Artificial Intelligence and Nursing Practice

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Overview

Artificial Intelligence (AI) is a tool that has and will continue to create a revolutionary change in health care delivery. It has improved surveillance and predictive intervention in public health. It is helpful in managing polypharmacy by identifying potential and actual drug-drug interactions, contraindications, and prevention of adverse events. It enhances patient scheduling and triage. It provides support for clinical decision-making, disease management, patient engagement, and improvement in operational efficiencies.

AI is also a challenge based on the non-transparency of data sources that are being used to create algorithms. Patient privacy is a slippery slope as data is being mined to enhance the large language model sources. Biases and hallucinations (factually incorrect outputs) can skew the outputs and lead to amplified health disparities and dangerous outcomes (Mello & Guha, 2023).

Definitions

Predictive artificial intelligence is technology that simulates human intelligence. This type of technology has been used in health care for decades. It uses machine learning techniques and data to generate algorithms that classify or predict things (Dillard-Wright & Smith, 2025). An example would be cardiac monitors that track electrocardiogram (EKG) feed, identify rhythms, and alarm if potentially dangerous rhythms are detected.

We have now moved into an era of **generative** AI. Computers trained on large language models are now able to create content (Yakusheva et al., 2025). Complex mathematical formulas take information, perform calculations, and return results based on the data accessed as determined by prompts entered by humans.

Current Environment

Our current environment provides us with some areas that are worrisome. It is of concern that AI has received less testing than most other clinical innovations and errors may

propagate if biases and assumptions of the model are not tested and corrected. As with all aspects of health care, the nurse is the last line of defense. If an AI platform suggests a clinical course of action or makes a clinical decision, the nurse is the one at the patient's side making the final safety determination and explaining the care to the patient (Dillard-Wright & Smith, 2025; Shepherd et al., 2025). AI can assist in helping to identify patient risk by identifying patterns of symptoms and offering a course of action based on pre-determined algorithms (Pinto & Jackson, 2025). However, just as one might question an order that does not seem appropriate in the present circumstances, one must also question an AI output that does not seem "quite right." Nurses are still responsible for their actions based on both clinical decision-making skills and intuition (Pinto & Jackson, 2025).

Nursing is both a science and an art. Overreliance on AI outputs could potentially erode both professional autonomy and human connections. Human-centered care guided by nursing values and standards must be maintained as these tools are integrated into health care delivery (Yanto et al., 2025). Nursing may be pulled from direct patient care into the management of AI technologies such as troubleshooting software issues, re-entering data, and identifying and mitigating software errors (Dillard-Wright & Smith, 2025).

Another concern is the security and accuracy of data and patient privacy. How and from whom is the patient data collected and used (Dillard-Wright & Smith, 2025; O'Neil, 2016)? These large language models collect data from a vast number of sources with inherent risks of misuse or bias (Bodur et al., 2025). Concern also arises that nursing data, such as nursing notes and plans of care, are not being used to the same degree as other professions' data in designing and constructing the nursing care algorithms, in other words, other professions' data is being used to determine nursing care (Pinto & Jackson, 2025).

Environmental Impact

As demand for AI increases, so does the impact on the environment. Aging power grids are being strained to a breaking point requiring diesel backup generators to supplement the power load of generative AI training which is seven or eight times that of predictive computing and new models are released for training every few weeks as previous versions are retired. Once "trained" the energy load continues, for example, "a Chat GPT query consumes about five times more electricity than a simple web search" (Zewe, 2025).

Hardware components require plastics, silicon, gold, copper, and aluminum. Mining of minerals has local environmental consequences to the water, air, and soil and the subsequent non-recyclable e-waste (Hosseini et al., 2025). Fine particulate matter and

emissions from diesel generators are being released into the air raising respiratory health risks including asthma, lung cancer, heart attacks, and death (Ren & Wierman, 2025).

Water used to cool the computing servers is impacting this finite resource and the surrounding ecosystem. To give a sense of scope, it is predicted that globally in 2026 data centers will use nearly 1,050 terawatts of electricity. Each kilowatt of energy requires two liters of chilled water for cooling. That corresponds to 2,000,000,000 liters or 528,344,354 gallons of water, nearly twice the amount of water that will be consumed in New York City in 2026 (Ren & Wierman, 2025; Zewe, 2025).

Argument for AI

AI can ease workloads and predict or identify problem areas. It can be used to optimize clinical workflows, enhance diagnostic accuracy, improve patient outcomes, and improve patient engagement. These predictors have the potential to eventually move the health care system from a reactive into a probabilities care model. Science can be enhanced through faster research and collaborative scholarly writing (Ahmed, 2024). AI has the potential of performing tedious, repetitive tasks such as errands and documentation, thus freeing up nurses' time to more fully assess, teach, and evaluate their patients and the care provided (Yakusheva et al., 2025). A risk that could come from this off-loading of tasks is the reduction of the currently over-stretched health care workforce. Employers might see the implementation of AI as an opportunity to decrease the number of nurses needed to provide quality care, further increasing the nurse-patient ratios. Nurses must be involved in the development and implementation of AI which can help support nursing workload, enhance patient care, and reduce burnout through improved efficiency (Beaudet & Turchioe, 2025; Bodur et al., 2025). These technologies need to be implemented in ways that add value to nursing care (Shepherd et al., 2025). Population health management through the use of predictive analytics can improve patient outcomes and add efficiencies to nursing care. Nurses would have the capability of providing specific community-based programming and resource allocation (Wei et al., 2025).

Recommendations

Nursing education has current and expanding opportunities to integrate AI and teach the current and future nurses how to safely and ethically use AI. Simulation and virtual reality exercises have become more common in nursing programs. AI-powered standardized patients and telepresence robots are being integrated into education to expand clinical experiences without continued burden on the health care partners. AI is also being used in predictive models to identify students and provide focused tutoring to those who may need

additional support to be successful in their nursing education. AI can also be used for program evaluation with appropriate training of the faculty (Chicca et al., 2025). As with patient care applications, overreliance on AI can be problematic and may perpetuate imbalance in decisions, interventions, and outcomes, based on the data used for the model – garbage in, garbage out. Nursing faculty must ensure that AI is an enhancement, not a distraction from the college experience (Doston et al., 2025).

As AI platforms are being evaluated for implementation in areas that influence health care, it is imperative that the hosting company be reviewed for the inclusion of nurses on their research and development teams. Nurses need to be involved in the development of these tools and have direct negotiation in the development, selection and integration of these models in nursing education and the workplaces (Walker, 2025; Yakusheva et al., 2025). Engagement of nurses can prevent the disconnect that comes when innovative technologies are designed to support the workload but instead impede the workload of the nurse. If nurses can approach further development of AI tools with an open mind and a willingness to be involved in advances, they can be advocates for where, when, and how AI is deployed into health care and nursing education (Khatib & Ndiaye, 2025; Yakusheva et al., 2025). Nurses can craft AI's role to ensure safety remains at the center of patient care and delineate how nursing's role can expand to the full scope of nursing practice. Feedback must be provided to the companies creating and marketing AI health care products that the title "nurse" is protected and cannot be used for non-human, unlicensed technologies.

Nurses need to be provided the training and be aware of the risks that can go with technology and be able to educate patients about their rights to consent or decline access to personal information for data mining. This is a tool, but not a replacement for critical thinking, clinical judgement, clinical decision-making, ethical care, and empathy. The nurse is ultimately responsible for their nursing practice. They are legally and ethically accountable for their decisions, actions, and behaviors (ANA, 2025; Yakusheva et al., 2025). It can easily be relied on without verification and provides a danger to patients through data bias or faulty algorithms (Brydges, 2025; Jeffries, 2025). It is imperative that nurses have competency in digital literacy, ethical reasoning, and critical engagement with AI tools (ANA, 2025; Bodur et al., 2025).

Health systems should consider interdisciplinary oversight committees that include nurses reviewing the algorithms, creating governance structures, and educating the public and staff about the strengths and weaknesses of the technology (Brydges, 2025; Jeffries, 2025). Nurses need to be involved in the review of the outputs of AI to screen for accuracy and

help prevent further health inequities. Algorithms trained on data containing historical biases can perpetuate unfair or discriminatory outcomes and exacerbate health disparities (ANA, 2025; Dillard-Wright & Smith, 2025; Gianfrancesco et al., 2018). Not only can the patient data be biased, the perspective of nursing and the role of the nurse can be biased (Reed et al., 2025).

Nurses, as the frontline for public health, must be actively involved in reducing the impact of AI from the development and implementation of AI models to the location of data centers, the temperature-controlled facility that houses servers, data storage drives, and network equipment. Any organization or individual who deploys cloud-based AI can make critical choices to lower the impact on the health of the public through promotion of sustainable practices. Standardized reporting of health impacts should be required. Data centers can be operated in a decentralized model to decrease the impact in any single region. Data centers should be located in areas that do not already have severe air pollution or other health risk factors and do have pollutant-free energy sources available (Hosseini et al., 2025; Ren & Wierman, 2025; Zewe, 2025).

Resources

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