Laura Gilbert July 30th, 2025

Could AI save the NHS?

The NHS needs all the help it can get, and Artificial Intelligence could be part of that help. From applications in early disease detection and prevention, to administrative streamlining and helping manage the NHS's enormous infrastructure and supply chains, AI offers opportunities to revolutionise the UK's delivery of healthcare. But, argues ***Laura Gilbert****, all this must be done in a way that doesn't undermine the public's trust in the NHS, and without creating new, harder to solve problems, in the process.*

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The National Health Service faces ever-worsening pressures from an aging population, staff shortages, and a growing demand for services, the NHS desperately needs innovative solutions. Artificial intelligence offers tantalising possibilities for transformation, but can it truly save our most cherished national institution? The answer is nuanced. While AI presents remarkable opportunities to revolutionise healthcare delivery, its implementation must be carefully managed to avoid creating new problems whilst attempting to solve existing ones.

The Promise of Early Detection and Prevention

Some of AI's most glamorous and compelling healthcare applications lie in early disease detection and prevention. Machine learning algorithms can for example identify cancers in medical imaging with accuracy that matches or exceeds human radiologists, sometimes spotting subtle patterns undetectable by the human brain, and impervious to fatigue or distraction. Similarly, there are AI systems capable of analysing vast datasets of patient information to predict who might develop conditions like diabetes or cardiovascular disease years before symptoms appear, with the

potential to save both lives and the huge treatment costs of managing these diseases once they have progressed.

> *AI can be built to identify population-level health trends, enabling public health interventions before problems become crises.*

This predictive capability extends beyond individual diagnoses. AI can be built to identify population-level health trends, enabling public health interventions before problems become crises. During the COVID-19 pandemic, machine learning models were able to help predict infection spreads and hospital capacity needs, demonstrating the technology's potential for system-wide health management.

However, this diagnostic revolution comes with a paradox. Better detection often means more patients requiring treatment, in the near term potentially increasing rather than reducing demand on NHS services. When AI identifies more cases of early-stage cancer, the health system must be prepared to treat them all. Better screening can create a "detection bottleneck", finding problems faster than the healthcare system can treat them. In some parts of the system AI assessments could directly overwhelm services unless carefully managed alongside capacity planning. For example, when Apple Watch released its ECG analysis there was a surge in cardiology referrals that required ongoing monitoring placing strain on cardiology practices.

Generating Administrative Efficiency

Perhaps AI's most unambiguous immediate benefit to the health system then lies in administrative streamlining. The NHS loses countless hours to paperwork, duplicate data entry, and inefficient processes that keep healthcare professionals away from patient care. AI offers immediate solutions to these chronic problems.

AI systems could be built to more effectively integrate disparate patient records across the NHS into the single, accurate, comprehensive, accessible patient histories that the system should provide to ensure that patients are safely and effectively treated and managed.

Intelligent triaging systems can assess patient symptoms and direct them to appropriate services, for example reducing emergency department overcrowding by steering non-urgent cases to more suitable care pathways, cutting waiting times and improving patient satisfaction. Ambient technology, in which listening devices automatically gather crucial information for medical use, represents another transformative opportunity. AI-powered systems can listen to patient consultations and automatically generate clinical notes, freeing doctors and nurses to focus entirely on their patients rather than computer screens. This technology can also improve patient handovers between shifts and departments, ensuring critical information isn't lost in translation. Computing "on the edge" will protect privacy, automatically filtering out non-medically important and private conversations, with individuals able to further control what data is stored for later use.

Realising the potential for creating truly connected healthcare services is an unmissable opportunity. AI systems could be built to more effectively integrate disparate patient records across the NHS into the single, accurate, comprehensive, accessible patient histories that the system should provide to ensure that patients are safely and effectively treated and managed. Focussing on data integration has the potential to eliminate dangerous information gaps and reduce medical errors caused by incomplete patient information.

Transforming infrastructure and logistics

Beyond direct patient care, AI could be used to optimise the NHS's vast infrastructure and supply chains. Hospitals are complex ecosystems requiring precise coordination of resources, from medical equipment to medications to basic supplies like food and cleaning materials, and in some senses they may operate in competition for one another for resources. It should be possible to automate supply and inventory management to rapidly respond to or – better – pre-empt the needs of these facilities and ensure that resources are readily available and properly tracked, for example reducing the approximately £300 M in wasted and expired medicines annually across the NHS. During the pandemic, supply chain disruptions highlighted how vulnerable healthcare systems can be when logistics fail.

AI-powered energy management systems could optimise heating, lighting, and ventilation based on real-time occupancy and usage patterns, potentially saving millions in energy costs while improving patient comfort. Predictive maintenance algorithms can identify equipment issues before failures occur, preventing costly downtime and ensuring critical medical services remain operational.

Smart scheduling systems can optimise staff deployment, matching patient needs with available resources while working to ensuring adequate coverage across all departments. This optimisation could be especially valuable during peak periods or staff shortages, prioritising people to core services and helping maintain an acceptable standard of care even under pressure.

Addressing Bias and Inequality

One of AI's most profound potential contributions to the NHS lies in reducing healthcare inequalities that have persisted for decades or longer. Current medical protocols often fail to account for differences in how diseases present and progress across different demographic groups, leading to devastating consequences.

For example black women in the UK remain almost four times more likely to die in childbirth than white mothers, partly due to clinical guidelines that don't adequately account for different risk factors and presentations. AI systems trained on diverse datasets could identify these disparities and suggest more personalised care protocols that better serve all patients.

Similarly, gender bias in healthcare leads to significant inequalities in heart attack diagnosis and treatment. Women are 50 per cent more likely to receive incorrect initial diagnoses and less likely to receive effective treatment even when correctly diagnosed, resulting in approximately 8,200 needless deaths annually. AI diagnostic tools could help identify heart attacks in women by

recognising symptom patterns that human doctors might miss due to unconscious bias or incomplete training.

These AI systems could continuously learn from new data, identifying subtle patterns that indicate when standard protocols might not be optimal for specific patient populations. By flagging potential disparities in real-time, AI could help healthcare providers deliver more equitable care across all patient groups.

Enhancing Patient Care While Preserving Human Connection

The most successful AI implementations in healthcare are most likely to be those that augment rather than replace human decision-making. The goal should be enabling medical professionals to spend more time with patients, not less, and to reduce stress and burnout in these crucial roles. When AI handles routine tasks, documentation, and basic analysis, doctors and nurses can focus on what matters most: providing compassionate, individualised, human care.

For example, AI can enhance patient monitoring and risk management without replacing human judgment. Continuous monitoring systems can alert staff to subtle changes in patient conditions, enabling medical professionals time and space to implement early interventions that may halt worsening conditions and prevent complications. These systems can perform a wide range of tasks including tracking vital signs, monitoring medication adherence, and assessing recovery progress, providing healthcare teams with comprehensive, real-time patient status updates.

The Path Forward

Successfully implementing AI across the NHS requires careful planning and realistic expectations. The technology must be integrated thoughtfully, with adequate training for staff and robust safeguards to prevent repetition and amplification of existing flaws, or new forms of bias or error being introduced.

Investment in digital infrastructure is essential. Many NHS trusts still rely on outdated systems that can’t effectively integrate with modern AI tools. Upgrading these systems while maintaining service continuity presents a significant challenge but is necessary for realising AI’s full potential.

AI won't solve all of the NHS's challenges overnight, but it offers powerful tools for addressing many of the system's most pressing problems.

Data privacy and security concerns must also be addressed comprehensively, and transparently, out in the open. Patient trust is fundamental to healthcare, and any AI implementation must maintain the highest standards of data protection while enabling the information sharing necessary for effective care coordination. For people to trust a modern, AI powered NHS they must trust the technology – and trust comes from clarity and understanding. When I was building the Incubator for AI in government in 2024 we adopted a principle of "radical transparency", publishing everything from our code to our evaluation results, as a way to communicate with the public that we were developing with the wellbeing of the public in mind in good faith, and that we were competent and professional and delivering genuinely excellent algorithms and products. This approach is crucial for the public to support rapid transformation of healthcare services based on new technology that is widely known to also be capable of doing harm.

Can AI save the NHS? The answer is qualified yes, but only if implemented strategically and with realistic expectations. AI won't solve all of the NHS's challenges overnight, but it offers powerful tools for addressing many of the system's most pressing problems.

The technology's greatest value lies not in replacing human healthcare workers but in enabling them to work more effectively. By handling routine tasks, optimising resources, reducing bias, and improving diagnostic accuracy, AI can help the NHS deliver better care to more people while making more efficient use of limited resources.

Success will require significant investment, careful planning, and ongoing commitment to maintaining human-centred care. But with thoughtful implementation, AI is far and away the best hope for rapid, radical systematic improvement of healthcare delivery across every aspect of the system.

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About the author

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Dr. Laura Gilbert is the Senior Director of AI and Head of the AI for Government program at the Tony Blair Institute, working to deliver a program of AI solutions to improve the ability of governments to plan and deliver resilient public services and generate better economic and wellbeing outcomes for their citizens. From September 2020 to January 2025 Laura worked in 10 Downing Street as the founding director of 10DS, the data science and analytics team, and the Incubator for Artificial Intelligence (i.AI). Laura holds a doctorate in Particle Physics and Computing from Oxford University, undergraduate degrees from Cambridge University and is a Visiting Professor at the London School of Economics and Policy. In 2023 she was awarded a CBE for Services to Technology and Analysis. She is a renowned public speaker in AI, data and human decision making.

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