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Al: the new frontier in nursing

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Correspondence to: Sue Tranka; Sue.Tranka@gov. wales The healthcare industry stands on the precipice of a transformative revolution led by advancements in artificial intelligence (AI) and its power to democratise knowledge and understanding. Among the many facets of healthcare that AI is reshaping, nursing, a profession that combines critical thinking, technical expertise with human empathy is poised for profound change.

As the demands on nurses grow, AI offers a new frontier to enhance care, streamline workflows and address persistent challenges in the field. The integration of AI into nursing not only transforms the way care is delivered but also prompts critical ethical considerations and invites a re-imagining of the nursing profession in the 21st century.

The case for AI in nursing

Nursing is one of the most demanding yet rewarding professions in the world. Nurses are responsible for promotive, protective, preventative, curative, rehabilitation and palliative care and are often the safety-critical factor in delivering sustainable health care—all under tight time constraints and often with limited resources. The global shortage of nurses exacerbates these challenges. According to the WHO, there is a projected shortfall of 10 million healthcare workers by 2030, with nurses constituting a significant portion of that gap.

Enter AI: A technology capable of augmenting human capabilities and optimising workflows. AI can assist nurses by automating repetitive tasks, enhancing decision-making and individualising patient care. For example, algorithms can analyse vast amounts of patient data, bringing together disparate and complex information from multiple systems to aid decision-making and to detect early warning signs of deterioration, helping nurses intervene before a condition worsens. In Ireland, nurses are using Robotic Process Automation (RPA), a system widely used in the NHS to help with procurement and finance to undertake multiple complex repetitive tasks to bring together healthcare-acquired infection information from multiple systems, saving specialist infection control nurses hours of time trawling through digital systems to more quickly spot and intervene with appropriate infection prevention and control interventions. In intensive care units, AI-driven systems such as predictive analytics tools are already in use, providing real-time insights into patient health. These tools not only improve outcomes but also free up nurses to focus on areas that require human judgement and compassion.

AI-powered note takers can already record, transcribe, highlight and summarise meetings so you can focus on the conversation and streamline administrative burdens, which often consume significant portions of nurses' time. Virtual assistants powered by natural language processing can handle complex documentation completion, pull together key information from multiple parts of a conversation/assessment to provide new ways of creating multi-factorial insights, schedule management, prioritise actions and even potentially accelerate patient triage. Such tools have been shown to reduce burnout, a growing concern among nurses and enable them to devote more time to direct patient care. In Wales, AI-supported wound management systems are reducing the administration burden by approximate 7 min per patient, improving continuity of care and objectively assessing wound healing and reducing the overall wound management caseload in district nursing by 7% through improved patient outcomes. But to really clear, it is important for nurses, technology developers and the public to understand that AI is not a nursing it is not a human being, AI is a tech tool and cannot replace the nurse.

Enhancing patient outcomes

One of the most exciting aspects of AI in nursing its potential to enhance patient outcomes. Predictive analytics is a game-changer, enabling nurses to antie ipate complications such as sepsis, falls or medice tion errors before they occur. By analysing data from electronic health records, wearable devices and other sources, AI can identify patterns invisible to the hummeye.

For instance, the University of Pennsylvania Heal System has implemented AI tools that predict which patients are at risk of cardiac arrest or respiratory failure within the next 24 hours. Nurses use this information prioritise care and initiate preventive measures. Simlarly, AI-powered medication management system can flag potential drug interactions or errors, reducing adverse events and improving patient safety.

Telehealth is another domain where AI complements the art and science of nursing. Virtual care platforms enhanced by AI, enable nurses to monitor patients remotely, assess symptoms through chatbot interactions and provide follow-up care. This is particularly valuable for managing chronic conditions, augmenting continuity of care, where continuous monitoring and timely interventions are crucial. Additionally, the platforms can capture trends in the types of question asked, offering valuable insights into the information needs of people with similar conditions and needs. The data can inform the development of targeted education resources and support tools, further enhancing patients care and empowerment.

Challenges and ethical considerations

While the benefits of AI in nursing are undeniable, its integration is not without challenges. Ethical considerations loom large, particularly when it comes to patient privacy, algorithmic bias and the potential dehumanisation of care. I firmly believe that healthcare will always be human-led and digitally and technologically enhanced. But to ensure that the professions do not lag behind those who leverage AI capability effectively, we need to work with the experts to help understand how

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we build safe and trusting, collaborative robotic environments. I have heard concerns about data privacy and how to strike a safe balance when AI systems rely on vast amounts of patient data to function effectively. Ensuring that this data is secure and used responsibly will be paramount, we know that breaches or misuse of health data can erode trust and have severe consequences for patients. Nurses, as patient advocates, must play a role in safeguarding this information and ensuring transparency about how AI systems operate.

A discussion with the public is required about the need for healthcare data as part of delivering safe, reliable, timely and sustainable health and care that is free at the point of need (as in the healthcare system in the UK) as part of the national compact with the NHS and one where nurses will play a vital role.

Algorithmic bias is another issue. AI systems are only as good as the data they are trained on, and if that data reflects existing inequities, the algorithms may continue to perpetuate them. For example, studies have shown that some AI tools perform less accurately for certain demographic groups, such as people of colour, due to biases in the training datasets. Nurses must be vigilant in recognising inequities in outcomes and addressing such biases to ensure equitable care for all patients.

The potential for AI to depersonalise care is also valid concern. Nursing is inherently a human and а person-centred profession, built on trust, empathy and communication. Over-reliance on AI risks reducing patients to data points and eroding the nurse-patient relationship. To prevent this, AI must be viewed as a tool to complement, not replace, the human touch that defines nursing.

Preparing nurses for the AI era

To fully harness the potential of AI, nurses at every stage of their careers will require appropriate and proportionate training tailored to their roles and responsibilities. Incorporating AI literacy into nursing curricula is essential to equip future nurses with the skills to use these tools effectively and critically. Additionally, ongoing professional development programmes should be designed to provide current nurses with practical, role-specific training, ensuring they can confidently integrate AI technologies into their practice. This approach will empower the nursing workforce to embrace AI as a valuable tool for enhancing patient care and improving outcomes while maintaining professional judgement and person-centred care.

Continuing education programmes for practicing nurses should also include modules on AI, focusing on its applications, limitations and ethical implications. Healthcare organisations have a role to play as well.

They must involve nurses in the design and implementation of AI systems to ensure these tools address realworld needs and challenges. By doing so, they can foster a sense of ownership and collaboration, making the transition to AI-enhanced nursing smoother and more effective. AI-driven simulations and virtual reality tools offer evidence-based training opportunities, enhancing clinical skills and decision-making. AI fosters collaboration by integrating insights across healthcare disciplines, enhancing the evidence base for health and care interventions aligning with the Welsh interdisciplinary training approach.

The way forward

by co Healthcare has always been in the white heat of tech nology, and nursing has always been alongside delive ering that care to people. It is important to remember that AI is not a panacea for all the challenges in nursing but can be a powerful ally. By embracing AI the nursing profession can impact workforce productivity, reduce burnout and improve patient care and outcomes. However, this transformation must be guide by ethical principles, with a focus on equity, privacy and preserving the humanity of care.

The future of nursing envisions a seamless integra tion of advanced technology with the professionalism compassion and empathy that define the nursing profes sion, each amplifying the other. AI can handle the data predict outcomes and streamline workflows, but it is the nurse who will always be there to hold a patient's hand, listen to their fears and provide comfort in their mos vulnerable moments. At the heart of our safety-critica profession, it is the highly trained, expert nurses who synthesise a myriad of complex inputs and information who sense-make and navigate complexity and translate that into simplicity for patients and families. As we navigate this new frontier, let us ensure that the hearing of nursing remains its defining feature, even in an age of algorithms. Funding The authors have not declared a specific grant for this research from any funding agency in the

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