

BMHP6026: BSc (Hons) Health and Social Care

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Digital Transformation in the Health and Care Professions

Gen AI (Genetics + AI) in Health Care

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Introduction

Tucel (2023) discussed that GenAI, a hybrid of genetics and artificial intelligence, is a recent digital transformation in the UK Health and Social Care that has occurred in the last ten years. It is an innovation based on the use of AI algorithms to process complex genetic data, which allows customised medicine, better diagnostics, and targeted treatment. GenAI has been applied effectively in the UK to genomics services, including the NHS Genomic Medicine Service, and has improved the precision health methods and patient outcomes. This report will critically assess how GenAI is being implemented in the UK health and social care about its effects on the workforce, service delivery, patient experiences, and the community overall.

The evaluation aims to know the extent to which job roles and competencies have developed, the daily service operations have changed, the way patients perceive and experience their care, and how communities are impacted regarding access, participation, and community health. It is important to have a balanced appraisal because, on the one hand, GenAI has a transformative potential; whereas, technology has several issues, including adaptation of the workforce, ethical issues, privacy, and possible disparities in access (Rangarajan, 2025). It is the purpose of this report to offer a subtle perspective of positive as well as negative effects in support of informed decision-making regarding whether GenAI should be further integrated into the current health and social care systems or not.

Description of GenAI

GenAI (Genetics + AI) is a significant example of digital change in UK health and social care in the form of digital innovation. GenAI is an artificial intelligence system that combines genetic data with algorithms to improve personalized treatment plans, diagnostics, and planning. It has gained acceptance faster over the last ten years, especially following the outbreak of COVID-19, which pointed to the efficiency of digital healthcare. Rashid (2025) shows that GenAI systems are a component of the NHS genomics services, hospitals, and research centres, which are intended to enhance the concept of precision medicine. GenAI works to identify the risk of disease, tailored therapy, and predictive treatment outcomes, which is functionally referred to as a genomic data analysis.

It assists clinicians in making decisions by giving them AI-informed insights and ideas. The technology contains such aspects as health data integration, patient genomics profiling, and population health analytics. The UK government, through its 10-Year Health Plan for England, is strategically advancing AI-enabled healthcare, which is encouraging the NHS to integrate AI tools

to enlarge its workforce, enhance the quality of care, and decrease inefficiencies in its system (George, 2023).

Also, the AI implementation in healthcare is regulated by regulatory systems and agencies, including the National Commission of AI established by the MHRA to support effective and safe adoption (Patil, 2024). The need to tackle workforce shortage, individualised care, and the overall aim of health improvement among the population informs the adoption of GenAI. Although it guarantees higher diagnostic accuracy and tailored treatment, it also speaks of issues of privacy of data, equal opportunities, and the problem of adapting the workforce. This is a balanced perspective through which the critical judgement of this report on the effects of GenAI on the workforce, service delivery, patients, and communities within the UK health and social care is informed.

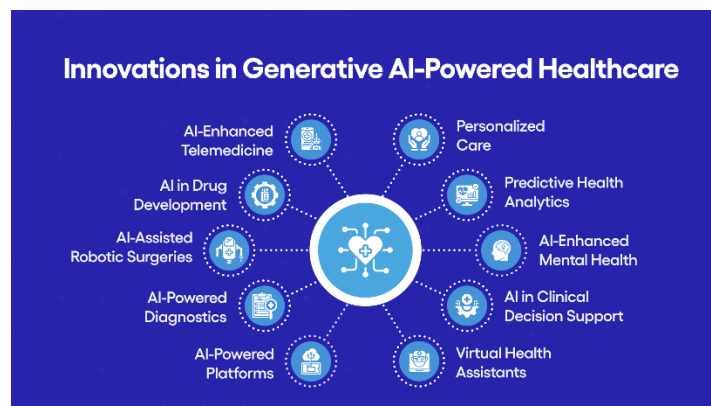


Figure 1: Gen AI in Healthcare

Source: (Insidea, 2024)

Impact on Workforce

Bekbolatova (2024), GenAI (Generative AI) has greatly influenced the workforce of the UK healthcare system by transforming the job description and imposing new skills. With gen-ai being introduced, there have emerged hybrid jobs, combining medical knowledge with data science, like clinical bio-informaticians, genomic counsellors. The traditional functions have changed as AI supplements clinical decision-making and automates simple administrative duties, leaving the medical staff with direct patient care. A study by Hussain (2022) analyses that automation of repetitive tasks has resulted in redundancy or a redefinition of some of the job positions. The development of workforce competency has turned into a priority, and NHS organisations have dumped millions of pounds on training, upskilling, and GenAI literacy programs.

These initiatives focus on ensuring that staff are well prepared to incorporate AI tools in the clinical workflows. Attitudes of the staff are ambivalent: many welcome efficiency benefits and improved decision support, whereas some people also fight back, fearing insecurity as well as ethical issues and a mismatch in skills.

Positive and Negative Outcomes

GenAI has transformed different workloads by streamlining the work of administration, increasing the speed of accessing information, and enhancing inter-professional collaboration due to common AI knowledge (Lin, 2022). Among the positive effects are efficiency improvement, making more informed clinical decisions, and an opportunity to treat patients in a personal way. On the other hand, as per Ćwiklicki (2021), discussed the issues that adapting the workforce will be difficult, some employees will face the threat of deskilling, employees will be unequal in their AI fluency, and worries about the overdependence on technology.

In general, GenAI in UK health care presents radical changes in the workforce that have to be supported with continuous training and cultural adaptation (Mahabub, 2024). It is essential to create a balance between technological gains and human discretion and overcome the fears of the workforce to ensure that patient care remains of the highest quality and safety level.

GenAI Impact on Service Delivery

The field of GenAI in healthcare has brought significant transformations to the routine activities and workflows by automating everyday administrative tasks such as medical record keeping, enabling clinicians to pay increased attention to patients. Its integration will facilitate the workflow by providing personalised treatment plans with AI-based risk prediction and real-time clinical decision support. Research by Alowais et al. (2023) evaluated that remote patient monitoring technologies and virtual care platforms have facilitated access to services by allowing patients to communicate at home and lessening the clinic waiting time.

GenAI helps with better diagnostic possibilities and precision of treatment, which improves the quality and timeliness of care. The innovation is normally seamless with the current NHS digital infrastructures, but has to be aligned with the legacy systems, which can be difficult to roll out. Shared AI-generated insights support interdisciplinary collaboration with communication across and between clinical teams (Lee, 2023). There is also patient-provider communication through AI-enabled education tools, monitoring, and follow-ups.

Positive and negative

The use of generative AI (GenAI) in the UK in health and social care has resulted in many positive effects. It has simplified services by automating routine administrative processes, which has minimised the workload of clinicians, giving them more time to care for patients. The insights provided by AI support the coordination and communication of different teams in healthcare, enhancing the collaboration of multidisciplinary teams. Bhuyan et al. (2024) show that diagnostic accuracy will be enhanced by the AI-supported image analysis, predictive analytics, which results in minimised errors, more individualised, data-driven treatment plans offered by AI. Service accessibility has improved through the remote monitoring technologies and telehealth, where timely care delivery is possible even in remote areas.

All these innovations enhance patient outcomes, which play a role in creating more efficient and responsive health services. Nevertheless, the introduction of GenAI also has several adverse effects. Reddy (2024) also analyses that delays in implementation are likely to be a problem since the integration of AI and the existing NHS systems is complicated, which disrupts the service continuity. The malfunctions of AI systems or bugs may disrupt working processes and affect the delivery of patient care. Employees will feel resistant to change, where workflow will be interrupted, and adjustment to new technology will be a challenge.

Impact on Patient/Service User

The UK healthcare system has been significantly influenced by generative AI (GenAI) in its perceptions and experiences by patients. Sai et al. (2024) discussed that GenAI allows patients to have better interactions and feel empowered since it can analyse genetic and clinical data and provide patients with personalised care and real-time health monitoring. AI-powered portals and telehealth platforms enhance access to personal health information and enable patients to have more control and increased convenience in managing their health. Chronic disease management is among the areas of benefit of remote monitoring, as patients can receive care even if they are not in the hospital.

Positive and Negative Outcomes

GenAI helps to improve patient experiences and perceptions because it leads to more personalised care due to individual genetic profiles and clinical histories. It allows patients to gain better engagement and empowerment by having an easier experience in accessing health information, telehealth, and remote monitoring solutions, which may provide convenience and continuous care (Ghunaim, 2024). GenAI will increase the accuracy of diagnoses and accelerate

the treatment plan, which will last longer and lead to better patient results and safety. Also, AI-based chatbots and virtual assistant computers offer 24/7 assistance to patients and health-related information available in simple and understandable terms, which enhances patient autonomy.

Alowais et al. (2023) indicate that privacy and security issues related to GenAI have become a concern because GenAI uses sensitive genetic and health data, which may negatively impact patient confidence. The issue of digital exclusion has not stopped, since older adults and disadvantaged populations might have less access or ability to utilise AI-driven technologies, and this will result in disparities in healthcare access. The more prominent application of AI can also introduce the risks of over-dependence on automated tools, which can lead to the inability to guarantee safety in case of AI suggestions being false or biased.

Impact on Community

General AI (GenAI) has also played a major role in the location dynamics of patients and service users in the UK, filling the knowledge gaps between the rural and urban healthcare accessibility. GenAI applied in rural settings with telemedicine allows remote diagnostics and monitoring, and the necessity to travel is minimised, which addresses the historical problem of healthcare access (Reddy, 2024). One of the positive effects of this technology on underserved groups is that it allows the transfer of the expertise of specialists virtually, which could lessen the health disparities. To the family members and caregivers, as per Bhuyan et al. (2025), highlights that GenAI can provide a better engagement and support by providing real-time monitoring of health data to alleviate caregiving burden and initiate proactive interventions in real time. But not all families can easily exploit these technologies to their full potential, due to the digital literacy and infrastructure gap, and this can become a burden to them instead.

GenAI promotes health co-production where patients and communities actively engage in their health care plans with the aid of improved data insights and communication systems. It improves the health outcomes of individuals because AI is more effective in monitoring disease, creating individualised prevention strategies, and distributing resources (Mbung, 2021). Nevertheless, its role in health inequalities reduction is both positive and negative. Although GenAI increases access, there is a threat of digital division between marginalised groups without a trusted internet or technology knowledge. The level of acceptance by the community is understandable, as some communities see the potential of AI to provide improved care, whereas

others are sceptical or resistant because of privacy and the lack of knowledge about the technology.

Conclusion

Generative AI (GenAI) is an innovative breakthrough in the field of health and social care in the UK, with the potential to have a considerable positive effect on personalised medicine, diagnostic accuracy, and workflow optimization. It also has a positive influence on the workforce by producing new jobs, strengthening competencies, and lowering the burden of administration, besides simplifying service delivery to increase accessibility and coordination. Patients can enjoy more interaction and autonomy and personalised care, and remote monitoring and telehealth expand access to health care, particularly in rural and underserved communities.

Nonetheless, these innovations are associated with such pitfalls as adjusting the workforce, challenges in data privacy, the possibility of being digitally marginalised, and complexities in implementation in the current healthcare systems. The effects of GenAI on the community are both beneficial and detrimental, as it enables the production of health and health enhancement at the community level, as well as results in increased inequalities in case the problems of access and literacy remain unaddressed. It is imperative to strike a balance between these positive and negative results. Ongoing investment in training, sound ethical systems, good access policies, and technological interoperability will become critical to realise the full potential of GenAI safely and effectively to improve the quality and equity of healthcare in the UK.

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