

HEALTHCARE LIABILITY

LEADERSHIP & INNOVATION

Data and Artificial Intelligence in a Transforming National Health Service

The National Health Service is 70 years old this year and many have turned their mind's eye back to its conception and transformation since 1948. It is source of national pride, often cited as the jewel in the Queen's crown¹.

As technology evolves, the healthcare sector and the NHS are evolving with it to deliver more efficient and safer patient care. The King's Fund, a healthcare think-tank in London, published a report on what new technology will mean for the NHS and its patients².

Artificial intelligence (AI) and data

The healthcare sector generates a massive amount of data. This comes from the NHS, collecting billions of clinical and administrative data items each week; from patients' remote monitoring devices and pharmaceutical devices. The use of this data and AI can be harnessed to improve care and reduce variation in clinical practice.

The potential of linking data

- **Reduce variation in clinical practice.** If a patient attends with a suspected stroke, the doctor could trigger a stroke workflow by clicking one button—this would then organise the laboratory tests, the CT scan, and the administration of IV medications. Data can also be collected if the clinicians waiver from protocol which could allow analysis of what influences this might have on clinical outcomes.
- **Understand how diseases arise and thus, how they can be detected earlier or prevented altogether.** Causes of disease are often multifactorial. Combining social data with clinical data on diagnoses, treatment and lifestyle has the potential to help us understand the likelihood of disease within different populations.
- **Use linked data to develop targeted treatment.** Linking patient information, including the medical history and genome, may allow us to evaluate which of the available treatments is most effective, with the best side effect profile.
- **Use consumer devices to monitor the whole population and therefore establish population-level datasets.** This could enable early intervention for at-risk patients.

Potential uses of AI

- **Use algorithms to interpret CT or MRI scans** to detect tumours, which can learn and evolve as they gain more information about the task.
- **Triage in primary care.** Patients can enter their symptoms into a platform and, depending on the data inputted, they are led down particular pathways, including self-care, GP, out of hours or the emergency department. This could be more accurate than the current online triage resources, which do not have a learning algorithm and tend to be overly cautious.
- **Improving back functions including assisting with theatre scheduling.** It has been suggested that AI could solve scheduling problems more quickly than humans and could improve patient care and productivity gains.
- **Enhanced detection of diseases.** There are promising results in detecting pneumonia, breast and skin cancers, and eye diseases.
- **ECG interpretation.** The Ultromics system, trialled at John Radcliffe Hospital in Oxford, has used AI to analyse patterns of heartbeats to diagnose ischaemic heart disease.
- **Doctor's assistant.** A Chinese robot that has recently passed a medical licensing written exam will capture and analyse patient information to make initial diagnoses and assist doctors to improve efficiency of treatment plans.

How does the general public feel about the risks and benefits of using machine learning for diagnosis?

The Health Foundation asked a sample of people about their views regarding the balance of risks and benefits with computers analysing medical records to help diagnose patients. The majority of people responded that they believed the benefits either outweigh or are equal to the risks.

How comfortable are patients with digital sharing of personal health data?

The evidence for this is mixed. It seems that people are generally happy for their data to be shared between healthcare professionals that care for them, and many assume that this already takes place. However, there was a general lack of support for commercial organisations accessing healthcare data for health research.

Limits of AI

AI depends on digital data, so inconsistencies in the data could limit its potential. In addition, a large amount of computing power is required for the analysis of complex data sets. Moreover, clinical practice often requires sensitivity and requires one to take into account the patient's context, and respond to social cues. Would artificial intelligence be able to replicate this important part of the consultation process? Some have debated whether this element of being human can be taught. Furthermore, if AI platforms start to carry out a wide range of tasks without human control or input, then would these platforms need to be able to make ethical decisions? Can ethics and values be coded? Who would code these ethics, and would these codes reflect the coder's values? Does a robot even have the same responsibilities as a human or would we need to develop a new ethical code for these types of machines?



Challenges for governance

There are a number of questions that have been raised. For example, is there now a requirement for AI systems to be regulated distinctly, or should current policy be updated with the development of AI in mind? We maintain that it is important that AI is developed transparently, with accountability and is compatible with the public interest. Who is liable if patient harm occurs as a result of a malfunctioning AI system? There are many different parties involved in the delivery of healthcare via an AI system, and apportionment of liability has not yet been tested. In its infancy, a medical professional should oversee any AI systems, in order to ensure that a minimum standard of care is delivered to all patients — regardless of the mode of delivery.

Sources and further reading

¹ [Camden New Journal](#)

² What will new technology mean for the NHS and its patients? Four big technological trends. Sophie Castle-Clarke. [Kingsfund](#).

• [NuffieldBioethics](#)

• The Robot Will See You Now: Meet Xiaoyi, the First Robot to Pass China's Medical Licensing Exam. ECRI Institute; November 2017.

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