

AI could help identify high-risk heart patients

<https://bit.ly/su-away-ai-1>

BBC 31 August 2024

Artificial intelligence (AI) could help GPs identify patients most at risk of developing conditions that could lead to fatal heart problems.

The University of Leeds has helped train an AI system called Optimise, that looked at health records of more than two million people.

Researchers found that in many cases patients had undiagnosed conditions, or had not received the medications that could help reduce their risk.

Dr Ramesh Nadarajah, from the university, said preventing conditions worsening was often cheaper than treatment.

Of those two million records that were scanned, more than 400,000 people were identified as being high risk for the likes of heart failure, stroke and diabetes.

This group made up 74% of patients who died of a heart-related condition.

In an Optimise pilot involving 82 high-risk patients, one in five were found to have undiagnosed moderate or high-risk chronic kidney disease.

More than half of patients with high blood pressure were given different medication to better manage their heart risk.

The approach could allow medics to treat patients earlier, helping to relieve pressures on the NHS, the study found.

Dr Nadarajah, a health data research fellow, said heart-related deaths are often caused by a constellation of factors. "This AI uses readily available data to gather new insights that could help healthcare professionals ensure that they are providing timely care for their patients."

Relieving pressure on NHS

Plans are in place to carry out a larger clinical trial, according to researchers, who presented their findings at the European Society of Cardiology Congress in London.

"We hope our research will ultimately benefit patients living with heart and circulatory diseases, as well as helping relieve pressure off our NHS systems," Dr Nadarajah added.

"Next, we plan to perform a clinical trial where we are providing doctor-led care to patients."

Prof Bryan Williams, chief scientific and medical officer at the British Heart Foundation, which funded the study, said diagnosing people early was key to reducing hospital admissions.

"A quarter of all deaths in the UK are caused by heart and circulatory diseases and this new and exciting study harnesses the power of ever-evolving AI technology to detect the multitude of conditions that contribute to it."

NHS AI test spots tiny cancers missed by doctors

<https://bit.ly/su-away-ai-2>

BBC 21 March 2024

An AI tool tested by the NHS successfully identified tiny signs of breast cancer in 11 women which had been missed by human doctors.

The tool, called Mia, was piloted alongside NHS clinicians and analysed the mammograms of over 10,000 women.

Most of them were cancer-free, but it successfully flagged all of those with symptoms, as well as an extra 11 the doctors did not identify.

At their earliest stages, cancers can be extremely small and hard to spot.

The BBC saw Mia in action at NHS Grampian, where we were shown tumours that were practically invisible to the human eye. But, depending on their type, they can grow and spread rapidly.

Barbara was one of the 11 patients whose cancer was flagged by Mia but had not been spotted on her scan when it was studied by the hospital radiologists.

Because her 6mm tumour was caught so early she had an operation but only needed five days of radiotherapy. Breast cancer patients with tumours which are smaller than 15mm when discovered have a 90% survival rate over the following five years.

Barbara said she was pleased the treatment was much less invasive than that of her sister and mother, who had previously also battled the disease.

She told me she met a relative who expressed sympathy that Barbara had "the Big C".

"I said, 'it's not a big C, it's a very little one,'" she said.

Without the AI tool's assistance, Barbara's cancer would potentially not have been spotted until her next routine mammogram three years later. She had not experienced any noticeable symptoms.

Because it works instantly, tools like Mia also have the potential to reduce the waiting time for results from 14 days down to three, claims its developer Kheiron.

None of the cases in the trial were analysed by Mia alone - each had a human review as well. Currently two radiologists look at each individual scan, but the hope is that one of them could one day be replaced by the tool, effectively halving the workload for each pair.

Of the 10,889 women who participated in the trial, only 81 did not want the AI tool to review their scans, said Dr Gerald Lip, clinical director of breast screening in the north east of Scotland and the doctor who led the project.

AI tools are generally pretty good at spotting symptoms of a specific disease, if they are trained on enough data to enable them to be identified. This means feeding the programme with as

many different anonymised images of those symptoms as possible, from as diverse a range of people as possible.

Getting hold of this data can be difficult because of patient confidentiality and privacy concerns.

Sarah Kerruish, Chief Strategy Officer of Kheiron Medical, said it took six years to build and train Mia, which is run on cloud computing power from Microsoft, and it was trained on "millions" of mammograms from "women all over the world".

"I think the most important thing I've learned is that when you're developing AI for a healthcare situation, you have to build in inclusivity from day one," she said.

Breast cancer doctors look at around 5,000 breast scans per year on average, and can view 100 in a single session. "There is an element of fatigue," said Dr Lip.

"You get disruptions, someone's coming in, someone's chatting in the background. There are lots of things that can probably throw you off your regular routine as well. And in those days when you have been distracted, you go, 'how on earth did I miss that?' It does happen."

I asked him whether he was worried that tools like Mia might one day take away his job altogether.

He said he believed the tech could one day free him up to spend more time with patients.

"I see Mia as a friend and an augmentation to my practice," Dr Lip said.

Mia isn't perfect. It had no access to any patient history so, for example, it would flag cysts which had already been identified by previous scans and designated harmless.

Also, because of current health regulation, the machine learning element of the AI tool was disabled - so it could not learn on the job, and evolve during its use. Every time it was updated it had to undergo a new review.

The Mia trial is just one early test, by one product in one location. The University of Aberdeen independently validated the research, but the results of the evaluation have not yet been peer reviewed. The Royal College of Radiologists say the tech has potential.

"These results are encouraging and help to highlight the exciting potential AI presents for diagnostics. There is no question that real-life clinical radiologists are essential and irreplaceable, but a clinical radiologist using insights from validated AI tools will increasingly be a formidable force in patient care." said Dr Katharine Halliday, President of the Royal College of Radiologists.

Dr Julie Sharp, head of health information at Cancer Research UK said the increasing number of cancer cases diagnosed each year meant technological innovation would be "vital" to help improve NHS services and reduce pressure on its staff.

"More research will be needed to find the best ways to use this technology to improve outcomes for cancer patients," she added.

There are other healthcare-related AI trials going on around the UK, including an AI tool by a firm called Presymptom Health which is analysing blood samples looking for signs of sepsis before symptoms emerge - but many are still in early stages without published results.

First NHS physiotherapy clinic run by AI to start this year

<https://bit.ly/su-away-ai-3>

The Guardian 9 June 2024

Exclusive: New platform to provide same-day appointments with digital physiotherapist in effort to cut waiting times

The first [NHS](#) AI-run physiotherapy clinic is to be rolled out this year in an effort to cut waiting times amid growing demand and staff shortages.

The new platform will provide same-day automated video appointments with a digital physiotherapist via an app that responds to information provided by a patient in real time.

It is the first platform of its kind to be approved by the health regulator, the Care Quality Commission, as a registered healthcare provider.

Patients seeking physiotherapy for issues such as back pain can be referred to the platform Flok [Health](#) through a community or primary care healthcare setting, such as their GP. They can also self-refer directly into the service.

The service aims to provide faster care and reduce waiting times and pressure on clinicians, those behind it say.

Waiting lists for treatment for musculoskeletal (MSK) problems such as back, neck, and knee pain have [grown by 27% since January last year](#). According to the [NHS website](#), more than 30m working days are lost to MSK conditions every year in the UK, and they account for up to 30% of GP consultations in England.

However, some in the industry say that AI cannot yet replicate the skill of a fully trained physiotherapist, and that treatment needs to be nuanced due to the complexity of cases.

The Chartered Society of Physiotherapy (CSP) said the number of [physiotherapy](#) posts in the NHS was not keeping pace with demand from Britain's ageing and increasingly obese population.

CSP health informatics lead, Euan McComiskie, said of the AI clinic: "There is no doubt that more needs to be done to tackle huge NHS waiting lists, particularly for musculoskeletal services and AI has huge potential to be an adjunct to the work of physiotherapists. However, AI cannot yet replicate the clinical judgment and skills of a physiotherapist, who is required to be registered with a statutory regulator, the Health and Care Professions Council (HCPC)."

McComiskie added that physiotherapists manage "increasing complexity in patient presentation and their treatment needs to be individually tailored". He said: "It is early days to know how much AI can eventually provide clinical decision making and more research is needed ... but not at the cost of patient access, safety, experience nor trust."

Those behind the Flok app, co-founded by the medic and former professional rower Finn Stevenson, say initial trial results show its effectiveness. As part of a series of three-month pilot

studies between May and December 2023, more than 1000 NHS staff suffering from back pain self-referred to an AI physiotherapist for treatment.

All of those surveyed patients from the NHS pilot said their experience with Flok had been at least equivalent to seeing a human physiotherapist, and 57% of patients said they thought the AI experience was better.

Stevenson said: “Our technology means every patient gets a constantly individualised experience and care pathway based on their feedback, symptoms and progress. It’s like having a structured video call with a physiotherapist, but our side of the call is being assembled on servers.”

He added that it was “getting harder” for patients to access physiotherapy, “leaving them in pain and often unable to continue their daily routines”.

Participants in each of the organisations involved in the pilot – NHS Lothian, NHS Borders, Cambridge University hospitals, and Royal Papworth hospital NHS foundation trust – could self-refer themselves to the AI service.

An initial video assessment with an AI physiotherapist was performed to evaluate their symptoms. Once approved for treatment, patients had weekly video appointments. The digital physiotherapist prescribed exercises and pain management techniques, monitored symptoms and adjusted patients’ treatments.

More than four in five participants reported that their symptoms had improved during treatment with the platform. Ninety seven per cent of the patients who self-referred to Flok within NHS Lothian received an automated triage outcome; 92% were immediately approved for AI physio and given access to an appointment that same day; 5% were automatically referred to another NHS service such as a GP.

Data from the trial at Cambridge University hospitals indicated that the digital clinic had helped reduce wait times for physiotherapy. Waiting lists for in-person musculoskeletal appointments increased by more than 50% once the pilot had ended.

Flok is the first and only digital MSK provider to be approved by the CQC, the app founder said. This means that rather than being a technology supplier licensing software to NHS trusts, Flok can directly treat and manage patients on behalf of their trusts. The CQC assesses regulated services at initial registration and then inspects at variable intervals to ensure that all quality and governance requirements are met.

Flok is also the first technology to be granted medical device clearance under MHRA regulations for fully automating the triage, assessment and treatment of back pain.

The system provides autonomous assessment and triage as opposed to diagnosis. Flok uses an automated process to determine whether a patient can instantly have access to physiotherapy appointments or is triaged to another service such as NHS 111 or their GP. Flok has not received any reports of missed red flags from the trials, they said. Stevenson said: “The autonomous triage process is subjected to rigorous continuous testing.”

The AI clinic is scheduled to launch with its first NHS partners this summer, although no specific dates could be provided.

DrugGPT: new AI tool could help doctors prescribe medicine in England

<https://bit.ly/su-away-ai-4>

The Guardian 31 March 2024

New tool may offer prescription ‘safety net’ and reduce the 237m medication errors made each year in England

Drugs are a cornerstone of medicine, but sometimes doctors make mistakes when prescribing them and patients don’t take them properly.

A new AI tool developed at Oxford University aims to tackle both those problems. DrugGPT offers a safety net for clinicians when they prescribe medicines and gives them information that may help their patients better understand why and how to take them.

Doctors and other healthcare professionals who prescribe medicines will be able to get an instant second opinion by entering a patient’s conditions into the chatbot. Prototype versions respond with a list of recommended drugs and flag up possible adverse effects and drug-drug interactions.

“One of the great things is that it then explains why,” said Prof David Clifton, whose team at Oxford’s AI for Healthcare lab led the project.

“It will show you the guidance – the research, flowcharts and references – and why it recommends this particular drug.”

Some doctors already use mainstream generative AI chatbots such as ChatGPT and Google’s Gemini (formerly Bard) to check their diagnoses and write up medical notes or letters. International medical associations have previously advised clinicians not to use those tools, partly because of the risk that the chatbot will give false information, or what technologists refer to as hallucinations.

But Clifton and his colleagues say, in a preprint about DrugGPT’s effectiveness, that it “achieves performances competitive with human experts” in US medical licence exams.

“Imagine if you’re a GP: you’re trying to stay on top of a bazillion different bits of medical guidance which are being updated every year. It’s tough,” said Clifton, who is also a research professor at the National Institute for Health and Care Research (NIHR), which has supported the project.

“But it’s important not to take the human out of the loop. You don’t want the problem of ‘computer says no’. It’s always got to be advice to a human like a co-pilot. It’s a safety net: here’s a recommendation to compare your recommendation against.”

Other research published by the *British Medical Journal* estimates that [about 237m medication errors](#) are made every year in England, costing about £98m and more than 1,700 lives. Only about 2% of errors could potentially result in serious harm, the research said, with GPs making the fewest errors and prescribers in care homes making the most.

Patients also make mistakes with medicines. “Nonadherence”, where patients fail to take - medication according to a doctor’s instructions, wastes about £300m for NHS England a year, according to the *Pharmaceutical Journal*.

General practices already use technology such as ScriptSwitch, which checks medication options and lets prescribers choose cheaper options.

Dr Lucy Mackillop, a consultant obstetric physician at Oxford University Hospitals NHS Foundation Trust who has advised Clifton’s team, said the potential advantage of DrugGPT was that it would give busy doctors more information about the drugs they were prescribing.

“If you discuss it with the patient, they are more likely to understand and be compliant with medication, and the medication is therefore more likely overall to work and do the job it’s meant to do,” she said.

Dr Michael Mulholland, vice-chair of the Royal College of GPs, said that in the vast majority of cases, prescriptions were made correctly.

But “doctors are only human and errors can happen, particularly when doctors are working under intense workload and workforce pressures, as GPs and our teams currently are. This is particularly the case with patients who take lots of medications at once, as there will be many different ways the medications may interact with each other.

“We are always open to introducing more sophisticated safety measures that will support us to minimise human error – we just need to ensure that any new tools and systems are robust and that their use is piloted before wider rollout to avoid any unforeseen and unintended consequences.

“Ultimately, the most effective long-lasting solution to delivering safe patient care is to ensure that general practice is adequately funded and staffed with enough GPs and other healthcare professionals working at safe levels.”

Case study: AI tool improving outcomes for patients by forecasting A&E admissions

<https://bit.ly/su-away-ai-5>

NHS England, 18 August, 2023

A&E departments across the country are facing unprecedented pressure dealing with patients requiring urgent care. The total number of attendances in June 2023 was 2,221,000, an increase of 1.3% on June 2022 ([NHS England, June 2023](#)).

Historically, it has been difficult for decision makers to effectively plan and make sure crucial resources are available without knowing anticipated surges in levels of demand.

Using lessons learned during the recent pandemic, NHS England data scientists worked with Faculty, a private AI organisation, to develop an A&E demand forecasting tool. This tool provides hospitals in England with anticipated A&E admissions three weeks in advance and alerts them to potential upcoming surges. This helps local and frontline NHS staff make more informed decisions on their allocation of resources by understanding when emergency demand pressures are likely to be higher or lower, ensuring there is capacity for patients when they need it.

Accounting for historical trends in the data as well as variations such as seasonality, weather and public holidays, forecasts are broken down by age so that staff can plan for specific bed needs, such as for paediatric patients, ensuring that they are provided with the relevant care they require.

NHS leaders are now able to proactively plan for surges in demand and divert resources to other areas such as elective care when demand is lower with the aim of treating patients as fast as possible.

The provision of accurate three-week ahead forecasts places the NHS in a better position to anticipate and prepare for surges in demand rather than react once they've started. This benefits patients as well as frontline staff who are better placed to deal with all the different situations they are faced within A&E.

The tool – which has been co-developed in collaboration with frontline, clinical and operational staff in nine pilot NHS trusts – is now available to 123 hospital trusts and has been shown to be approximately twice as accurate at predicting admissions than a baseline comparison model.

The tool has been built upon the NHS Data Platform, and NHS England is procuring a Federated Data Platform (FDP) to support health and care organisations to make the most of the information they hold. Vital tools such as the A&E forecasting tool will continue to be supported through the FDP in order to provide trusts with the information they need to understand patterns, solve problems and plan services for their local populations and patients.

An Associate Director for Performance Information at Luton and Dunstable Hospital said, “I think you’ve got something which is ground-breaking and incredibly useful”.