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THE POTENTIAL OF AI IN TRANSFORMING CANCER OUTCOMES

Cancer Research UK (CRUK) sees significant potential in the use of artificial intelligence (AI) in both medical research and healthcare. The UK is well-placed to be a world leader in AI, thanks to its capabilities in medical research and computer science, and the unique benefit of the NHS. However, there are several considerations if the UK is to realise the potential of AI in transforming cancer outcomes.

Early detection and diagnosis of cancer is crucial if we are to improve cancer survival in the UK. International comparisons suggest that cancer survival in the UK lags behind other comparable countries.

The Government's mission to revolutionise healthcare using the power of artificial intelligence is pioneering. Advances in detection technology specifically have the potential to save hundreds of thousands of lives every year. We need to ensure we have the right infrastructure, embedded in our health system, to make this possible.

CANCER RESEARCH UK'S RESEARCH ACTIVITY ON AI

We are in the early stages of exploring AI in our research. Some of our ongoing projects that we fund or support include:

- A Data Study Group, in collaboration with the Turing Institute, investigating the application of machine learning in chemoprevention for breast cancer
- Three of the ten shortlisted Grand Challenge teams' plans involve artificial intelligence. The projects include using AI to diagnose cancers earlier and predicting response to treatment
- Multi-parametric ultrasound imaging for assessment of tumour response to radiotherapy
- The 'Optimam' project, investigating the application of AI in breast cancer screening

AI IN THE NHS

Earlier detection and diagnosis could fundamentally transform outcomes for people with cancer. For this reason, so far we have focused our attention on the potential of AI in cancer diagnostics – although we recognise it could have an impact in many areas of healthcare.

In the future we will see more patients diagnosed with cancer, more older patients, and more patients with comorbidities and complex care needs. Cancer services are already under significant pressure.

The NHS is facing critical staff shortages, especially in diagnostic specialties such as radiology and pathology – which play a key role in the diagnosis of cancer. It is often assumed that AI could streamline aspects of the diagnostic process, freeing up valuable time for staff to focus on other activities, including patient care, service improvement and research.

For more information please contact Rose Gray, Policy Manager at rose.gray@cancer.org.uk or 020 3469 8046.

Our view on the future of AI in cancer diagnostics is as follows:

- AI will be most applicable to tasks which are binary, repetitive and underpinned by large datasets
- AI could therefore be used in cancer screening. However, we do not think that it will be in routine NHS use for at least the next five years, and only for certain aspects of cancer screening
- AI could also enable more health professionals to work to the top of their license, by automating less complex tasks
- We must be cautious not to overestimate the impact of AI in radiology – particularly since radiologists only spend a small amount of time doing tasks that could be replicated by AI

For AI to make an impact, there must be:

- High-quality data input and quality assurance, as well as interoperability between systems. Investment in data-holding organisations such as NHS Digital and Public Health England will be critical
- Digitisation of radiology and pathology images
- Access to large datasets for training, and that can be curated for research
- A reduction of the current pressure on staff, so that they have the headspace to innovate
- Strong pathways for adoption and diffusion. Centres of excellence will play a critical role
- Good communication and engagement with patients and the public. The work of the National Data Guardian and of Understanding Patient Data should be central to this.
- Strong safeguards governing the use of personal data

In summary, we do not foresee AI replacing the jobs of pathologists and radiologists. While their roles might change, AI will be used in tools that would augment their activity, rather than replacing it. This is in line with the conclusions of the Topol Review's interim report, which predicts that AI will give the 'gift of time': technology should be used to give more time for care, thus enhancing the patient-clinician relationship.

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