HIMSS

AI SOLUTIONS FOR NURSES TO DRIVE EFFICIENCY AND RESILIENCE

Navigating The Healthcare Workforce Crisis With Technology

Navigating the Healthcare Workforce Crisis:

Harnessing AI Solutions for Nurse Informaticists to Drive Efficiency and Resilience

This article proudly presents insights from the HIMSS CNO-CNIO Vendor Roundtable members made up of nurse leaders from premier organizations with HIMSS Corporate Diamond, Emerald, or Platinum memberships who hold Nurse Executive and Nurse Leader roles within highly influential institutions. By sharing their perspectives, experiences, and recommendations, the authors contribute to the ongoing transformation of healthcare delivery and operations, ensuring that technology-driven solutions align with the goals, needs of nursing professionals, and enhance patient outcomes.

The Roundtable is led by industry experts, Cathy Menkiena, MBA, FACHE, RN-BC, FHIMSS, Senior Vice President and General Manager Northeast at Health Catalyst and Cathy Turner, MBA, RN, NI-BC, Chief Marketing and Nurse Executive at MEDITECH.

Abstract

This article overviews the current healthcare workforce crisis, its implications for nurse informaticists, and how artificial intelligence (AI) solutions can positively impact current barriers. The need for more qualified healthcare professionals is driven by factors such as an aging population, increasing demand for healthcare services, and a limited supply of new healthcare professionals entering the workforce. The nursing shortage is particularly acute, with approximately 100,000 nurses leaving the profession during COVID-19 and an estimated additional 600,000 nurses reporting the intent to leave the workforce by 2027. Burnout also contributes to the decline in the nursing workforce, which accelerated during the pandemic. To address this crisis, healthcare organizations may need to consider strategies such as using artificial intelligence and automation. Nurse informaticists can play a crucial role in leveraging healthcare technologies to improve workforce efficiency and effectiveness, to support a healthy, sustainable, and resilient healthcare workforce.

Authors:

Cathy Turner, MBA, RN, NI-BC, Chief Marketing and Nurse Executive at MEDITECH Information. Technology, Inc

Kathleen McGrow, DNP, MS, RN, PMP, FAAN, Global Chief Nursing Information Officer, Microsoft

Lisa Wolf, BSN RN, NI-BC, Senior Consultant Clinical Informatics, Wolters Kluwer Health

Kathryn Owen, MS, RN, NI-BC, Lead Product Manager, UKG

Nursing informatics and healthcare workforce challenges

As practicing nurse informaticists and informatics leaders, awareness of the current healthcare workforce crisis is critical. The industry needs more qualified healthcare professionals across various disciplines, including nursing, physicians, advanced practice providers, and other allied health professions.[1,2]

As our experienced nurses leave the workforce, and learning opportunities for nurses become even further limited, we must consider new strategies moving forward. The pandemic has catapulted the healthcare ecosystem to think more innovatively as consumers push for new technologies and alternative care delivery models and settings.

The nursing workforce crisis has implications for the field of nursing informatics. As healthcare organizations need help recruiting and retaining healthcare professionals, they may face challenges in implementing and using information technology systems effectively, relying on nurse informaticists' essential skills and knowledge. This knowledge barrier could impact the adoption and success of applied technology initiatives, which rely heavily on the expertise and engagement of healthcare professionals.[3]

Meeting the Challenge

To address the workforce crisis in healthcare and its impact on the specialty of nursing informatics, organizational leaders may need to consider strategies such as increasing recruitment efforts, offering incentives for healthcare professionals, investing in technology and infrastructure and knowledgeable human resources, and supporting continuing education and professional development opportunities. Additionally, healthcare organizations can explore innovative staffing models, such as telehealth, virtual nursing, and remote work, to address workforce shortages and improve patient and caregiver access to care.

Nurse informaticists must be aware of the healthcare workforce crisis and work collaboratively with organizations and stakeholders to address this challenge. With influence and wisdom, nurse informaticists can ensure organizations leverage healthcare technologies to improve workforce efficiency and effectiveness to help support a sustainable and resilient healthcare workforce for the future.

Nurses, as major stakeholders, must be included in the design and implementation of new technologies that support the drivers of change. Being involved in all steps of the system development life cycle will ensure solutions are based on clinical evidence, are integrated into workflows, and do not add to overall burden.

When it comes to the implementation and management of these types of more business-oriented solutions, Nurse informaticists should be an active participant. However, this is an area which is often left to Information Technology and/or Human Resources departments to manage. Nurse informaticists should have a seat at the table whenever decisions are made that impact nursing. They can provide valuable insight into nursing processes.

Nursing Workforce Statistics

There were 4.3 million registered nurses in the workforce prior to Covid-19. The pandemic took its toll and resulted in many nurses leaving the field. A study published in *Health Affairs*, in April 2022 found that the "total supply of RNs decreased by more than 100,000 from 2020 to 2021 – the largest drop ever observed over the past four decades. A significant number of nurses leaving the workforce were under the age of 35, and most were employed in hospitals."[4] It is estimated that an additional 600,000 nurses have reported the intent to leave the workforce by 2027.[5] Even before the pandemic, the nursing shortage had already begun, due to an aging nursing workforce coupled with an increased demand for nursing care , as well as a decrease in nursing school faculty. As of 2020, the average age of nurses in practice was 52 years old; one-fifth of whom indicated that they would be retiring within the next five years.[6]

The US Bureau of Labor Statistics predicts that there will be approximately 203,200 openings for registered nurses annually between 2021 and 2031. The number of new nurses entering the field cannot keep up with this demand, nor do schools of nursing have enough faculty to train the number of nurses needed, citing a national 8.8% vacancy rate in nursing faculty.[7]

BURNOUT IS A MAJOR CONTRIBUTOR

Nurse burnout is a genuine healthcare phenomenon that accelerated during COVID-19. Defined as emotional, mental, and physical exhaustion caused by excessive and prolonged stress, burnout negatively impacts nurses' personal lives, quality of care for patients and caregivers, and stability in healthcare organizations.[8] According to a survey completed by the American Nurses Foundation (March 2022), 69% of the respondents under age 25 stated they have been suffering from burnout, which is more than double of those older than 25 (30%). In addition, 60% of nurses under age 25 and 57% of nurses 25-34 do not believe their organization cares about their well-being and feel unsupported (2022). These statistics are alarming as new nurses are the future of healthcare and are the most likely to leave the profession. Given these statistics and the nursing workforce's state, organizations and nurse leaders can consider leveraging new, intelligent technologies to address and improve nurse and patient care team burnout.[9]

Artificial Intelligence in Healthcare

DEFINITION AND AUGMENTATION

AI (Artificial Intelligence) refers to the ability of a computer system to perform tasks that typically require human intelligence, such as learning, problem-solving, and decision-making.[10] In healthcare, AI is a computer system's ability to perform intelligent tasks in clinical delivery and operations. AI helps nurses provide the right information to the right team members at the right time to provide the best patient care and make the right operational decisions.

AI augments, or assists, human intelligence and judgement by identifying data and patterns that are not typically able to be quickly recognized including patterns of disease before they present clinically. Thus, it is important to implement a solution that is clinically trained to extract relevant information from notes and in real-time present vital information such as patient conditions, medications, lab values, vital signs, and other needed clinical concepts to the clinician for decision support, also known as CDS.

MACHINE LEARNING

Machine Learning (ML) is a subset of AI that refers to the ability of a computer system to learn from multi-sourced data and improve its performance over time without being explicitly programmed. It involves the use of statistical techniques and algorithms to automatically learn patterns and insights from data. An algorithm is a set of rules or steps that a computer system follows to solve a problem or perform a specific task. ML algorithms inform CDS, providing clinicians with evidence-based information, alerts, and clinical recommendations to aid decision-making. Harnessing this innovative technology in various healthcare applications can improve patient care delivery, administrative tasks, and health outcomes and enhance the clinician experience.

CLINICAL NATURAL LANGUAGE PROCESSING

Among the many types of AI, one is becoming prominent in the healthcare industry which organizations can embrace and operationalize to advance the customer-centered digital transformation and help address many of the pain points that increase burden for clinicians at the point of care. Natural Language Processing (NLP) Such as text-to-voice, voice-to-text, and other AI functionality assists in the tagging and identification of critical clinical indicators within the EHR that could otherwise be overlooked in the sea of information housed in the patient record.

AI-driven Solutions for Workforce Challenges

With challenges in the workforce right now, AI can feed CDS systems to present suggestions, recommendations and reminders for activities or tasks needing to be completed during patient care shifts. These integrated technologies not only help seasoned nurses, but also serve as learning opportunities for nurses pulled to work in departments outside their specialty area, and for novice nurses entering the workforce. Improved outcomes, lower costs, and increased patient and clinician experience are some of the benefits of implementing such solutions.

To address the workforce crisis in healthcare and nursing informatics, healthcare organizations need to consider AI solutions as part of their workforce strategies. AI tools can be extremely useful in managing the healthcare workforce. Traditionally, schedules have been made based on organizational needs with some consideration to employee preferences in the case of self-scheduling. Organizations can combine the ability

> ***"Overall, AI has the potential to support and enhance the healthcare workforce, allowing them to provide more efficient, effective, and personalized care to patients."[12]***

BILL GATES
The Age of AI has begun
(gatesnotes.com)

to schedule staff based on their preferences while at the same time improving staff satisfaction and productivity by leveraging AI-based workforce management tools. By optimizing work schedules with artificial intelligence, organizations can offer more flexibility, enabling employees to be more engaged and less likely to leave thus not impacting the organization's ability to provide quality patient care.

STAFF SCHEDULING

AI-based solutions help organizations find strategic ways to utilize staff. These tools can assess patient volumes down to the day of the week, week of the year, and even down to the shift to predict future volumes. This allows for the creation of schedules that will more accurately depict what is needed at the time, and the impact of weather conditions that may impact staffing. When schedule needs are known at the time of creation, organizations can more accurately represent what will really happen and there will be less fluctuation in staffing. This means that staff are less likely to be floated or have their schedules changed at the last-minute leading to greater staff satisfaction.

Traditionally staff scheduling has revolved around fixed 8 or 12-hour shifts with some consideration to employee preference. By harnessing AI tool capabilities, there is the potential to explore staff scheduling in a more innovative manner, offering heightened flexibility to employees without compromising operational efficiency. Using AI tools Organizations and leaders can now combine the ability to schedule staff based on their preferences. In addition, AI tools can help employees self-schedule shifts by suggesting a schedule based on their own scheduling patterns and preferences. Through the utilization of AI-driven optimization of work schedules, organizations can provide their workforce with enhanced flexibility. This, in turn, can lead to higher employee engagement and reduced turnover rates, while ensuring the organization's capacity to deliver high-quality patient care remains unaffected.

SCHEDULE QUALITY

Another use case for AI in workforce management is in measuring schedule quality. Using AI and machine learning algorithms organizations have the potential to assess or rate staff schedules as they are created as well throughout the staffing process to analyze metrics such as coverage, cost, and matching of employee preferences as just some examples. This insight can be useful in assessing the relation of manager/staffing office impact on schedules. These insights can be useful in mentoring those individuals in how to better manage staffing in the future for fairness and equitability.

PERFORMANCE EVALUATION AUTOMATION

An area of growth with AI tools is in Human Capital Management (HCM). AI can be leveraged in the performance evaluation process to help mitigate the common concern of employees regarding subjectivity and bias during performance reviews evaluations. The evaluation then becomes completely transparent leaving minimal room for personal bias from managers and supervisors. The entire process becomes much more equitable and as a result there is greater job satisfaction which can lead to less organizational turnover.[11]

Improving the Workforce

Specific use cases for AI in healthcare:	
Improved Diagnosis and Treatment	AI-powered diagnostic tools can help healthcare professionals to diagnose medical conditions more accurately and quickly, enabling faster and more targeted treatments.
Workflow Optimization	AI can help to automate and streamline various healthcare processes, such as appointment scheduling, medical record keeping, and billing, reducing the workload of healthcare professionals to focus on patient care.
Precision Health	AI can be leveraged to enable personalized and precise healthcare interventions tailored to individual patients. Through combining large-scale data analysis, machine learning algorithms, and clinical expertise to enhance the prevention, diagnosis, and treatment of diseases.
Disease Progression Prediction	AI can analyze large amounts of data to identify patterns and predict future health outcomes, allowing healthcare professionals to intervene early and prevent the onset of diseases or complications
Supporting Patients through the Care Continuum	AI-powered chatbots and virtual assistants can automate scheduling appointments, answering medical questions, and providing basic healthcare information. These chatbots can also assist in staffing and scheduling the workforce as well assisting employees in managing their schedules
Virtual Patient Simulation	Virtual patient simulators can present real-life diverse scenarios, engage students in learning, help with critical decision-making and judgement skills, identify patient care priorities, and more all using realistic settings and patient responses. Although not a replacement solution for onsite clinicals, these are technologies students of today feel more comfortable with and have experience with from other use cases such as gaming. These solutions thus offer many advantages and fill gaps that are so necessary for effective learning, especially during a nursing shortage. As with other AI supported solutions, it is imperative that nurses are involved in the design and build ensuring the content and scenarios are evidence-based and clinically vetted. Taking these initial steps will increase the likelihood of adoption and use, enabling solutions to generate meaningful ROI while improving clinical outcomes.
Robotic Assistance	AI-powered robots can assist healthcare professionals with tasks such as surgery, physical therapy, and rehabilitation, education, improving accuracy and reducing the risk of human error.
Auto-generated Content Creation	Large Language Models/Generative AI can enhance clinician and patient facing learning, teaching, and clinical efficiencies, including change of shift, discharge and specialty note summaries, billing chatbots, clinical trial matching, and auto responses to messaging.

IMPROVING EMPLOYEE WELL-BEING

How can organizations improve the well-being of their employees and promote a sense of caring and belonging? By harnessing AI tools that provide employers the ability to track metrics such as missed breaks and meals resulting in fatigue which are contributing factors to clinician burnout. Fatigue in healthcare can be physical and mental in nature such as working too long and too many shifts in a row, heavy workloads and caring for ill patients facing many challenges can be incredibly stressful. These factors and feelings of being overworked can lead to burnout. Using AI and machine learning tools can help assure that staff have rest in between shifts and schedules are made with staff wellbeing in mind by seeing patterns and applying organizational rules to provide for the best schedules. The use of these types of tools can help to foster a culture that promotes wellbeing of all employees.

Numerous AI-powered tools are available for organizations to utilize, aiming to establish a community characterized by inclusivity and a strong sense of belonging. For instance, Employee Resource Groups provide a platform for sharing thoughts, ideas, and fostering camaraderie among team members beyond their immediate work environment, like social media groups. Examples include groups dedicated to lunchtime walks, as well as journal or book clubs that employees can join. Using these types of tools can foster a sense of belonging and community which can lead to the overall wellbeing of team members.

Greater job satisfaction and easier talent recruitment are outcomes of organizations utilizing empowering tools, fostering equity and belonging, and being an employer of choice.

Utilizing AI tools enables the incorporation of diversity as a key element alongside skills and other qualities when recruiting team members, contributing significantly to the establishment of a well-rounded workforce. Moreover, AI tools prove valuable in the assessment of potential candidates for novel positions or committees, fostering an environment of inclusivity and a sense of belonging.

Conclusion

Currently, the healthcare industry is facing a staffing crisis. It is crucial for nurse informaticists to collaborate with healthcare organizations and stakeholders to effectively address this challenge. AI tools will play a pivotal role in tackling this challenge by enabling managers to optimize staff schedules, accounting for staff preferences and availability with little or no manual intervention. Additionally, AI can aid in predicting patient flow to manage capacity, and intelligently consider staff well-being.

It is important that nurse informaticists are at the forefront in the design and development of AI-enhanced technologies. Informatics nurses expertly represent the clinicians and the patients in decision-making, influence what and how intelligent technologies are implemented, and are a key component in the successful adoption of the AI solutions.

For additional information about this group, please contact us at nursinginformatics@himss.org

References

1. Tackling the Nursing Workforce Crisis. Am J Nurs. 2022 Aug 1;122(8):12. doi: 10.1097/01.NAJ.0000854924.04730.fd. PMID: 35862587.
2. Why Is There a Nursing Shortage? Nurse Journal Kristen Hamlin February 1, 2023 <https://nursejournal.org/articles/why-is-there-a-nursing-shortage/
3. Sampson CJ. Healthcare's Workforce Crisis Demands Radical, Reasoned Responses. Front Health Serv Manage. 2022 Jul 1;38(4):1-3. doi: 10.1097/HAP.0000000000000144. PMID: 35670611.
4. Auerbach, D. I. , Buerhaus, P. I., Donelan, K. , Staiger, D. O. (2022, April 13). *A Worrisome Drop In The Number Of Young Nurses.* Health Affairs .
5. *NCSBN Research Projects Significant Nursing Workforce Shortages and Crisis.* (2023, April 13). NCSBN.
6. Smiley, R. A., Ruttinger, C., Oliveira, C. M., Hudson, L. R., Allgeyer, R., Reneau, K. A., Silvestre, J. H., & Alexander, M. (2021). The 2020 National Nursing Workforce Survey. *Journal of Nursing Regulation, 12*(1), S1–S96. https://doi.org/10.1016/S2155-8256(21)00027-2
7. Byrne, C., Keyt, J., & Fang, D. (2022). *Special Survey on Vacant Faculty Positions for Academic Year 2022-2023.* American Association of Colleges of Nursing.
8. *Nurse Burnout Everything you need to know about nurse burnout.* (accessed August 16, 2023).
9. *NEW SURVEY DATA: Younger Nurses More Likely to Experience Negative Impacts from the COVID-19 Pandemic.* (2022, March 1). American Nurses Foundation.
10. McGrow K. Artificial intelligence: Essentials for nursing. Nursing. 2019 Sep;49(9):46-49. doi: 10.1097/01.NURSE.0000577716.57052.8d. PMID: 31365455; PMCID: PMC6716553.
11. Patra, A. (2022, November 21). *How AI Can Help Overcome Workforce Management Challenges.* Readwrite.