**Response to the AI Healthcare Commission Consultation by the Institution of Engineering and Technology**

## About the Institution of Engineering and Technology (IET)

The IET is a trusted adviser of independent, impartial, evidence-based engineering and technology expertise. We are a registered charity and one of the world's leading professional societies for the engineering and technology community with over 158,000 members worldwide in 148 countries. Our strength is in working collaboratively with government, industry and academia to engineer solutions for our greatest societal challenges. We believe that professional guidance, especially in highly technological areas, is critical to good policy making.

## Executive summary

With the publication of the 10 Year Plan and Life Sciences Strategy outlining digital transformation of the NHS, there is a significant opportunity to reshape healthcare delivery through innovation, however implementation is going to be key to success. It is, therefore, important to ensure that when considering regulation of AI in healthcare we start with the service transformation requirements and then consider the technological solution. Human centred design and transparent interfaces are essential for day-to-day clinical adoption. Before a product is developed, it is important to know the usefulness, usability and value to the system. AI should support existing patient pathways, build resilience and improve data flow within healthcare. Regulatory expectations should explicitly reference cognitive load reduction, support for shared decision making, and safeguards against automation bias. To do this a systems thinking approach is required.

**Key recommendations:**

1. **The Responsible Handover of AI should be included as part of ethical guidance.**
2. **Systems thinking must be used to ensure that there are patient pathways and adequate workforce capacity in place to direct patients to once they have been diagnosed.**
3. **We advise continued development of technical standards, transparent documentation expectations, and harmonisation with international frameworks.**
4. **There needs to be transparency on what data has been used to develop the AI tools that are being used.**
5. **An oversight body, potentially the MHRA, should be used to assess the technology on its usefulness, usability, and value to the system.**
6. **IET recommends an infrastructure plan for power stability and connectivity, alongside targeted funding to ensure resilience and safe development of robotic technology in healthcare.**
7. **We recommend adoption of a structured and robust cybersecurity assurance model and the routine use of continuous monitoring tools for detecting drift,**

**anomalies, or unsafe behaviour across the lifecycle of artificial intelligence-driven systems.**

**Regulation and data**

As regulation of AI across sectors develops it will be important to harmonise and share best practice through collaboration amongst regulators. With regards to healthcare technology, there is currently a gap between the design of the technology at the innovation and engineering stage to the development and launch of these technologies. **It is important in healthcare to start with the challenge and assess what is needed for service transformation before selecting the correct technology to address the problem**. To bridge this gap, the IET recommends that **a body should be responsible for assessing the technology on its usefulness, usability, and value to the system in addition to its safety and efficacy.**

The NHS holds large amounts of data and AI technology will consume that data; however, quality and consistency vary significantly across systems and trusts. Differences in technology, such as varying models of scanners, can result in incompatible data formats, making interoperability a challenge. Addressing these disparities is essential for building a cohesive digital infrastructure that works in practice. Additionally, wearable smart devices offer a potential source of data from healthy individuals (as opposed to a representative population), but safeguards must be in place to ensure wearables are medical grade technology. It is critical that the appropriate legal and regulatory structures are in place to allow AI's safe development and use. **The IET recommends that the Responsible Handover of AI should be included as part of ethical guidance**.

As decentralised care models grow, reliance on consumer wearables raises questions about regulatory standards. Many devices may not meet the necessary thresholds for clinical use and as they develop will be increasingly using technology such as AI. Greater support is needed for initiatives like the Centres of Excellence for Regulatory Science and Innovation (CERSIs) and the Regulatory Innovation Office (RIO) to transfer regulatory learning across sectors. There needs to be greater transparency around the training and operation of AI systems. Industry and academics must also be educated on the importance of initiating regulatory pathways early in the design phase. Developing standards, and codes and guidance for developers is critical to successful innovation**. We advise continued development of technical standards, transparent documentation expectations, and harmonisation with international frameworks** to ensure global compatibility across regulation frameworks such as the FDA approval and evolving EU related frameworks.

There is also a fundamental issue with access to data, particularly for diagnostics. Ethical data sharing is going to be critical to the successful development, deployment and assessment of tools. Techniques that are advocated by big data should be incorporated, such as the use of high quality and real time data. The IET recommends that there needs to be transparency on what data has been used to develop the AI tools that are being used. However, to do this there is a need for diverse data as there will naturally be a bias in the data if people are volunteering their data or if it is trained solely on healthy or unhealthy populations.

The MHRA already acknowledges the need for risk-based oversight and structured mechanisms for monitoring post-market performance and adaptive updates (MHRA, Impact of AI on the regulation of medical products. The IET supports expanding use of digital twins, simulation environments, and regulatory sandboxes such as the MHRA AI-Airlock to ensure controlled testing of system updates without exposing patients to unnecessary risk (Gov.UK, AI Airlock: the regulatory sandbox for AIaMD).

## Diagnostics

Although the use of AI for diagnostics has profound potential to support the delivery of care, it is also a strong example of where **systems thinking must be used to ensure that there are patient pathways and adequate workforce capacity in place to direct patients to once, they have been diagnosed.** There is also a need to consider the effects of over-reliance of AI. Research by the Lancet Gastroenterology & Hepatology journal in August 2025 found that in patients who underwent colonoscopies with and without AI-assisted systems, endoscopists introduced to an AI-assistance system had a 20% drop in detection rate after they no longer had access to the AI tools they were introduced to (The Lancet Gastroenterology & Hepatology, Endoscopist deskilling risk after exposure to artificial intelligence in colonoscopy: a multicentre, observational study).

Therefore, it is important to highlight that an increase in diagnostics alone is not necessarily beneficial. Diagnostic tools must be developed and implemented through a systems-based approach, ensuring that the care pathways and workforce they direct patients to are in place. Additionally, the potential effects of over-reliance on AI should be considered, as it may impact the ability of medical professionals to identify anomalies independently. It is the role of the developer to monitor the technology after it has been deployed as there is also a need for post-market surveillance. To monitor the technology, staff using it should be trained to spot deviations in how the technology should be working, such as algorithm drifting, and report it to the manufacturer.

## Robotics

In order to successfully implement digital technologies in the health service, for example, the use of robotics in surgery, it is imperative to have a resilient telecommunication and connectivity infrastructure.

In the 10 Year Infrastructure Strategy, it states that part of the £725 billion funding towards social and economic infrastructure will cover digital connectivity by continuing investment in high-speed internet access via Project Gigabit. It also highlights government's ambition for all populated areas to have standalone 5G by 2030. (GOV.UK, UK Infrastructure: A 10 Year Strategy) However, there is no mention of work towards 6G, or investment for upgrading mobile connectivity in healthcare structures.

6G provides sub-millisecond latency, ultra-high reliability, and massive bandwidth, which 5G is unable to provide. While 5G technology can be suitable for surgical procedures that are not overly complex, the use of robotics or telesurgery in the future for more complex surgeries will not be possible due to the latency of 5G compared to 6G (ScienceDirect, A smart contract-based robotic surgery authentication system for healthcare using 6G-Tactile Internet).

When considering resilience of infrastructure, power stability is important, especially with the increased use of robotics and AI in surgery, diagnostics and clinical practice. In the 10 Year Infrastructure Plan, it states that £70 billion of funding to be used over the next five years for targeted infrastructure replacement, maintenance, critical safety and the wider DHSC portfolio. However, due to the amount of energy needed to safely run robotics in surgery, it is imperative that funding is specifically allocated to ensure that healthcare-built environments have the power capabilities to use these technologies. **IET recommends an infrastructure plan for power stability and connectivity, alongside targeted funding to ensure resilience and safe development of robotic technology in healthcare.**

## Built environment

Further, the built environment of healthcare settings needs to be considered. Without this, technology cannot be used. The Government has already highlighted plans of essential maintenance in public buildings, including hospitals in their UK Infrastructure: 10 Year Strategy, including £6 billion per year from 2025-26 to 2034-35 for maintenance and repair of the NHS estate. However, the subsequent 10 Year Plan does not go into detail on what maintenance, or repair would need to be undertaken to allow for hospitals to be "fully AI-enabled within the lifetime" of the plan (NHS, Fit for the future: 10 Year Health Plan for England).

## Cybersecurity

There is a risk, however, with the use of digital technologies such as robotics or AI, of cyberattacks. AI misinformation or cyber security attacks can be significant. With an increase in the number of devices connected by digital networks, it can expose hospital digital infrastructure to new risks. AI-driven malicious misinformation campaigns could mislead operators or automated systems, causing disruptions and outages. An AI system manipulated by false data could also open vulnerabilities that hackers could exploit, such as misleading data analysis and faulty decision making. **We recommend adoption of a structured and robust cybersecurity assurance model** and the routine use of continuous monitoring tools for detecting drift, anomalies, or unsafe behaviour across the lifecycle of artificial intelligence-driven systems.

To minimise risk, it is imperative we, as a country, develop a better, broader definition of safety and the risks of AI tools. As cybersecurity is a fast moving issue, we should look to use existing guidance on cybersecurity for medical devices, and continue to review and build on these principles, for example the US Food and Drug Administration (FDA, Cybersecurity in Medical Devices: Quality System Considerations and Content of Premarket Submissions) and the International Medical Device Regulators Forum (IMDRF, Principles and Practices for Medical Device Cybersecurity). This will also help AI developers ensure their product is safe and fit for purpose before going to market. This will lead to robust and transparent AI systems that are subject to comprehensive ongoing validation and verification processes (IET, Spending Review 2025). There should also be effective cybersecurity measures to protect AI systems from manipulation. Communicating the potential threats and risks around AI will increase awareness, develop competence, and create the correct cyber security culture within an organisation. This will make the UK a leader in AI safety.

## Resilience

When considering resilience of infrastructure, power stability is important, especially with the increased use of robotics and AI in surgery, diagnostics and clinical practice. In the 10 Year Infrastructure Plan, it states that £70 billion of funding will be used over the next five years for targeted infrastructure replacement, maintenance, critical safety and the wider DHSC portfolio. However, due to the amount of energy needed to safely run robotics in surgery, it is imperative that funding is specifically allocated to ensure that healthcare-built environments have the power capabilities to use these technologies.

Mechanisms are already in place to encourage safe use of new products by patients, such as a number of digital apps and online forms. These are used to empower patients to manage their health, streamline healthcare interactions, and improve overall wellbeing and clinical decision-making. The NHS app can be updated to include these new products, with guides and tutorials included when the product is first used through the app. It is important to have community engagement involving diverse user groups in order to ensure inclusive design as well as demonstrating the value of the products.

## Skills

A recent IET survey of engineering employers found that the most important digital skills for growth over the next five years include automation (38%), cyber security (38%), data engineering (34%), and software engineering (33%) (IET, 2025 UK Engineering and Technology skills survey). However, the survey found that automation ranks highest as the area in which engineering employers feel they do not have the necessary digital skills (30%).

Reskilling and upskilling are critical to ensuring robust cyber resilience on a day-to-day basis. A cyber cultural change needs to be encouraged through greater learning and cyber awareness, to ensure that the UK is protected from the increasing threat of cyber-attacks. One example where healthcare facilities are being particularly targeted is via QR phishing (Quishing) – using fake QR codes to target patients and healthcare professionals, as they would not normally expect to be targeted in a public place. According to the latest IET Skills Survey one of the most important digital skills that employers ranked highly for growth is cyber security (38%), however cyber security is also the digital skill that employers find the most difficult to recruit for (17%) (IET, 2025 UK Engineering and Technology skills survey).

## Conclusion

The IET supports the UK Government's continued commitment to a pro innovation yet safety focused approach to regulating artificial intelligence within the healthcare sector. Through alignment with the recent strategies such as the 10 Year Plan, Artificial Intelligence White Paper, the MHRA's strategic publications, and national initiatives such as regulatory sandboxes and reform programmes, the UK is well positioned to lead globally in responsible deployment of artificial intelligence-driven medical technologies from diagnosis to decision making and beyond. We look forward to contributing further as these frameworks continue to evolve.