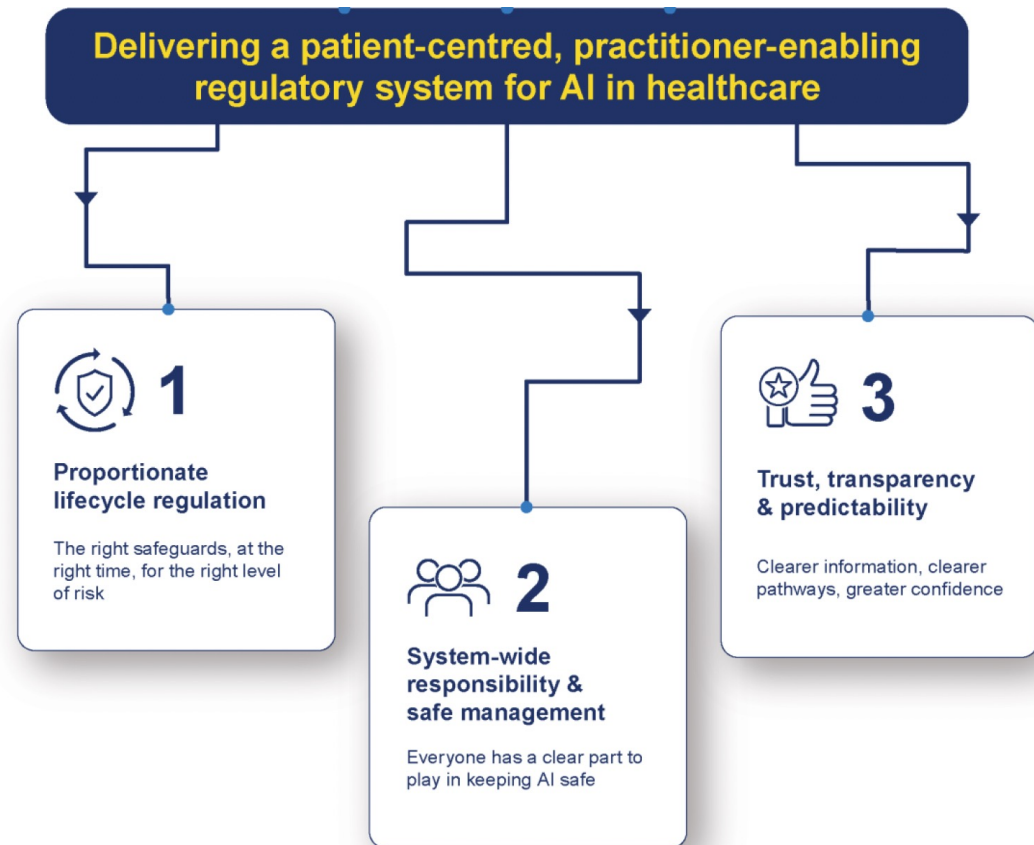
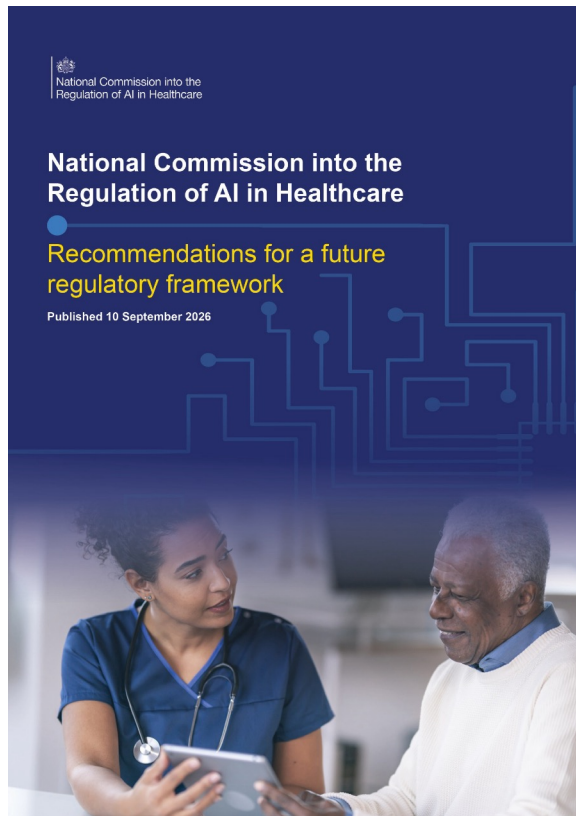
“So-so technology”

- Displaces human workers, instead of augmenting them to create new kinds of valuable work.
- Tends to shift work from employees to customers and degrade service quality while saving only modest costs.
- Well-known examples are self-checkout kiosks and automated customer-service phone lines.
- Neither unavoidable nor an inherent property of any technology.

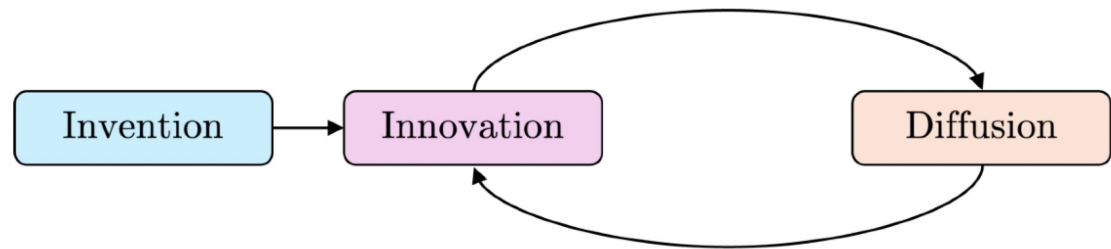
Acemoglu, D., & Johnson, S. (2023). Power and progress: Our 100-year struggle over technology and prosperity. New York: PublicAffairs.



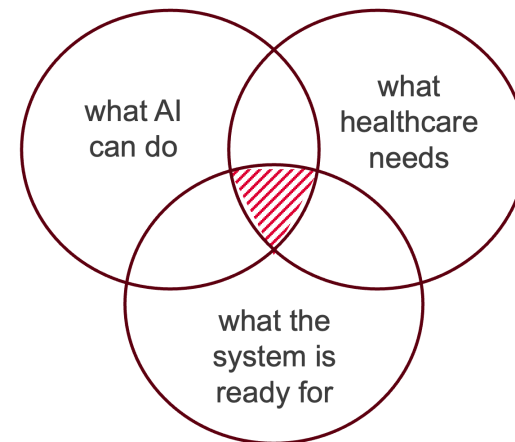
What should healthcare AI regulation look like?



This talk



- ✓ AI as normal healthcare technology
- ✓ Two case studies:
 - ✓ risk prediction models
 - ✓ AI medical scribes
- ✓ Diffusion and the “value intersect”



Summary

- AI is not fundamentally different from other transformative, general-purpose technologies that preceded it (such as electricity and the internet).
- Diffusion and impact of AI are realised through human, organisational, and institutional change.
- Understanding and controlling the innovation-diffusion feedback loop is key.
- Diffusion is inherently slow in healthcare, for good reasons, but often slower than it needs to be.

Making AI normal healthcare technology:

Four recommendations

1. Start from the need, not the technology. Design innovations together with patients and clinicians, and choose augmentation over displacement.
2. Plan and budget for the whole lifecycle from the start, involving all relevant stakeholders.
3. Build continuous evaluation into real-world deployment, and monitor both anticipated and unanticipated consequences.
4. Share infrastructure and learning nationally, preventing that every region, hospital and practice needs to reinvent the "last mile".

Further reading: Some recent papers

Peek N, Dixon J, Ereira E, Dixon-Woods M. AI might help the NHS-but we need to build the evidence. BMJ. 2026;394:e100390.

Peek N, Woodward M, Zielinski L, Goldstone R, et al. Does ambient voice technology in healthcare really save time? The need for rigorous evaluation to test the promise. BMJ Digit Health AI. 2026;2(1):e000039.

Usher-Smith JA, Taylor LC, Blackburn L, et al. Overcoming technical barriers to enable real-time risk prediction in primary care: recommendations from expert workshops. Lancet Primary Care 2026, <https://doi.org/10.1016/j.lanprc.2026.100199>.

Taylor LC, Peek N, Ercole A, et al. Enabling digital multifactorial risk assessment in primary care: an umbrella review and recommendations for design and implementation. BMJ Health Care Inform. 2026;33(1):e101896.

Perry BI, Hammond B, Oliver D, et al. Missing infrastructure for real-world predictive AI impact. BMJ Health Care Inform. 2026;33(1):e101954.

Peek N, Capurro D, Rozova V, et al. Bridging the Gap: Challenges and strategies for the implementation of artificial intelligence-based clinical decision support systems in clinical practice. Yearb Med Inform. 2024;33(1):103-14.

Jenkins DA, Martin GP, Sperrin M, et al. Continual updating and monitoring of clinical prediction models: time for dynamic prediction systems? Diagn Progn Res. 2021;5(1):1.

Thank you

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