AI and robots – a support not a substitute

Artificial intelligence and robotics have the potential to aid nurses in clinical practice, from taking on repetitive tasks to speeding up decision-making.

By Pavan Amara
We are hearing more and more about robots taking over the world, and the existential threat artificial intelligence (AI) could pose to humanity. But a more optimistic take on these emerging technologies could be to recognise the huge potential of using ever more sophisticated robots and algorithms in nursing care.

While robots and other forms of AI are predicted to take over as many as 300 million jobs worldwide in the future, AI could prove an assistance to – rather than a substitute for – nurses.

**Role of AI in assisting the nursing workforce**

Over the next decade new job markets could open up for nurses, and AI could help to ease the effects of workforce shortages. Many innovative AI projects are already under way or in use in nursing settings.

At the National Robotarium in Edinburgh, which develops and tests robotics and AI, assistant professor Mauro Dragone says AI could help community nurses manage their patient caseloads.

‘Robotic Zimmer frames use sensors to collect data,’ Dr Dragone says. ‘They will pick up on small deteriorations in movement and alert nurses. This will help nurses remotely triage their patient list. They will also know if a patient falls.’

**Noting patterns, alerting staff – but not making decisions**

Sheffield Hallam University lead for digital technologies Leisa Anderton is a former emergency department nurse who leads the university’s master’s course in healthcare analytics and AI.

‘AI will pick up on patterns faster than a human can,’ she says. ‘It won’t make decisions and a human will review them, but it will save time. AI already recognises patterns in national early warning scores (NEWS) in some NHS trusts.

‘If the NEWS score is high, a message flashes up on the screen that a senior clinician should be informed. A human needs to look at the whole clinical picture before escalating. But it’s calculating for us faster and we’re less likely to miss things.’

Robotics company Touchlab works with the National Robotarium in Edinburgh. Touchlab’s founder, nanotechnologist Zaki Hussein is working on new AI initiatives including new ways of supporting standard nursing tasks such as catheterisation, cannulation and phlebotomy.

Dr Hussein says: ‘Nursing encompasses a huge variety of things, so the robot we’re working on needs a wide skill base. In comparison, surgical robots are easy to produce because all they do are precision tasks.

‘The technology is there, but it will take time to develop,’ he says.

Dr Hussein is clear that technology cannot replace compassion or the experience that enables clinical decision-making, but can save time.

‘The technology exists to create a scanner that can help cannulation. It could identify the best vein using vision and touch so you go into the right vein on the first try. The same goes for giving injections.

‘The obstacle is the time it might take for proper development, approval and for the costs to come down so the NHS can realistically buy things like this.’

Dr Hussein is currently designing a robot that could help move patients. The nurses he works alongside said this was a priority for them because of their risk of back injuries.

‘It needs stronger arms before it can lift patients,’ he says. ‘It’s around £500,000 to buy one. But once it’s manufactured at scale, in around two to five years, the cost will reduce. If technology can help with the physically demanding tasks, I’m hoping it will help retention and workforce shortages.’

‘Patient-facing staff need to be spoken to before procurement, or money will be spent on the wrong things. We also need to answer questions like if something goes wrong, who is responsible? We don’t know at this stage’

Irena Papadopoulos, head of research for transcultural studies in health, Middlesex University

AI developments in healthcare around the world include Robear, a robot in Japan, capable of lifting patients from a bed into a wheelchair, while, another in the US, called Pepper, speaks to patients who have dementia and shows them videos evoking their past. Robotic pets, including an engineered baby seal called Paro, are also being used to comfort people with dementia.

**Robot interactions can be equated with human contact**

Elsewhere, robots deliver lab samples and medications around hospitals, and patients in one large, urban US emergency department have their clinical histories taken by robotics, which assists triage. The patients rate the quality of
interaction with robots as equivalent to that with a person.

In the future, Ms Anderton says AI could read electrocardiograms (ECGs) and analyse breathing patterns and chest expansion.

‘If you look at critical care settings, AI is already in the early stages of doing these things but it needs to develop. There is a medical version of the AI chatbot Chat GPT under way. The patient types in their symptoms and gets a response and rationale.

‘Again it’s an early version and focused on symptom management and escalation. Humans will always do the care and advocating, but technology can assist. Look at virtual wards, we’re now able to monitor remotely and save hospital bed spaces.’

Middlesex University head of research for transcultural studies in health Irena Papadopoulos is an adult nurse by background. She co-authored a global study of the use of culturally competent robots in older people’s care.

‘It’s not straightforward,’ says Professor Papadopoulos. ‘I can see the logic of robotics and AI helping workforce shortages. It could also go the other way.

‘This will open a new job market to nurses, one where health technology companies will be an employer. Nurses could go to these employers, who pay very well, and there’s a risk NHS nursing could be pushed further.’

Nurses must be consulted before tech is procured

She says vulnerable patient groups, such as those with poor literacy, could also be left behind. ‘If robots are taking patient histories and patients have to type their answers, they could struggle.’

Professor Papadopoulos says nurses need to be involved in choosing the technology they will work with and patients have to type their answers, they could struggle.’

‘People at the top may think it is a good idea to pay for certain tools. When they arrive, frontline staff may find them useless. Patient-facing staff need to be spoken to before procurement, or money will be spent on the wrong things.

‘We also need to answer questions like if something goes wrong, who is responsible? We don’t know at this stage.’

She believes nurse education needs to include AI, robotics and technology as compulsory modules. ‘Future nurses will need to navigate these areas. There’s no point teaching...

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Leisa Anderton, lead for digital technologies, Sheffield Hallam University

Hospital helper robots

Milton Keynes University Hospital NHS Foundation Trust began using ‘helper robots’ nine months ago.

Chief nursing information officer Laura Crump says: ‘It’s all about time-saving. The robots bring medication from the hospital pharmacy to wards, so nurses, healthcare assistants and pharmacists don’t spend ten minutes going there and back. The robots are learning to navigate busy hospital corridors.

‘We’ve also had sensors installed in our 24-bed cancer ward. Staff, drug keys and equipment are all tagged. Before, if you were looking for drug keys, you’d have to go in all the rooms to find the keys. That’s not ideal for efficiency or patient privacy. Now, I look at a screen and can see where everything is.’

Source: Milton Keynes University Hospital NHS Foundation Trust tinyurl.com/mkuh-trials
things that were relevant 20 years ago.’

University of Manchester professor in clinical decision-making Dawn Dowding agrees there is a mismatch between the reality of technology on the ground today and future potential. ‘In some trusts you’ve got 2.5 nurses sharing one computer that crashes a lot. The tech basics aren’t sorted.’

Use of technology in NHS organisations varies, says Professor Dowding, with some offering electronic patient records (EPR) and reliable wi-fi, and others still using pen and paper for some things.

‘There is exciting stuff out there but there’s a huge gap between that and the real-life wards,’ she says.

Professor Dowding agrees that AI can help nurses in areas where large amounts of high-quality data are available.

‘AI is based on mathematical algorithms, so it can use data sets to diagnose conditions. It is helping with mammography, X-rays and smart stethoscopes that detect and predict abnormalities.’

AI is ‘trained’ using data from white patient populations

Sheffield Hallam University computing and artificial intelligence lecturer Marjory Da Costa Abreu says AI could widen existing inequalities. She says most data samples come from white patients, and because AI is trained using these it thinks white skin is the norm.

‘On a white person, AI comes across a darker spot and detects abnormality. On darker skin it won’t work. Anything skin-based has this problem. MRIs and X-rays also have the problem of variation in the samples they’re trained on.’

King’s Fund’s research fellow in digital technologies Pritesh Mistry, who specialises in computing and artificial intelligence, says use of robotics and AI could ease physical and cognitive demands on nurses, and AI could ease physical and cognitive demands on nurses, and AI could ease physical and cognitive demands on nurses, and AI could ease physical and cognitive demands on nurses, and AI could ease physical and cognitive demands on nurses.

‘It’s true that if nurses aren’t engaged in selecting the technology then health services will procure products that aren’t appropriate. That will create more friction and efficiency issues.’

NHS leadership and culture will need to adapt

Mr Mistry says that in the finance sector, technology such as AI has improved outcomes and eased workloads, but this is because finance leaders include staff in their technology budgets. In the NHS, he says, this has not been the case.

‘Financial organisations spend 25-50% of the budget on the product, and 50-75% on the staff using it and upskilling them. But NHS leadership and culture is different, and might not allocate the same spend on staff. That could lead to unintended consequences.

‘We already know there are problems with the technology – computers crashing, things not being updated, multiple logins that frustrate staff. Technology will change things, but it can help or hinder nurses depending on how things are done.’

Nursing fellowships in clinical AI

Nurses can now apply for one-year NHS fellowships in clinical artificial intelligence (AI) – until now only available to doctors and dentists.

Successful candidates will be embedded in their NHS organisation’s clinical AI team for two days per week, and work on deploying new software in hospital environments. Nurses, midwives and allied health professionals are among the programme cohort for the first time this year.

The fellowships are led by the NHS Digital Academy and Guy’s and St Thomas’ NHS Foundation Trust.

The programme’s manager Beatrix Fletcher, a nurse and midwife says: ‘We’re using AI for everything – booking appointments, diagnosing conditions, suggesting treatment plans. It helps us see more patients.

‘But we want to bridge that gap between procurement and nurses on the ground. Front-line staff need to sit at the table with technology.

‘We’d like applications from experienced band 6 or band 7 nurses who have implemented something technological for service improvement. It doesn’t have to be complex. It could be something as simple as a spreadsheet that calculates stock and sends an email to order more of what’s needed every month.’

Applications for cohort three of the fellowship, to run for 12 months from August 2024, are now open and close on 20 December.

Find out more about the programme and apply at tinyurl.com/apply-ai-fellowship

Pavan Amara is a nurse, midwife and health journalist