Artificial Intelligence in Nursing Practice: Decisional Support, Clinical Integration, and Future Directions

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Article

Abstract

Integrating artificial intelligence (AI) into healthcare has the potential to transform nursing practice. Nurses can utilize the capabilities of AI to incorporate evidence-based practices and enhance patient outcomes. For example, one main application of AI in nursing is clinical decision support (CDS) systems, which assist nurses to interpret complex patient data, identify potential complications, and personalize care. AI tools are also evolving at the systems level. AI tools can optimize nursing workflows by automating routine tasks, managing patient appointments, and streamlining documentation. Despite these benefits, integrating AI applications into nursing practice also presents challenges related to data privacy, ethical considerations, and appropriate training. This article explores how AI supports clinical decision-making, presents real-world examples of its application in nursing settings, examines changes to the nursing scope of practice, discusses ethical implications, and envisions the future role of AI in healthcare delivery and education. Included within is a discussion about the need to redefine the scope of nursing practice in response to these emerging technologies, and a call to action to prepare nurses and nursing practice for AI integration.

Key Words: Artificial intelligence, nursing practice, clinical decision-making, healthcare technology, future of nursing, decisional support, automated ultrasound technology

Integrating Artificial Intelligence (AI) into healthcare transforms how nurses deliver care, make decisions, and manage patient outcomes (Elhaddad & Hamam, 2024). As frontline healthcare providers, nurses must leverage the capabilities of AI to enhance evidence-based practices. This article explores how AI supports clinical decision-making, presents real-world examples of its application in nursing settings, examines changes to the nursing scope of practice, discusses ethical implications, and envisions the future role of AI in healthcare delivery and education. I also highlight the need to redefine the scope of nursing practice in response to these emerging technologies and offer a call to action to prepare nursing practice for AI integration (Elhaddad & Hamam, 2024).

Current Applications of AI in Nursing

As frontline healthcare providers, nurses must leverage the capabilities of AI to enhance evidence-based practices.

Many AI applications are currently used in healthcare facilities. This section discusses exemplars that offer clinical decision support; personalize patient education; assist with documentation, administrative tasks, workflow optimization, scheduling, and resource allocation; and describe an example of automated ultrasound systems, a current emerging technology in nursing.

Enhancing Clinical Decision Support (CDS)

AI-powered Clinical Decision Support (CDS) systems significantly transform nursing practice by enhancing the interpretation of complex patient data, identifying potential issues, and optimizing care plans (Aggarwal et al., 2023; Elhaddad & Hamam, 2024). These systems combine large volumes of data from various sources, including electronic health records (EHRs), laboratory results, and real-time monitoring devices, providing nurses with actionable insights at the point of care (Elhaddad

& Hamam, 2024). By processing and analyzing patient information, AI-driven CDS can reveal patterns and correlations that may be challenging for human experts to detect, empowering nurses to make more informed decisions (Aggarwal et al., 2023) (See Table 1).

Table 1. ***AI Applications in Nursing Practice***

Application Area	Description	Impact on Nursing
Clinical Decision Support	AI-powered Clinical Decision Support (CDS) systems enhance decision-making by analyzing patient data and providing real-time insights.	Enhances diagnostic accuracy and personalized care plans.
Medication Administration & Error Reduction	AI cross-references patient data with medication prescriptions to prevent adverse drug events and enhance patient safety.	Reduces medication errors and improves patient safety.
Workflow Optimization	AI automates administrative tasks such as scheduling, documentation, and patient monitoring, improving workflow efficiency.	Minimizes administrative burden, allowing more time for direct patient care.
Patient Education	AI-powered chatbots and virtual assistants provide 24/7 health education, appointment reminders, and medication adherence support.	Improves patient engagement and adherence to treatment plans.
Predictive Analytics for Patient Deterioration	AI detects early signs of deterioration, such as sepsis, by analyzing physiological trends and alerting nurses for timely intervention.	Enables proactive interventions to reduce hospital mortality and complications.

(Aggarwal et al., 2023; Alotaibi & Federico, 2017; Elhaddad & Hamam, 2024; Haas & McGill, 2022; Härkänen et al., 2021; Hong et al., 2021; Jia et al., 2021; Loria, 2023; Mulac et al., 2021; Sloss, & Jones, 2021)

These systems combine large volumes of data from various sources...

One of the primary advantages of AI-powered CDS systems is the ability to leverage machine learning algorithms and predictive analytics to help nurses make informed decisions. Machine learning algorithms, such as neural networks and decision trees, enable CDS to detect patterns, identify correlations, and extract insights from complex datasets (Aggarwal et al., 2023; Elhaddad & Hamam, 2024). By continually learning from new data inputs, these algorithms enhance their predictive capabilities and adapt to evolving clinical situations, allowing CDS to offer personalized recommendations tailored to individual patient needs (Elhaddad & Hamam, 2024). Additionally, predictive analytics strengthen CDS by identifying high-risk patients developing specific conditions, enabling timely interventions that mitigate risks and enhance patient outcomes (Aggarwal et al., 2023; Davies et al., 2020; Elhaddad & Hamam, 2024). Ultimately, integrating AI into CDS aims to improve patient outcomes and reduce the risk of adverse events (Aggarwal et al., 2023; Elhaddad & Hamam, 2024) (See Table 1).

Early Detection of Patient Deterioration. Predictive models enhanced with AI analyze trends in vital signs and laboratory data to forecast the onset of illnesses, such as sepsis. For instance, Early Warning Systems (EWS) equipped with AI capabilities alert nurses to subtle physiological changes that may indicate a clinical decline, enabling timely treatment interventions (Aggarwal et al., 2023; Elhaddad & Hamam, 2024; Haas & McGill, 2022). An example is the Targeted Real-time Early Warning System (TREWS), which utilizes physiological and laboratory data. A prospective study confirmed that TREWS can reduce in-hospital mortality (Aggarwal et al., 2023; Haas & McGill, 2022) (See Table 1).

Personalizing Patient Care Plans. AI can analyze individual patient data alongside population health statistics to suggest customized treatments that align with a patient's unique health profile. For instance, AI can recommend specific lifestyle changes and medication adjustments for managing chronic illnesses through predictive modeling. This personalized strategy ensures that care plans are evidence-based and tailored to each patient's specific needs, which enhances adherence and overall health outcomes (Aggarwal et al., 2023; Elhaddad & Hamam, 2024; Haas & McGill, 2022) (See Table 2).

Predictive models enhanced with AI analyze trends in vital signs and laboratory data to forecast the onset of illnesses...

Table 2. ***AI Enhanced Nursing Workflow Optimization***

Workflow Area	How AI Optimizes It	Outcome Benefits
Automated Documentation	Natural Language Processing (NLP) extracts clinical insights from nursing notes, reducing documentation time.	Minimizes documentation burden and allows more time for direct patient care.

AI-Powered Scheduling	AI-driven staffing predictions adjust nurse schedules based on patient demand patterns.	Reduces nurse burnout and ensures optimal staffing levels.
Ambient Voice Technology	Voice-activated documentation captures patient interactions and integrates them into Electronic Health Records (EHRs).	Improves documentation accuracy and reduces manual data entry errors.
AI in Nurse Triage & Prioritization	AI prioritizes nurse workload based on patient acuity, optimizing resource allocation.	Enhances patient safety by ensuring critical cases receive immediate attention.
Remote Patient Monitoring	Real-time AI monitoring analyzes patient vitals and alerts nurses to early signs of deterioration.	Facilitates timely interventions, reducing hospital readmissions and mortality.

(Aggarwal et al., 2023; Alotaibi & Federico, 2017; Elhaddad & Hamam, 2024; Haas & McGill, 2022; Härkänen et al., 2021; Hong et al., 2021; Jia et al., 2021; Mulac et al., 2021)

Managing Complex Medication Regimens and Error Reduction. AI-driven CDS assists healthcare providers to manage complex medication regimens by cross-referencing patient data (e.g., allergies and current medications) to identify potential drug interactions and prevent adverse drug events. These systems can also analyze vast amounts of published data, and machine learning-based prediction algorithms can accurately evaluate potential efficacy compromises and toxicity risks. Such features are particularly valuable in high-acuity patient environments where the risk of medication errors increases. The main advantage of using AI-driven CDS to handle complex medication regimens is improved clinical outcomes (Loria, 2023; Mulac et al., 2021; Poon et al., 2010). As healthcare systems generate increasing volumes of complex data, nurses can utilize AI-driven CDS to interpret this information, anticipate potential issues, and personalize care plans (Hong et al., 2021; Jia et al. [preprint], 2021; Sloss & Jones, 2021) (See Table 1).

The ability of AI systems to understand and process human language allows AI-powered medication reminder applications (i.e., apps) to assist patients in adhering to medication regimens improved patient adherence ultimately improves outcomes and reduces hospital readmissions (Jia et al., 2021) (See Table 2). By providing access to evidence-based recommendations and patient-specific information at the point of care, AI-driven CDS thus increases diagnostic accuracy, treatment effectiveness, and patient outcomes (Alotaibi & Federico, 2017; Graafsma et al., 2024; Härkänen et al., 2021; Hong et al., 2021; Jia et al., 2021).

Personalized Patient Education

AI is transforming patient education by providing content tailored to individual literacy levels, preferences, and health needs (See Tables 3 and 4). This customization enhances understanding and engagement, leading to improved health outcomes. By analyzing patient data, AI systems can determine the most effective educational strategies for each individual, ensuring that information remains accessible and relevant (Clark & Bailey, 2024). A notable application of AI in personalized patient education is using chatbots to deliver health information after discharge. Chatbots are AI-powered rule-based programs designed to simulate a text-based conversation. When presenting educational content, chatbots can use visual aids such as forms and videos. Chatbots act as "virtual assistants," actively engaging patients and managing administrative tasks typically handled by nurses (Clark & Bailey, 2024; Weber, 2023) (See Tables 3 and 4).

Table 3. ***AI in Nursing Clinical Decision-Making***

AI Application Area	Example	Function	Nursing Impact
Early Detection of Patient Deterioration	Targeted Real-time Early Warning System (TREWS)	Analyzes vital signs and lab data to predict sepsis; alerts nurses to subtle physiological changes	Enables early intervention and potentially reduces in-hospital mortality
Personalized Care Planning	Reinforcement Learning for Sepsis Treatment	Learns from patient data and treatment outcomes to adjust therapy dynamically	Supports individualized care strategies and improves adherence and outcomes
Medication Safety	AI algorithms cross-checking prescriptions	Detects drug interactions, contraindications, and dosage errors	Reduces medication errors and enhances patient safety
Patient Education	AI-powered Chatbots (e.g., Quincy)	Delivers personalized educational content, appointment reminders, and medication support	Improves health literacy and patient engagement

Documentation Support	Natural Language Processing (NLP)	Extracts and structures data from unstructured clinical notes	Reduces administrative burden and supports decision-making
Workflow Optimization	Ambient Voice Technology	Captures bedside conversations for automatic documentation	Frees time for direct patient care and enhances documentation accuracy
Dynamic Staff Scheduling	Predictive Staffing Algorithms (e.g., Cleveland Clinic Command Center)	Forecasts patient volumes and adjusts nursing staff levels in real-time	Improves workload distribution and prevents burnout
Point-of-Care Diagnostics	AI-GUIDE for Ultrasound	Guides vascular access with real-time imaging and needle insertion	Enhances procedural efficiency and accuracy

(Aggarwal et al., 2023; Alotaibi & Federico, 2017; Boca Bene et al., 2021; Brattain et al., 2021; Chen et al., 2021; Cleveland Clinic, 2024; Dadon et al., 2024; EchoNous, n.d.; Jacobs et al., 2024; Elhaddad & Hamam, 2024; Graafsma et al., 2024; Graham & Reifsnyder, 2024; Haas & McGill, 2022; Härkänen et al., 2021; Hong et al., 2021; Jacobs et al., 2024; Jia et al., 2021; Lay & Okiror, 2024; McQuillen, 2024; Mitha et al., 2023; Mulac et al., 2021; Nicosia et al., 2020; Presti, 2024; Putty, 2025; Rony et al., 2023; SCP Health, 2025; Topaz et al., 2020; Weber, 2023)

Table 4. *Future AI Trends in Nursing*

Future AI Trend	Description	Potential Impact
AI-Driven Virtual Care	Telehealth platforms integrate AI-powered chatbots and remote monitoring for personalized virtual consultations.	Expands access to care in remote and underserved areas.
Predictive Population Health Analytics	AI analyzes social determinants of health (SDOH) to predict health risks and improve population-level interventions.	Improves health equity and targeted preventive care strategies.
AI in Robotics for Nursing Tasks	Robotic systems assist nurses in medication delivery, patient transport, and automated ultrasound imaging.	Reduces workload and enhances efficiency in routine nursing tasks.
AI-Assisted Personalized Treatment Plans	AI tailors treatment recommendations based on individual patient health profiles and genetic markers.	Enables precision medicine and personalized patient care.
Augmented Intelligence in Clinical Decision Making	AI enhances human decision-making by providing evidence-based insights while preserving clinician oversight.	Strengthens clinical decision-making while maintaining human oversight.

(Aggarwal et al., 2023; Alotaibi & Federico, 2017; Clark & Bailey, 2024; Elhaddad & Hamam, 2024; Falcone, 2024; Haas & McGill, 2022; Härkänen et al., 2021; Hong et al., 2021; Horowitz, 2024; Jia et al., 2021; Jorie, 2024; Koleck et al., 2019; Migal, 2024; Mulac et al., 2021; Olsen, 2024; Pant, 2024; Weber, 2023; Yelne et al., 2023).

AI is transforming patient education by providing content tailored to individual literacy levels, preferences, and health needs.

In contrast, conversational AI systems are advanced natural language processing (NLP) platforms that analyze large volumes of text to understand, process, and generate human-like conversations. Successful implementation of conversational AI in nursing requires careful consideration of risks and benefits and a clear definition of the chatbot's purpose. Before implementation, it is essential to gather evidence to support the safe and effective use of conversational AI systems. Data collection and storage transparency are vital, as user data may be monitored and linked across the Internet, raising privacy concerns. Nurses should ensure that patients know these risks and how to protect their personal information (Clark & Bailey, 2024; Weber, 2023) (See Table 5).

Table 5. *Ethical and Practical Challenges in AI Integration*

Challenge	Description	Mitigation Strategies
Ethical Considerations	AI decision-making raises concerns about accountability, patient autonomy, and informed consent.	Establish ethical frameworks for AI decision-making and transparency in recommendations.

Data Privacy & Security	AI requires large datasets, posing risks of data breaches and misuse of patient information.	Implement strict data encryption, access controls, and compliance with healthcare regulations.
Bias in AI Algorithms	AI models may perpetuate biases in healthcare decisions due to reliance on historical data.	Develop AI models with diverse datasets and regularly audit for bias correction.
Workforce Displacement	AI automation of routine tasks may impact job roles and require upskilling of nurses.	Provide continuous education and AI literacy training for nursing professionals.
Technical & Interoperability Issues	Integrating AI into existing healthcare IT systems presents compatibility challenges.	Ensure standardized AI integration protocols for seamless interoperability with healthcare systems.

(Clark & Bailey, 2024; Weber, 2023)

When implementing conversational AI, nurses can utilize chatbots to facilitate patient self-empowerment activities. For example, a chatbot can offer timely educational information before a colonoscopy appointment and improve patient preparation. Conversational AI technologies can also enhance the Quadruple Aim in nursing care. By reducing no-shows, conversational AI can lower costs and expand screening for conditions such as cancer. Chatbots can further improve the clinical experience by providing savings through essential education, ensuring that more informed patients can effectively manage their health conditions (Clark & Bailey, 2024; Weber, 2023) (See Table 5). For example, QliqSOFT's *Quincy* chatbot remotely monitors post-discharge patients to verify that follow-up appointments are scheduled, medications are refilled, and patients report any symptoms. This proactive strategy may promote medication adherence and early intervention, ultimately enhancing positive patient outcomes (Weber, 2023).

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Documentation and Administrative Tasks

NLP is considered a branch of AI, enabling computers to understand, interpret, generate, and respond to human language by processing text and speech. By using linguistics, machine learning, and computational modelling techniques, NLP presents promising opportunities to improve nursing workflows by extracting valuable information from nursing notes. Nursing documentation is a rich source of clinical data; however, nurses spend considerable time on documentation, which requires reading and reviewing patient clinical notes. NLP can help nurses to identify patient characteristics and predict critical symptoms that are often not recorded as structured data (Mitha et al., 2023).

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Mitha et al. (2023) observed that NLP has been employed to analyze data related to mortality, hospital readmission, and patient safety, including fall risk (See Table 3). For instance, Koleck et al. (2019) used NLP to identify patients at high risk for falls. The application of NLP in nursing notes enables healthcare providers to derive valuable insights that can enhance patient care and outcomes (Topaz et al., 2020) (See Table 4). Future studies should aim to apply NLP to a diverse range of populations, including pediatric and adult outpatient groups, to enhance understanding about subspecialty populations by using NLP to analyze nursing notes (Koleck et al., 2019; Mitha et al., 2023; Topaz et al., 2020).

AI and Nursing Workflow Optimization

AI applications have become increasingly important for nurses, offering tools that streamline workflows and enhance patient care. By automating routine tasks, AI can enable nurses to dedicate more time to direct patient interactions, improving care quality (Presti, 2024; Putty, 2025; Rony et al., 2023). For instance, many industry blogs have noted that AI can effectively manage patient appointments and staff schedules, decreasing no-shows and optimizing resource allocation (See Tables 2 and 3). The examples below briefly illustrate industry discussions about three common ways that AI is currently impacting nursing workflows:

- **Documentation:** AI-powered systems automate the organization and retrieval of medical records, reducing the time that nurses spend on paperwork.
- **Workload Management:** AI can potentially improve the distribution of nurse workloads, enhancing job satisfaction and enabling nurses to focus on direct patient care, which results in better patient outcomes (Presti, 2024; Putty, 2025; Rony et al., 2023).
- **Ambient Voice Technologies:** AI-driven ambient voice technologies may transform nursing workflows by enabling hands-free documentation. These systems capture and automatically enter patient information into electronic health records during nurse-patient interactions, eliminating the need for manual data entry.

However, successful implementation of AI applications in nursing requires careful planning, collaboration, and a focus on ethical considerations. Nurses must be involved in the design and development of AI solutions to ensure that these tools appropriately meet their needs and workflows (Presti, 2024; Putty, 2025; Rony et al., 2023). Addressing concerns about job displacement, ensuring data privacy and security, and promoting transparency and accountability in AI decision-making are critical areas to address to foster trust and acceptance among healthcare professionals (Presti, 2024; Putty, 2025).

Nurse Scheduling and Resource Allocation

Nurses must be involved in the design and development of AI solutions to ensure that these tools appropriately meet their needs and workflows.

Some AI applications are transforming healthcare by optimizing nursing staff scheduling and resource allocation. These efforts ensure that medical facilities are appropriately staffed to meet patient needs. AI tools can forecast patient volumes by analyzing historical data and real-time information, empowering healthcare administrators to proactively adjust staffing levels. According to some reports, this predictive capability enhances operational efficiency and improves patient care by reducing wait times and can help to prevent staff burnout (Cleveland Clinic, 2024; Graham & Reifsnyder, 2024; McQuillen, 2024; SCP Health, 2025).

AI-driven dynamic staffing has been crucial to optimize nursing schedules and resource allocation, particularly in unpredictable settings like emergency departments (EDs). Traditional scheduling methods often fall short as they rely on manual input and do not adapt to changing patient volumes (Cleveland Clinic, 2024; Graham & Reifsnyder, 2024; McQuillen, 2024; SCP Health, 2025). Dynamic staffing, driven by AI, addresses these issues by adjusting staffing levels in real-time or near real-time to align with patient volume (See Table 3). The ability of AI to analyze large datasets can result in more accurate patient volume and acuity predictions, thereby enhancing staffing decisions. Machine learning algorithms can uncover patterns and correlations that human analysts might overlook, such as the effects of weather, local events, or seasonal trends on emergency department traffic (Cleveland Clinic, 2024; Graham & Reifsnyder, 2024; McQuillen, 2024; SCP Health, 2025).

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In sum, predictive analytics provides a considerable advantage in healthcare decision-making by uncovering complex patient scheduling patterns possibly beyond human capabilities. AI-assisted scheduling allows practices to optimize nursing schedules, ensuring effective patient flow while allocating adequate time for documentation and other administrative tasks (Cleveland Clinic, 2024; Graham & Reifsnyder, 2024; SCP Health, 2025). For instance, Veradigm's *Predictive Scheduler* employs AI and predictive analytics to tackle patient and nursing scheduling challenges by reorganizing day-to-day schedules for patients with high needs and continuously updating them based on anticipated demand fluctuations (Graham & Reifsnyder, 2024) (See Table 3). Overall, scheduling is matched for patient acuity and volume to nurse availability.

Emerging Technology in Nursing: Automated Ultrasound Systems

Efficient Bedside Assessments. The incorporation of automated ultrasound technology in nursing, a recently emerging AI application, enhances the efficiency of bedside assessments. For example, AI-powered ultrasound devices allow nurses and midwives to conduct prenatal scans in obstetric care, supporting the early identification of potential issues (Boca Bene et al., 2021; Brattain et al., 2021; Chen et al., 2021; EchoNous, n.d.; Hillis et al., 2022; Jacobs et al., 2024; Nicosia et al., 2020). This has been reported as especially beneficial in resource-limited settings with limited access to specialized sonographers (Dadon et al., 2024; Lay & Okiror, 2024).

The incorporation of automated ultrasound technology in nursing [is] a recently emerging AI application...

Enhanced Workflow Efficiency. Other reports have asserted that integrating automated ultrasound systems into nursing practice improves workflow efficiency. Nurses can conduct comprehensive assessments with limited training due to image acquisition automation, allowing more time for other vital patient care activities. Additionally, standardized imaging techniques reduce variability, ensuring that all patients receive the same high-quality care (Boca Bene et al., 2021; Brattain et al., 2021; Chen et al., 2021; EchoNous, n.d.; Jacobs et al., 2024; Nicosia et al., 2020).

Improved Clinical Outcomes. Automated ultrasound systems have reportedly enhanced patient outcomes by enabling early detection and intervention (Chen et al., 2021; EchoNous, n.d.; Jacobs et al., 2024; Lay & Okiror, 2024; Nicosia et al., 2020) (See Table 3). Robotics and AI offer innovative solutions to enhance nursing practice and patient care across various settings (Chen et al., 2021; EchoNous, n.d.). A compact robotic system, such as VeniBot, integrates hardware and software to automate tasks like venipuncture, thereby improving efficiency and safety (Chen et al., 2021; EchoNous, n.d.; Jacobs et al., 2024). Similarly, AI-enabled ultrasound devices, like AI-GUIDE, assist nurses in procedures such as vascular access by providing real-time guidance and automated needle insertion (See Table 3). For instance, AI-GUIDE recorded an average time of 53 ± 36 seconds to identify the femoral vein insertion point, a total time of 80 ± 30 seconds for catheter insertion, and an average of 1.1 needle insertion attempts under normotensive conditions (Brattain et al., 2021; Chen et al., 2021).

Point-of-care ultrasound is establishing its important role in all healthcare fields...

Point-of-care ultrasound is establishing its important role in all healthcare fields, including among advanced care providers and nurses (Attia et al., 2019; Baloescu et al., 2025). Research has shown that nonexperts find these tools beneficial to identify anatomical structures, learn scanning methods, and enhance their overall training experience (Brattain et al., 2021; Chen et al., 2021; Jacobs et al., 2024) (See Table 3).

Challenges in Redefining the Scope of Practice

Integrating AI applications into nursing practice presents complex challenges, especially concerning role displacement and the redefinition of the nursing scope of practice (See Table 6). As AI systems increasingly assume tasks traditionally performed by nurses, concerns arise about the potential diminishment of the nursing role and its implications for patient care (Rony et al., 2023; 2024). Some examples related to these concerns include:

- **Ethical and Accountability Issues:** Delegating responsibilities to AI systems raises moral and accountability concerns (Rony et al., 2024).
- **Perpetuation of Existing Biases:** Furthermore, the integration of AI may unintentionally perpetuate or worsen existing biases within healthcare systems (Rony et al., 2023; 2024).
- **Technical Barriers**: The integration of AI is hindered by complex technical challenges and significant interoperability barriers, including incompatible data systems, lack of standardized protocols, and limited infrastructure to support seamless data exchange (Rony et al., 2023; 2024).

Integrating AI applications into nursing practice presents complex challenges...

Additional examples are illustrated within Table 6. A study that examined healthcare workers' concerns about AI applications replacing medical professionals highlighted worries regarding job security and the possible loss of professional autonomy (Rony et al., 2023; 2024). A primary concern was the potential for AI to replace critical aspects of nursing, such as clinical decision-making and patient monitoring. The ability of AI algorithms to analyze vast amounts of patient data, predict clinical events, and suggest interventions may diminish the roles of nurses in these areas. This shift could cause nurses to rely excessively on AI recommendations, potentially undermining their clinical judgment and critical thinking skills.

Table 6. ***Challenges and Barriers to Adopting AI in Nursing***

Challenge Area	Specific Barrier	Implication for Nursing
Redefinition of Scope of Practice	Risk of role displacement as AI systems automate tasks traditionally performed by nurses	May reduce the need for direct nurse involvement and diminish professional identity and clinical judgment
Ethical and Accountability Issues	Ambiguity in responsibility for AI-driven clinical decisions	Complicates accountability, undermines the nurse-patient trust relationship, and raises legal concerns
Algorithmic Bias	AI trained on biased historical data may perpetuate disparities	Could lead to unequal care quality and reinforce systemic inequities
Technical Barriers	Lack of interoperability, standardized protocols, and infrastructure	Limits seamless integration of AI into clinical workflows and adds to system inefficiencies
Over-Reliance on AI	Automation of routine tasks could diminish critical thinking	May result in reduced autonomy and erosion of essential clinical decision-making skills
Lack of Clear Guidelines and Regulations	Absence of comprehensive frameworks for ethical AI use	Jeopardizes patient safety and may lead to inconsistent implementation across institutions
Insufficient Nurse Involvement in AI Development	AI tools may be designed without nursing workflow considerations	Reduces usability, hinders adoption, and may increase frustration among nursing staff
Education and Skill Gaps	Limited AI literacy and training opportunities for nurses	Creates barriers to effective use and reduces confidence in AI-supported decision-making

(Rony et al., 2023; 2024)

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AI has the potential to redefine workforce roles. Nurses are moving into roles as big data interpreters, which necessitates collaboration with AI tools. To adjust to these changes, healthcare professionals require structured training to incorporate AI into their practices. A proactive stance on AI, innovation, and technology will help ensure high-quality patient care. Adapting to new skill requirements involves embracing technology and data literacy to deliver effective patient care. While integrating AI has the potential to enhance the relationship between patients and providers by simplifying routine tasks and enabling nurses to focus more on patients' emotional and medical needs (Rony et al., 2023; 2024), several challenges can undermine this goal. Without clear guidelines and regulations, the ethical implementation of AI may be compromised, potentially eroding patient trust.

Education and Skill Development

Nurses are moving into roles as big data interpreters, which necessitates collaboration with AI tools.

Developing AI-related competencies in nursing curricula and ongoing professional development programs is essential to prepare nurses for effective collaboration with AI technologies and ensure that nurses can critically assess, implement, and monitor these tools to enhance patient care and safety. Leaders in nursing education acknowledge the important role of integrating innovative technologies to enhance teaching and learning experiences. Specifically, generative AI models such as ChatGPT, Copilot, and Gemini present transformative opportunities for nursing education (Siwicki, 2023). Integrating AI into nursing education necessitates the development of AI-related competencies within nursing curricula and ongoing professional development programs (Siwicki, 2023; Sullivan et al., 2024).

Integrating AI into nursing education necessitates the development of AI-related competencies within nursing curricula...

Nurse leaders recognize the fast-evolving landscape of education and the potential advantages of using generative AI as a teaching assistant for nursing faculty. Educators can leverage generative the capabilities of AI to enhance engagement, provide support, and create personalized learning experiences for students in nursing programs. For instance, nurse educators can leverage AI to tailor explanations, examples, and analogies that align with course specific learning objectives and content areas. Students can engage in realistic learning scenarios through simulated role-playing interactions, which enhance their understanding and application of nursing concepts. Moreover, AI can facilitate personalized tutoring systems that address individual student learning needs and preferences. Educators can also use AI to create interactive quizzes, tests, and lesson plans, promoting active learning and ensuring continuous assessment of student comprehension (Siwicki, 2023; Sullivan et al., 2024)

...AI can facilitate personalized tutoring systems that address individual student learning needs and preferences.

Nurse educators must ensure that students understand how to appropriately use AI technologies to promote the best interests of future nurses and their patients (Glauberman et al., 2023; Riley, 2024). Training related to AI should address ethical and legal aspects, including fairness and bias in AI algorithms, data privacy, regulatory compliance, and security. Faculty should encourage open communication and explain how AI enhances nurses' roles to facilitate adoption and foster trust in AI-driven technologies (Siwicki, 2023; Sullivan et al., 2024). Table 7 summarizes several important implications for AI in nursing education.

Table 7. ***Implications for AI in Nursing Education***

Focus Area	Implication	Example/Application
Curriculum Integration	AI competencies should be embedded across nursing curricula, including foundational courses and clinical practice modules.	Incorporating data literacy, AI ethics, and clinical decision-making supported by AI into BSN and MSN programs.
Faculty Development	Nurse educators must be trained in AI tools and technologies to effectively teach and support student learning.	Workshops on using generative AI (e.g., ChatGPT, Gemini) for creating simulations, adaptive quizzes, and personalized learning modules.
Simulated Learning	AI-powered simulations can provide realistic, adaptive scenarios that enhance clinical reasoning and decision-making skills.	Use of AI-based virtual patients that respond dynamically to nursing interventions during simulation labs.
Ethics and Professional Responsibility	Nurses must be educated about ethical challenges, including bias, privacy, and algorithmic accountability.	Case-based learning scenarios exploring ethical dilemmas in AI-driven clinical decisions.

Lifelong Learning and Continuing Education	Ongoing professional development should include AI literacy to keep pace with evolving tools.	CE modules on evaluating AI-supported clinical decision support systems or AI-assisted documentation.
Student Engagement and Personalization	AI can tailor educational experiences based on individual learning styles and needs.	AI-powered tutoring systems that provide targeted feedback and resources based on student performance analytics.
Policy Awareness and Advocacy	Students must understand the regulatory and policy landscape influencing AI in healthcare.	Classroom discussions on ANA position statements, regulatory frameworks, and licensure updates related to AI.

(American Nurses Association, 2022; Badawy et al., 2024; Bodine & Russell, 2024; Glauberman et al., 2023; Patel et al., 2024; Ronquillo et al., 2021; Riley, 2024; Simbo AI, n.d.; Siwicki, 2023; Sullivan et al., 2024; Teixeira, 2024)

Regulatory and Policy Adjustments

Regulatory and policy adjustments are important to keep pace with the integration of AI in nursing practice. As AI technologies become prevalent in clinical settings, policymakers at licensure and certification bodies must evaluate whether current competency frameworks adequately reflect the knowledge and skills nurses need to use AI safely and effectively. While this does not necessarily mean that nurses will be required to pass an additional licensure examination, it may lead to the inclusion of AI-related content in continuing education requirements, renewal criteria, or specialty certifications. These types of requirements would ensure that nurses remain equipped to critically appraise, ethically implement, and utilize AI tools in a way that supports patient safety and quality care (Glauberman et al., 2023; Riley, 2024).

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Licensure and certification requirements must evolve to reflect changes in nursing practice in the age of AI. Regulatory bodies (e.g., state boards of nursing), must integrate AI-related competencies into their standards. This may involve adding AI-specific content to nursing education programs and continuing education requirements (Riley, 2024). Furthermore, new and revised professional codes of ethics, standards of practice, and codes of conduct should clearly outline areas of responsibility and accountability for nurses concerning AI technology (Glauberman et al., 2023; Riley, 2024) (See Table 7).

To ensure the safe and ethical implementation of AI in nursing, healthcare facilities should involve nurses in designing AI solutions and guarantee ongoing monitoring and improvement of AI algorithms. Nurse educators play a crucial role in preparing students to critically assess the ethical implications of new technologies and ensure their use aligns with patient-centered care. Furthermore, regulations and policies should address issues such as bias in AI algorithms, privacy concerns, and equitable access to AI technologies (Glauberman et al., 2023; Riley, 2024).

To ensure the safe and ethical implementation of AI in nursing, healthcare facilities should involve nurses in designing AI solutions...

Collaboration Across Disciplines

Promoting interdisciplinary collaboration to define roles and ensure the effective use of AI technologies is essential (Patel et al., 2024; Ronquillo et al., 2021; Simbo AI, n.d.; Teixeira, 2024). As AI becomes more integrated into healthcare, nurses, healthcare professionals, technologists, data scientists, bioethicists, and policymakers must work together to shape the future of AI in healthcare. This collaboration encourages the development of AI solutions that enhance nursing expertise, improve patient care outcomes, and uphold the humanistic values central to nursing (Patel et al., 2024; Ronquillo et al., 2021; Simbo AI, n.d.).

...nurses, healthcare professionals, technologists, data scientists, bioethicists, and policymakers must work together to shape the future of AI in healthcare.

Effective communication and shared decision-making among healthcare professionals leads to improved patient safety and health outcomes. Training staff across various disciplines is essential to support AI-driven solutions. Clinical staff, administrative teams, and IT professionals need effective communication to refine workflows, ensuring that AI tools enhance service delivery rather than and complication to systems. Regular interdisciplinary meetings can promote a culture of trust and openness, allowing teams to address challenges and celebrate successes, thus forming a unified approach to AI developments and implementations in healthcare (Patel et al., 2024; Ronquillo et al., 2021; Simbo AI, n.d.; Teixeira, 2024).

Nurses serve as essential intermediaries between technical experts and clinical end-users, bridging the vocabulary gap between these groups (Patel et al., 2024; Ronquillo et al., 2021; Simbo AI, n.d.; Teixeira, 2024). Additionally, nurses' expertise in relational practice enhances the AI development lifecycle. Such skills underscore the importance of empathy and the human touch in therapeutic relationships.

Regular interdisciplinary meetings can promote a culture of trust and openness,

allowing teams to address challenges and celebrate successes...

Academia, the healthcare technology industry, and clinical professionals each play a vital role in promoting interdisciplinary collaboration in healthcare AI. Academic institutions contribute by offering education and training in AI-related fields and fostering collaboration through joint research initiatives and specialized programs. The healthcare technology industry drives innovation and specialized programs, and includes companies that develop AI software, data analytics platforms, and clinical decision support tools. These companies often partner with academic institutions and healthcare organizations to translate research into real-world clinical applications. Clinical professionals in healthcare contribute critical frontline insights, guiding the design, evaluation, and ethical use of AI tools in practice. Interdisciplinary conferences further support this ecosystem by enabling global collaboration, knowledge exchange, and the growth of professional networks that advance AI innovation in healthcare (Patel et al., 2024; Ronquillo et al., 2021; Simbo AI, n.d.; Teixeira, 2024).

Policy Advocacy

Nurses serve as essential intermediaries between technical experts and clinical end-users, bridging the vocabulary gap between these groups.

In sum, nurses must take an active role in policy development to support responsible integration of AI tools into nursing practice standards. Incorporating AI into clinical care requires proactive advocacy from nurses to ensure these technologies are thoughtfully and ethically embedded within existing framework (American Nurses Association [ANA], 2022). As frontline healthcare providers with deep insight into patient care, nurses are uniquely positioned to shape policies that promote safe and effective use of AI applications while maintaining professional ethical and clinical integrity. This engagement involves the participation of nurses in interdisciplinary policy discussions, contributing to the creation of comprehensive guidelines for AI integrations (See Table 7). The ANA (2022) has emphasized the need for nurses to collaborate with stakeholders, including technology developers, regulators, and healthcare leaders, to propose an AI governance framework that establishes ethical accountability and regulatory oversight for advanced technologies.

Incorporating AI into clinical care requires proactive advocacy from nurses to ensure these technologies are thoughtfully and ethically embedded within existing framework.

Nurses must also advocate for policies that address the ethical considerations of using AI. A recent study highlighted the importance of establishing ethical frameworks and data protection policies designed explicitly for AI in nursing (Badawy et al., 2024). The researchers recommended support for continuous professional development and allocation of resources for the ethical integration of AI into healthcare. In nursing education, developing policies is essential for using AI tools (Badawy et al., 2024). Furthermore, nurses should encourage stakeholder engagement in policy development by considering a range of perspectives. Improving education for nurses about AI, promoting stakeholder engagement, and crafting comprehensive policies will serve as a foundation for the ethical integration of AI tools for nurses (Bodine & Russell, 2024).

Future Directions for AI in Nursing

Integrating AI into nursing practice is set to revolutionize patient care by providing innovative solutions to long-standing challenges. The section briefly describes several evolving areas for use of AI applications in the practice of nursing: Expansion of virtual care, AI in population health, and robotics and automation in nursing.

Expansion of Virtual Care

Incorporating AI into telemedicine platforms may enable features such as virtual health assistants or chatbots to foster patient engagement and improve the efficiency of care delivery. As noted previously, AI assistants can provide health information, remind patients about medication schedules, and assist with appointment bookings (Migal & Nazarov, 2024; Yelne et al., 2023). AI tools also support continuous monitoring through wearable devices and remote sensors, enabling nurses to proactively manage chronic conditions and response quickly to changes in patient status, particularly for individuals in remote or underserved areas (Yelne et al., 2023). Enhanced by AI, telemedicine addresses barriers related to distance, time, and resource availability, making healthcare more accessible, personalized, and effective (Horowitz, 2024; Yelne et al., 2023). This area of AI will only continue to grow. NLP in AI-enabled telemedicine facilitates understanding and responding to patient inquiries, provides immediate and accurate answers, and digitizes clinical notes, reducing healthcare providers' administrative burden and enhancing data usability (Jorie, 2024).

This area of AI will only continue to grow.

AI in Predictive Population Health

Integration of AI in nursing practice has the potential to enhance predictive population health by identifying and mitigating social determinants of health (SDOH), including non-medical factors like socioeconomic status, education, and environment that significantly influence health outcomes. Nurses can gain deeper insights into these determinants by leveraging AI, leading to targeted and effective interventions. This capability allows nurses to understand their patients' social challenges better and tailor care plans accordingly (Olsen, 2024; Pant, 2024).

AI can also facilitate the integration of diverse data sources to create comprehensive patient profiles. By combining public databases, experiential claims data, and personal assessments, AI helps nurses to develop a holistic understanding of a patient's social context (Carlton, 2021; Gurley, 2018). AI uncovers patterns and correlations between social factors and disease prevalence by analyzing extensive datasets. This information can be invaluable for nurses when crafting proactive strategies to address potential health risks within specific populations, ultimately enhancing patient outcomes (Olsen, 2024). As AI technology continues to evolve, its role in predictive population health is set to become increasingly integral to nursing care (Olsen, 2024; Pant, 2024)

Robotics and Automation in Nursing

As AI technology continues to evolve, its role in predictive population health is set to become increasingly integral to nursing care.

Integrating AI-powered robotics into nursing practice transforms healthcare delivery by automating tasks. This technological advancement enhances operational efficiency and allows nurses to spend more time on direct patient care (Falcone, 2024). A notable example is the use of robots like TUG, developed by Aethon, which are deployed in over 37 Veterans Affairs hospitals across the United States. These robots autonomously navigate hospital corridors to deliver medications, reducing the workload of nursing staff and minimizing the risk of human error in medication distribution (Falcone, 2024). Medbot, an AI-powered medication delivery robot, operates continuously to optimize pharmacy operations. Beyond medication delivery, AI-powered robots assist patient transport within healthcare facilities (Selheim & Metcalf, 2022). Market research has reported that the use of advanced sensors and AI-driven navigation systems, these robots can safely and efficiently transport patients and medical equipment to designated locations, reducing physical strain on nursing staff and improving workflow efficiency (GRG Health, n.d.).

Integrating AI-powered robotics in nursing extends to assistive roles, such as monitoring patient vital signs and providing companionship. Robots like Moxi, developed by Diligent Robotics, support clinical staff by managing routine tasks, allowing nurses to concentrate more on patient-centered care activities. While adopting AI-powered robotics brings numerous benefits, it is important to address potential challenges, including the need for appropriate training of nursing staff to work alongside these technologies and ensure that the human element in patient care is not diminished. Thoughtfully incorporating robotics into nursing practice can assist healthcare facilities to improve efficiency and quality of patient care (Falcone, 2024; Selheim & Metcalf, 2022).

A Call to Action for Nursing Practice

Rapid integration of AI tools into healthcare marks a critical moment for the nursing profession. To fully leverage the benefits of AI, nurses must adapt, embracing technological advancements while steadfastly upholding the core values of patient-centered care (Curley, 2024). This evolution requires a proactive approach wherein nurses take the lead in adopting and implementing AI tools that enhance patient outcomes and streamline clinical workflows. Nurses are positioned to advocate for AI solutions that prioritize patient safety and align with clinical needs (Curley, 2024). By actively participating in selecting and deploying AI technologies, nurses can ensure these tools complement their practice and improve their ability to deliver high-quality care. This involvement enhances the relevance and effectiveness of AI applications and cultivates a sense of ownership and responsibility among nursing professionals (Curley, 2024).

Rapid integration of AI tools into healthcare marks a critical moment for the nursing profession.

Nursing education must incorporate comprehensive training on AI and related technologies to prepare for this transformative shift. Educational initiatives should include data literacy, ethical considerations, and the practical application of AI in patient care, ensuring that nurses are both competent and confident in navigating this new landscape. Leaders within the nursing profession must also participate in interdisciplinary collaboration to clarify roles and responsibilities in AI integration. All nurses must advocate for the responsible use of AI and ensure that these technologies respect patient dignity, privacy, and autonomy. The nursing profession stands at a crossroads that offers the chance to lead the way in integrating AI technology into healthcare. By embracing technological advancements, advocating for patient-centered AI solutions, and committing to ongoing education and ethical practices, nurses can ensure that AI is a powerful tool for enhancing patient care (Teixeira, 2024). This call to action highlights the necessity for proactive engagement and positions nurses as key leaders in the digital transformation of healthcare (Curley, 2024).

Conclusion

All nurses must advocate for the responsible use of AI and ensure that these technologies respect patient dignity, privacy, and autonomy.

AI is revolutionizing nursing practice by augmenting clinical decision-making, streamlining workflows, and significantly improving patient safety and outcomes. AI-powered clinical decision support systems analyze vast amounts of patient data, offering nurses real-time, evidence-based recommendations that enhance diagnostic accuracy and promote early intervention. Predictive analytics further strengthen

nursing practice by identifying patients at high risk of complications, enabling proactive care that reduces morbidity and mortality rates. Automated documentation, voice recognition technologies, and AI-assisted workflow management systems alleviate administrative burdens, allowing nurses to focus more on direct patient care and fostering stronger patient-provider relationships. These advancements underscore the potential of AI to transform nursing practice.

However, the integration of AI applications into the practice of nursing is not without challenges. Ethical concerns surrounding data privacy, bias in AI algorithms, and the potential for workforce displacement must be carefully managed to ensure that AI tools serve as an enhancement rather than a replacement for human expertise. AI models rely on vast datasets that, if not properly curated, may perpetuate systemic biases, leading to disparities in patient care. Additionally, as AI automates routine tasks, there is a risk that nurses may become overly reliant on technology, potentially eroding their critical thinking and clinical judgment skills. To mitigate these risks, healthcare institutional leaders must establish rigorous ethical frameworks, implement robust data security measures, and invest in continuous AI education for nursing professionals.

To mitigate these risks, healthcare institutional leaders must establish rigorous ethical frameworks, implement robust data security measures, and invest in continuous AI education for nursing professionals.

Interdisciplinary collaboration between nurses, data scientists, and policymakers is essential to ensure that AI tools are designed with clinical relevance, safety, and usability in mind. By embracing AI with a balanced approach—leveraging strengths while safeguarding human oversight and ethical considerations—nurses can position themselves at the forefront of technological innovation and ensure that AI enhances the profession while preserving the irreplaceable human aspects of care.

Disclosure: AI Assistance

In the preparation of this article, I utilized ChatGPT, an AI language model, to assist with specific aspects of writing and research. ChatGPT was used to refine sentence clarity and to generate a Python script to search the internet for the most current literature on the use of artificial intelligence in nursing. The resulting literature was manually reviewed and verified for accuracy and relevance prior to inclusion. All decisions regarding content development, manuscript structure, and final scholarly interpretation were solely the responsibility of the author.

I mainly use ChatGPT to write script for Python to sub the internet for the latest topics targeted to my area of interest. This is the reason why blogs and other non-primary source literature is included in the article, which is in keeping with trying to be the most current applications.

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References

Aggarwal, A., Mathur, P., & Khanna, A. K. (2023). What every intensivist should know about using data science and AI to predict adverse postoperative ICU events. *Society of Critical Care Anesthesiology Newsletter, 34*(4). https://www.socca.org/vol34-iss4-what-every-intensivist-should-know-about-using-data-science-and-ai-in-prediction-of-adverse-postoperative-events-in-the-icu

Alotaibi, Y. K., & Federico, F. (2017). The impact of health information technology on patient safety. *Saudi Medical Journal, 38*(12), 1173–1180. https://doi.org/10.15537/smj.2017.12.20631

American Nurses Association. (2022). *The ethical use of artificial intelligence in nursing practice* [Position]. Author. Statement. https://www.nursingworld.org/globalassets/practiceandpolicy/nursing-excellence/ana-position-statements/the-ethical-use-of-artificial-intelligence-in-nursing-practice_bod-approved-12_20_22.pdf

Attia, Z. I., Kapa, S., Lopez-Jimenez, F., McKie, P. M., Ladewig, D. J., Satam, G., Pellikka, P. A., Enriquez-Sarano, M., Noseworthy, P. A., Munger, T. M., Asirvatham, S. J., Scott, C. G., Carter, R. E., & Friedman, P. A. (2019). Screening for cardiac contractile dysfunction using an artificial intelligence–enabled electrocardiogram. *Nature Medicine, 25*(1), 70–74. https://doi.org/10.1038/s41591-018-0240-2

Badawy, W., Zinhom, H., & Shaban, M. (2024). Navigating ethical considerations in the use of artificial intelligence for patient care: A systematic review. *International Nursing Review*. Advance online publication. https://doi.org/10.1111/inr.13059

Baloescu, C., Bailitz, J., Cheema, B., Agarwala, R., Jankowski, M., Eke, O., Liu, R., Nomura, J., Stolz, L., Gargani, L., Alkan, E., Wellman, T., Parajuli, N., Marra, A., Thomas, Y., Patel, D., Schraft, E., O'Brien, J., Moore, C. L., & Gottlieb, M. (2025). Artificial intelligence–guided lung ultrasound by nonexperts. *JAMA Cardiology, 10*(3), 245-253. https://doi.org/10.1001/jamacardio.2024.4991

Boca Bene, I., Ciurea, A. I., Ciortea, C. A., & Dudea, S. M. (2021). Pros and cons for automated breast ultrasound (ABUS): A Narrative Review. *Journal of Personalized Medicine, 11*(8), 703. https://doi.org/10.3390/jpm11080703

Bodine, J., & Russell, J. A. (2024, December 10). Creating policy around the use of AI tools in nursing education. *American Nurse*. https://www.myamericannurse.com/creating-policy-around-the-use-of-ai-tools-in-nursing-education/

Brattain, L. J., Pierce, T. T., Gjesteby, L. A., Johnson, M. R., DeLosa, N. D., Werblin, J. S., Gupta, J. F., Ozturk, A., Wang, X., Li, Q., Telfer, B. A., & Samir, A. E. (2021). AI-enabled, ultrasound-guided handheld robotic device for femoral vascular access. *Biosensors, 11*(12), 522. https://doi.org/10.3390/bios11120522

Carlton, T. (2021, August 10). SDOH: How data analytics and AI impact social determinants. *MTM, Inc* .https://www.mtm-inc.net/sdoh-how-data-analytics-and-ai-impact-social-determinants/

Chen, Y., Wang, Y., Lai, B., Chen, Z., Cao, X., Ye, N., Ren, Z., Zhao, J., Zhou, X.-Y., & Qi, P. (2021). VeniBot: Towards autonomous venipuncture with semi-supervised vein segmentation from ultrasound images. *arXiv.Org* [Collaborative Preprint Server]. https://doi.org/10.48550/arxiv.2105.12945

Clark, M., & Bailey, S. (2024, January). Chatbots in health care: Connecting patients to information: Emerging health technologies [Internet]. *Canadian Agency for Drugs and Technologies in Health*. https://www.ncbi.nlm.nih.gov/books/NBK602381

Cleveland Clinic. (2024, February 14). How AI assists with staffing, scheduling, and once-tedious tasks. *Consult QD*. https://consultqd.clevelandclinic.org/how-ai-assists-with-staffing-scheduling-and-once-tedious-tasks

Curley, M. A. Q. (2024, September 26). *Call to action: A blueprint for change in acute and critical care nursing*. News. https://www.nursing.upenn.edu/live/news/2704-call-to-action-a-blueprint-for-change-in-acute-and

Dadon, Z., Rav Acha, M., Orlev, A., Carasso, S., Glikson, M., Gottlieb, S., & Alpert, E. A. (2024). Artificial intelligence-based left ventricular ejection fraction by medical students for mortality and readmission prediction. *Diagnostics (Basel, Switzerland), 14*(7), 767. https://doi.org/10.3390/diagnostics14070767

Davies, S. J., Vistisen, S. T., Jian, Z., Hatib, F., & Scheeren, T. W. L. (2020). Ability of an arterial waveform analysis–derived hypotension prediction index to predict future hypotensive events in surgical patients. *Anesthesia and Analgesia, 130*(2), 352–359. https://doi.org/10.1213/ANE.0000000000004121

EchoNous. (n.d.). *Point of care ultrasound technology (POCUS) with AI*. https://echonous.com

Elhaddad, M., & Hamam, S. (2024). AI-driven clinical decision support systems: An ongoing pursuit of potential. *Cureus, 16*(4), e57728. https://doi.org/10.7759/cureus.57728

Falcone, S. (2024, March 21). 6 nurse AI robots that are changing healthcare in 2024. *Nurse.org*. https://nurse.org/articles/nurse-robots/

Glauberman, G., Ito-Fujita, A., Katz, S., & Callahan, J. (2023). Artificial intelligence in nursing education: Opportunities and challenges. *Hawai'i Journal of Health & Social Welfare*, *82*(12), 302–305. https://pmc.ncbi.nlm.nih.gov/articles/PMC10713739/

Graafsma, J., Murphy, R. M., van de Garde, E. M. W., Karapinar-Çarkit, F., Derijks, H. J., Hoge, R. H. L., Klopotowska, J. E., & van den Bemt, P. M. L. A. (2024). The use of artificial intelligence to optimize medication alerts generated by clinical decision support systems: A scoping review. *Journal of the American Medical Informatics Association: JAMIA, 31*(6), 1411–1422. https://doi.org/10.1093/jamia/ocae076

Graham, J., & Reifsnyder, C. (2024, March 21). Predictive scheduler: The AI-driven future of healthcare scheduling. *Veradigm.* https://veradigm.com/veradigm-news/predictive-scheduler-ai-healthcare/

GRG Health. (n.d.). Role of transportation robots in enhancing patient care and safety. *GRG Health*. https://www.grgonline.com/post/role-of-transportation-robots-in-enhancing-patient-care-and-safety

Gurley, V. (2018, May 22). Using predictive analytics to address social determinants of health. *First Report Managed Care.* https://www.hmpgloballearningnetwork.com/site/frmc/article/using-predictive-analytics-address-social-determinants-health

Haas, R., & McGill, S. C. (2022, March). Artificial intelligence for the prediction of sepsis in adults: CADTH horizon scan [Internet]. *Canadian Agency for Drugs and Technologies in Health*. https://www.ncbi.nlm.nih.gov/books/NBK596676

Härkänen, M., Haatainen, K., Vehviläinen-Julkunen, K., & Miettinen, M. (2021). Artificial intelligence for identifying the prevention of medication incidents causing serious or moderate harm: An analysis using incident reporters' views. *International Journal of Environmental Research and Public Health, 18*(17), 9206. https://doi.org/10.3390/ijerph18179206

Hillis, J. M., Bizzo, B. C., Mercaldo, S., Chin, J. K., Newbury-Chaet, I., Digumarthy, S R., Gilman, M D., Muse, V. V., Bottrell, G., Seay, J. C. Y., Jones, C. M., Kalra, M. K., & Dreyer, K. J. (2022). Evaluation of an artificial intelligence model for detection of pneumothorax and tension pneumothorax in chest radiographs. *JAMA Network Open, 5*(12), e2247172. https://doi.org/10.1001/jamanetworkopen.2022.47172

Hong, J. Y., Ivory, C. H., VanHouten, C. B., Simpson, C. L., & Novak, L. L. (2021). Disappearing expertise in clinical automation: Barcode medication administration and nurse autonomy. *Journal of the American Medical Informatics Association: JAMIA, 28*(2), 232–238. https://doi.org/10.1093/jamia/ocaa135

Horowitz, B. T. (2024, March 25). Integrating AI with telemedicine solutions improves patient care and clinical efficiencies. *HealthTech Magazine*. https://healthtechmagazine.net/article/2024/03/Integrating-ai-with-virtual-care-perfcon

Jacobs, E., Wainman, B., & Bowness, J. (2024). Applying artificial intelligence to the use of ultrasound as an educational tool: A focus on ultrasound-guided regional anesthesia. *Anatomical Sciences Education, 17*(5), 919–925. https://doi.org/10.1002/ase.2266

Jia, Y., Lawton, T., McDermid, J., Rojas, E., & Habli, I. (2021). A framework for assurance of medication safety using machine learning. *arXiv.Org* [Collaborative Preprint Server]. https://doi.org/10.48550/arXiv.2101.05620

Jorie AI. (2024, November 13). AI-powered telemedicine: Bridging the gap between doctors and patients. *Jorie AI*. https://www.jorie.ai/post/ai-powered-telemedicine-bridging-the-gap-between-doctors-and-patients

Koleck, T. A., Dreisbach, C., Bourne, P. E., & Bakken, S. (2019). Natural language processing of symptoms documented in free-text narratives of electronic health records: a systematic review. *Journal of the American Medical Informatics Association: JAMIA, 26*(4), 364–379. https://doi.org/10.1093/jamia/ocy173

Loria, K. (2023, July 13). Utilizing AI for medication management. *Drug Topics, 167*(07), 37. https://www.drugtopics.com/view/utilizing-ai-for-medication-management

Lay, K., & Okiror, S. (2024, July 12). I am happy to see how my baby is bouncing: The AI transforming pregnancy scans in Africa. *The Guardian*. https://www.theguardian.com/global-development/article/2024/jul/12/i-am-happy-to-see-how-my-baby-is-bouncing-the-ai-transforming-pregnancy-scans-in-africa

McQuillen, B. (2024, November 13). The future of work: How AI is revolutionizing workforce scheduling. *Ignite HCM*. https://www.ignitehcm.com/blog/the-future-of-work-how-ai-is-revolutionizing-workforce-scheduling

Migal, A., & Nazarov, V. (2024, September 2). AI in telehealth: Revolutionizing healthcare delivery to every patient's home. *TATEEDA GLOBAL*. https://tateeda.com/blog/ai-in-telemedicine-use-cases

Mitha, S., Schwartz, J., Hobensack, M., Cato, K., Woo, K., Smaldone, A., & Topaz, M. (2023). Natural language processing of nursing notes: An integrative review. *Computers, Informatics, Nursing: CIN, 41*(6), 377–384. https://doi.org/10.1097/CIN.0000000000000967

Mulac, A., Mathiesen, L., Taxis, K., & Gerd Granås, A. (2021). Barcode medication administration technology use in hospital practice: A mixed-methods observational study of policy deviations. *BMJ Quality & Safety, 30*(12), 1021–1030. https://doi.org/10.1136/bmjqs-2021-013223

Nicosia, L., Ferrari, F., Bozzini, A. C., Latronico, A., Trentin, C., Meneghetti, L., Pesapane, F., Pizzamiglio, M., Balestreri, N., & Cassano, E. (2020). Automatic breast ultrasound: State of the art and future perspectives. *Ecancermedicalscience, 14*, 1062. https://doi.org/10.3332/ecancer.2020.1062

Olsen, E. (2024, January 12). Generative AI can identify social determinants of health data in notes, study finds. *Healthcare Dive*. https://www.healthcaredive.com/news/generative-ai-social-determinants-health-npj-digital-medicine/704462/

Pant, P. (2024, July 26). Strategies for using AI to drive population health and address SDOH. *Healthcare IT Today*. https://www.healthcareittoday.com/2024/07/26/strategies-for-using-ai-to-drive-population-health-and-address-sdoh/

Patel. A. U., Gu, Q., Esper, R., Maesar, D., & Maeser, N. (2024). The crucial role of interdisciplinary conferences in advancing explainable AI in healthcare. *BioMedInformatics*, *4*(2), 1363-1383. https://doi.org/10.3390/biomedinformatics4020075

Poon, E. G., Keohane, C. A., Yoon, C. S., Ditmore, M., Bane, A., Levtzion-Korach, O., Moniz, T., Rothschild, J. M., Kachalia, A. B., Hayes, J., Churchill, W. W., Lipsitz, S., Whittemore, A. D., Bates, D. W., & Gandhi, T. K. (2010). Effect of barcode technology on the safety of

medication administration. *The New England Journal of Medicine, 362*(18), 1698–1707. https://doi.org/10.1056/NEJMsa0907115

Presti, M. V. (2024, August 15). Transforming the nursing workflow with ambient voice and AI. *Microsoft Industry Blogs*. https://www.microsoft.com/en-us/industry/blog/healthcare/2024/08/15/transforming-the-nursing-workflow-with-ambient-voice-and-ai/

Putty, C. (2025, January 10). The power of AI in streamlining healthcare workflows. *Thoughtful AI*. https://www.thoughtful.ai/blog/the-power-of-ai-in-streamlining-healthcare-workflows

Riley, C. (2024). Incorporating artificial intelligence into nursing education: Challenges and recommendations. *Leader to Leader*, Spring 2024, 1–4. https://www.ncsbn.org/public-files/LTL_Spring2024.pdf

Ronquillo, C. E., Peltonen, L. M., Pruinelli, L., Chu, C. H., Bakken, S., Beduschi, A., Cato, K., Hardiker, N., Junger, A., Michalowski, M., Nyrup, R., Rahimi, S., Reed, D. N., Salakoski, T., Salanterä, S., Walton, N., Weber, P., Wiegand, T., & Topaz, M. (2021). Artificial intelligence in nursing: Priorities and opportunities from an international invitational think-tank of the Nursing and Artificial Intelligence Leadership Collaborative. *Journal of Advanced Nursing*, *77*(9), 3707–3717. https://doi.org/10.1111/jan.14855

Rony, M. K. K., Parvin, M. R., & Ferdousi, S. (2023). Advancing nursing practice with artificial intelligence: Enhancing preparedness for the future. *Nursing Open, 11*(1), 10.1002/nop2.2070. https://doi.org/10.1002/nop2.2070

Rony, M. K. K., Parvin, M. R., Ferdousi, S., & Bala, S. D. (2024). "I wonder if my years of training and expertise will be devalued by machines": Concerns about the replacement of medical professionals by artificial intelligence. *SAGE Open Nursing, 10*, 23779608241245220. https://doi.org/10.1177/23779608241245220

SCP Health. (2025, February). *Dynamic staffing: Using AI to solve emergency department staffing problems.* [Blog post]. https://www.scphealth.com/artificial-intelligence-and-dynamic-staffing/

Sellheim, W., & Metcalf, J. (2022, May 6). How AI-powered robotics give nurses more time to spend with patients. *AWS Public Sector Blog*. https://aws.amazon.com/blogs/publicsector/how-ai-powered-robotics-give-nurses-more-time-patients/

Simbo AI. (n.d.). The role of interdisciplinary collaboration in advancing AI technologies within healthcare settings. *Simbo AI Blog*. https://www.simbo.ai/blog/the-role-of-interdisciplinary-collaboration-in-advancing-ai-technologies-within-healthcare-settings-3417912/

Siwicki, B. (2023, October 18). What nurse leaders need to consider when confronting AI. *Healthcare IT News*. https://www.healthcareitnews.com/news/what-nurse-leaders-need-consider-when-confronting-ai

Sloss, E. A., & Jones, T. L. (2021). Nurse cognition, decision support, and barcode medication administration: A conceptual framework for research, practice, and education. *Computers, Informatics, Nursing, 39*(12), 851–857. https://doi.org/10.1097/CIN.0000000000000724

Sullivan, D., Hall, V. P., & Morrison, J. (2024). Navigating the future: artificial intelligence's impact on transformational nurse leadership. *Teaching and Learning in Nursing*, *19*(3), 298–300. https://doi.org/10.1016/j.teln.2024.04.017

Teixeira, L. (2024). AI integration in nursing practice: Striking a balance between technology and the human touch. *British Journal of Nursing*, *33*(15). https://www.britishjournalofnursing.com/content/comment/ai-integration-in-nursing-practice-striking-a-balance-between-technology-and-the-human-touch/

Topaz, M., Murga, L., Gaddis, K. M., McDonald, M. V., & Schnall, R. (2020). Predicted influences of artificial intelligence on the domains of nursing practice. *JMIR Nursing, 3*(1), e23939. https://doi.org/10.2196/23939

Weber, B. (2023, May 8). Curious about conversational AI? Here's what it is and why it matters *Qliqsoft*. [Blog post]. https://www.qliqsoft.com/blog/conversational-ai-basics-in-healthcare?utm_source=chatgpt.com

Yelne, S., Chaudhary, M., Dod, K., Sayyad, A., & Sharma, R. (2023). Harnessing the power of AI: A comprehensive review of its impact and challenges in nursing science and healthcare. *Cureus, 15*(11), e49252. https://doi.org/10.7759/cureus.49252

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