AI at the forefront of efforts to treat coronavirus patients

- AI imaging database will improve diagnosis of patients presenting with COVID-19 symptoms
- Increased speed and accuracy in diagnosis can lead to early medical intervention and save lives

NHSX, a unit tasked with driving the digital transformation of care in the NHS, has brought together over 40,000 CT scans, MRIs and X-rays from more than 10,000 patients across the UK during the course of the pandemic.

Access to this National COVID-19 Chest Imaging Database (NCCID) has now been extended to hospitals and universities across the country who are using the images to track patterns and markers of illness. The database can speed up diagnosis of COVID-19, leading to a quick treatment plan and greater understanding of whether the patient may end up in a critical condition.

Matt Hancock, Secretary of State for Health and Social Care, said:

> The use of artificial intelligence is already beginning to transform patient care by making the NHS a more predictive, preventive and personalised health and care service.
>
> It is vital we always search for new ways to improve care, especially as we fight the pandemic with the recovery beyond. This excellent work is testament to how technology can help to save lives in the UK.

Clinicians at Addenbrooke's Hospital in Cambridge are developing an algorithm based on the NCCID images to help inform a more accurate diagnosis of patients when they present to hospital with potential COVID-19 symptoms and have not yet had a confirmed test. Using visual signatures of the virus, as they appear in chest scans, they are able to compare the patterns in the patient's imaging with those seen previously in the NCCID to get a more accurate diagnosis and prognosis.

Understanding the earlier stages of disease means that clinicians are more easily able to implement appropriate, early medical interventions, reducing the potential for later complications. This includes giving patients oxygen and medication before they reach a critical stage, and predicting the need for additional ICU capacity, enabling the management of beds and staff resource in those settings.

Carola-Bibiane Schoñlieb, Professor of Applied Mathematics and head of the Cambridge Image Analysis group at the University of Cambridge, said:

The NCCID has been invaluable in accelerating our research and provided us with a diverse, well-curated, dataset of UK patients to use in our algorithm development.

The ability to access the data for 18 different trusts centrally has increased our efficiency and ensures we can focus most of our time on designing and implementing the algorithms for use in the clinic for the benefit of patients.

By understanding in the early stages of disease, whether a patient is likely to deteriorate, we can intervene earlier to change the course of their disease and potentially save lives as a result.

The NCCID is also helping researchers from universities in London (University College London), and Bradford, to develop AI tools that could help doctors improve the treatment for patients with COVID-19.

The database is helping to inform the development of a potential national AI imaging platform to safely collect and share data, developing AI technologies to address a number of other conditions such as heart disease and cancers.

The NCCID is one workstream taken forward by the NHS AI Lab at NHSX. The NHS AI Lab has also set up and launched a £140 million AI award this year in collaboration with the Accelerated Access Collaborative (AAC) and National Institute for Health Research (NIHR), which aims to bring the benefits of AI technologies to patients and staff across health and care. Initial bids were awarded to 42 organisations in September 2020 with a further round of bids closing last month.

Dominic Cushnan, Head of AI Imaging at NHSX, said:

We are applying the power of artificial intelligence to quickly detect disease patterns and develop new treatments for patients. There is huge potential for patient care, whether through quicker analysis of chest images or better identification of abnormalities.

The industrial scale collaboration of the NHS, research and innovators on this project alone has demonstrated the huge potential and benefits of technology in transforming care.

Evis Sala, Professor of Oncological Imaging at the [University of Cambridge](), said:

The NCCID team have been extremely knowledgeable, helpful and responsive to our questions throughout the process. This is precisely the initiative we need to ensure we are better prepared and more responsive for future pandemics.

Dr Joe Jacob, consultant radiologist and research lead at BSTI, said:

> The National COVID-19 Chest Imaging Database was developed with the support and enthusiasm of chest radiologists and healthcare professionals from around the United Kingdom.
>
> Their efforts have helped to provide a resource that will help the NHS in the management of the healthcare emergency engendered by COVID-19.

NHSX was able to quickly establish the project during the spring by working closely with Royal Surrey NHS Foundation Trust to scale up an existing data collection process.

Dr Mark Halling-Brown, Head of Scientific Computing at Royal Surrey County Hospital, said:

> Royal Surrey NHS Foundation Trust has led the way in creating and sharing research imaging databases that have enabled the development of AI tools, and has more recently specialised in the evaluation and validation of AI radiology products within a range of specialties supporting their safe deployment into the clinic.
>
> Our expertise allowed us to help build the National COVID-19 Chest Imaging Database and we are excited by the potential of the AI solutions being developed and the research underway that will use this dataset.

Led by NHSX, the NCCID is a collaborative effort with the British Society of Thoracic Imaging (BSTI), Royal Surrey NHS Foundation Trust and Faculty, a London-based AI specialist.

All of the scans in the library are stripped of any identifying patient details by each hospital trust before they are submitted to the national collection, ensuring researchers are only able to access pseudonymised information.

To deliver technology for use in health and care, the NHS AI Lab has also this week published [A guide to good practice for digital and data-driven health technologies](#), setting out what the NHS is looking for when it buys digital and data-driven technology for use in health and care.

[Find out more about the NCCID and see a full list of research projects](#)

The full list of NHS trusts submitting data is below and we actively encourage more trusts to send in their data to continue to grow the database:

1. Royal United Hospitals Bath NHS Foundation Trust
2. Brighton and Sussex University Hospitals NHS Trust

3. London North West University Healthcare NHS Trust
4. George Eliot Hospital NHS Trust
5. Cwm Taf Morgannwg University Health Board
6. Hampshire Hospitals NHS Foundation Trust
7. Betsi Cadwaladr University Health Board
8. Ashford and St Peter's Hospitals
9. Royal Cornwall Hospitals NHS Trust
10. Sheffield Children's NHS Foundation Trust
11. Liverpool Heart and Chest Hospital NHS Foundation Trust
12. Norfolk and Norwich University Hospitals NHS Foundation Trust
13. Royal Surrey NHS Foundation Trust
14. Sandwell and West Birmingham NHS Trust
15. West Suffolk NHS Foundation Trust
16. Somerset NHS Foundation Trust
17. Cambridge University Hospitals NHS Foundation Trust
18. Imperial College Healthcare NHS Trust
19. Oxford University Hospitals NHS Foundation Trust
20. Sheffield Teaching Hospitals NHS Foundation Trust

See a list of [AI in Health and Care Award winners](#)