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AI and Automation within the NHS Workforce: Opportunities, Challenges and the Case for Strategic Implementation

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Executive Summary:
Artificial Intelligence (AI) is a necessary response to pressure on the NHS workforce and wider system. Continuous workforce shortages, increasing demand and the burden of administrative tasks have contributed to an unsustainable model and ultimately impact the delivery of healthcare services. This is compounded further by processes of modern care which are increasingly data intensive. Intensive Care Units (ICUs) are where these pressures are most visible due to the environment's complexity. AI should be understood and implemented not as a replacement for the workforce, but as a tool to augment roles, reduce inefficiencies by automating routine tasks and supporting more effective decision-making. The benefits of AI extend far beyond clinical settings to system-wide efficiency and financial sustainability. With the expenditure of the NHS exceeding £180 billion annually, any improvement in efficiency and productivity, no matter how marginal, will represent significant financial value. AI and automation present an opportunity to increase workforce capacity by reducing administrative burden allowing effective use of the workforce for more complex tasks. This can be achieved without a proportional increase in capital. However, implementation must be carefully considered and coordinated to ensure it is workforce-centred with the aim of avoiding the reinforcement of operational challenges and existing inequalities.

From the perspective of an Environmental, Social and Governance (ESG) framework, AI aligns with wider organisational priorities. Socially, it has the potential to reduce staff burnout and improve patient outcomes. From the perspective of governance, accountable, transparent and ethical frameworks are required to ensure not only considered implementation, but also ongoing usage across NHS trusts.

This evidence paper recommends an incremental approach to AI implementation which begins in ICUs as a data-intensive setting. This implementation must be supported by workforce development across the organisation, governance frameworks and targeted investment to ensure consistent and uniform adoption across the NHS.

Written Evidence:

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- Artificial Intelligence (AI) is not just a future innovation; it is also a necessary response to an unsustainable workforce model. The demand for AI and automation within healthcare is underpinned by workforce shortages and burnout in recent years. The NHS Workforce Plan in 2023 identified that The NHS is currently experiencing significant workforce shortages, which are projected to persist without intervention **(**NHS England, 2023**).** More recent evidence suggests that little to no improvement has been made, with workforce shortages and workload pressures continuing to place significant strain on NHS staff (BMA, 2024). As well as staff, the NHS systems themselves are becoming strained which compounds the problem in the UK. Workforce shortages are not just a staffing issue — they are directly affecting how well the NHS functions as a system **(**Health Foundation, 2023**)** during a period where healthcare delivery is becoming increasingly data-intensive (WHO, 2023).

- The UK must position itself as a leader in the adoption of AI within its healthcare system, this is supported by evidence that professional roles are the most exposed to AI driven change (ONS, 2023) and that previous studies a significant amount of healthcare tasks can be automated using existing technologies (McKinsey, 2023). Technologies like AI/Machine Learning (ML) are now moving from being solely speculative to in many cases, deployable tools that can increase efficiency through assisting practitioners in their roles. The UK government themselves indicated that AI is expected to deliver significant productivity gains across public and private sector organisations (UK Government, 2024). With the NHS being critical to public infrastructure, the time to adopt implementation is fast approaching as confirmed by The OECD (Organisation for Economic Co-operation and Development) (2024) who state that healthcare is a key sector for the application of AI due to its data intensive nature and operational complexity. It is important to note that the implementation of AI and automation is a structural shift, not a takeover of ML and actions. Whilst jobs within the public healthcare sector may see less demand, the goal of digital integration is not to remove job roles but to reshape and transform them.

- AI should be understood as a mechanism for workforce augmentation rather than replacement. Evidence suggests that AI is more likely to transform roles by redistributing tasks within them, rather than eliminating jobs entirely (OECD, 2022). One of the most significant areas for transformation across the NHS is administrative work. A significant proportion of clinical time is currently consumed by administrative tasks, representing a major source of inefficiency within an already strained healthcare system. Reducing administrative burden is essential to improving productivity and relieving pressure on NHS services (NHS England, 2023), this can be addressed through AI, which can automate and reduce the burden of routine tasks (McKinsey, 2023). This reduces the need for NHS staff to complete routine tasks daily, meaning that time can be better spent. In the case of clinicians, for example, AI enables clinicians to focus on more complex and human-centred aspects of care (Topol, 2019) rather than spending an estimated 30% of their time on administrative tasks. This indicates that the future of healthcare will be a collaborative effort between AI, automation and human oversight rather than a replacement model. A point of consideration

alongside this collaboration still centres around role transformation. It is important to note that while AI may reduce workload, it can increase responsibility for oversight and decision validation (JMIR, 2022). Whilst Deloitte (2024) report suggest that AI can enhance workforce productivity by supporting faster and more accurate decision-making, there will need to be a reallocation of roles to ensure oversight of AI support is monitored ethically and effectively.

- The practical application of AI within healthcare becomes clearer when looking at high-pressure environments such as Intensive Care Units (ICUs). Such settings are amongst the most complex and data intensive areas of healthcare making them a strong candidate to piloting new processes and technologies. ICUs are environments where clinicians are required to process large volumes of information and make high-stakes decisions daily. Evidence suggests that clinicians in ICU may be required to process up to 1,300 data points per patient per day as well as 100 clinical decisions (Manor-Shulman et al, 2008; Mckenzie et al, 2015). The sheer number of decisions being made contributes to wider workforce pressures, including high levels of burnout among NHS staff (The King's Fund, 2024). This statistics by itself is part of a bigger problem, which is that burnout among healthcare staff is associated with reduced quality of care and increased risk of error (WHO, 2021), considering that in this department patients are already in intensive care, the risk of error could be catastrophic and underlines the need for pilot programmes to take place in ICU settings. Specifically, automation and AI can assist clinicians by identifying patterns not readily visible through manual analysis whilst reducing diagnostic error and delay in high pressure environments (Lancet Digital Health, 2023). Aiding clinicians in this way reduces cognitive load and highlights one of the key needs for AI and automation, the limitations of human cognitive capacity. The volume and complexity of data in critical care can exceed human processing capacity (Intensive Care Medicine, 2022), underscoring that high-intensity clinical environments represent key settings where AI-driven decision support can deliver significant value (OECD, 2022; WHO, 2021).

- The benefits of AI and automation are not just visible in ICU but can provide value across the NHS, particularly in relation to efficiency and relieving the severity of cost pressures. The NHS regularly operates with an annual bill in excess of £180 billion, but demand for services continue to outpace both workforce capacity and available funding (NHS England, 2023; HM Treasury, 2023). This highlights an ongoing problem within the organisation which is that these cost pressures are largely down to inefficiencies within the existing systems and operation model of the NHS, namely administrative burden across all levels of staff and fragmented and siloed processes. As clinicians have been used as an example, BMJ (2022) and Health Affairs (2023) estimate that between 30% and 50% of clinicians time is spent on administrative tasks representing the underutilisation of some of the most skilled members of the NHS workforce. Not only are they repeating routine tasks, but the time spent doing this is time where they are not using their full arsenal of expertise. Even in an

organisation the size of the NHS, marginal improvements are likely to result in significant financial gains.

- Financial sustainability is a key part of the NHS strategy and part of the many challenges impacting this is infrastructure. The organisation routinely suffers from a maintenance backlog which has remained over £10 billion and is projected to increase as the years progress (NHS England, 2023). The problem is persistent and unresolved highlighting a gap between infrastructure demand and the amount of investment available. This backlog not only represents a financial burden, but also indirectly impacts service delivery and the safety of patients. With such a large backlog, this is of primary concern when potential, but costly service improvements are being considered. The NHS cannot simply afford to increase capital or build further infrastructure so it must increase efficiency with that which is already in place, namely constrained resources. As such, AI-enabled solutions should be viewed not only as a clinical innovation but as a necessary increasingly important intervention to support the long-term sustainability of the NHS. By making processes more financially efficient within service delivery and administrative tasks, the organisation will have more financial manoeuvrability to reallocate funds and improve across the whole organisation.

- Whilst the implementation of AI is highly recommended and the benefits are significant, like all transformation projects, poor implementation can increase challenges and risk. A key challenge follows on from a common problem within the NHS, siloed working and uneven levels of collaboration. If adoption is also siloed and/or uneven across the organisation, this may result in an organisation where digital infrastructure varies across the organisation and the risk of a 'two-speed system' increases (Nuffield Trust, 2024). Varying speeds of implementation and/or use will also be dependent on the digital capability of staff. Organisations with greater resources and digital capability are more likely to benefit from AI integration whilst others may fall further behind. In the NHS this will not only reinforce inequalities of trust capabilities but also inequality in process inefficiencies that will impact service delivery. Workforce readiness remains a major barrier and NHS staff lack the training required to effectively engage with digital technology. This ultimately limits the ability to implement AI at scale (Health Education England, 2022) if training protocol is to stay as it currently is. Alongside this are important ethical and professional considerations to consider. The implementation and integration of AI into decision making raises several questions, the most important of those relate to responsibility of outcomes and accountability (General Medical Council, 2022). There is also a risk that more responsibility is given to AI through over-reliance. If not managed appropriately AI-supported systems may begin to influence clinical judgement (BMA, 2024) which in its current form, is not the primary aim. Wider concerns relate to bias and transparency with AI systems having potential to reflect existing inequalities within healthcare data (WHO, 2021). The challenge with AI is not whether or not it should be adopted, but the way in which it is implemented. There is a risk that AI could continue to embed inefficiencies rather than resolve them without a co-ordinated workforce-first approach. It is fair to say that AI is not a low-risk efficiency tool to

implement, but it is also a structural and strategic shift that must be managed carefully. Improvements must not come at the expense of safety, ethics or trust in the NHS.

- AI and automation risk reproducing and amplifying existing inequalities embedded in healthcare data and systems. Historical under-representation of some groups, including ethnic minority communities and people with disabilities, means AI models may perform less accurately for these populations, affecting diagnosis, triage and access to treatment. Without explicit safeguards, benefits may concentrate in well-resourced organisations and populations, while harms fall on those already experiencing poorer outcomes.

- Differential digital maturity across NHS trusts also risks creating a "two-speed system", where some areas gain from AI-enabled care while others fall further behind. This can entrench geographic and socioeconomic disparities and interact with protected characteristics such as ethnicity, age and disability to widen health inequalities. To address this, national policy should combine dataset-level measures (representativeness checks and bias audits) with investment to reduce digital inequality between providers.

- Governance should require routine evaluation of AI performance across key protected characteristics, transparent reporting of disparities and clear triggers for retraining, recalibration, or withdrawal where harm or inequity is identified. Equality impact assessments for high-risk tools should be mandatory, with input from clinicians, data scientists, and patient representatives from minoritised groups.

- Effective redress is central to public trust. Current accountability frameworks were not designed for AI, creating uncertainty about responsibilities between developers, NHS organisations, and clinicians. A national framework should clarify liability in AI-assisted decisions and how duties of candour, incident reporting and compensation apply. Patients should be informed when AI contributes to their care, able to question any AI-informed recommendation, and have access to rapid human review if they are not satisfied. They should also be able to decline AI-supported services where a safe alternative exists. AI-related incidents should be explicitly recorded and independently reviewed, with findings feeding back into procurement, regulation, and ongoing monitoring.

Summary of recommendations:

- Ensure national NHS workforce and digital strategies explicitly account for the current scale of AI-driven transformation required. This will help align future policy, prevent fragmented adoption and enable coordinated, system-wide implementation across NHS trusts.

- Establish a national AI workforce strategy to ensure NHS staff are equipped with the digital skills and knowledge required to engage with AI systems and to understand automation of processes at scale. This should be embedded into mandatory training frameworks.

- Embed AI into the growth strategy of the NHS. It should be given the same consideration as financial, social and sustainability objectives.

- Produce a clear national framework for AI governance, accountability and ethics. This should be introduced to ensure responsibility, clinical standards in decision-making and transparency of use across all NHS trusts.

- Adopt a workforce-first approach to underpin AI implementation. This will include ensuring that the goal of AI and automation is to collaborate with staff, reduce pressure and improve working conditions, not replace staff as a primary goal.

- Adopt incremental but high-impact AI implementation. Begin in data-intensive environments such as ICU. This will allow controlled testing in a complex setting meaning scalability to less complex environments will not be as difficult.

- Invest in reducing digital inequality across NHS trusts. This should ensure that AI adoption does not create an asynchronous system.

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