A Compass for North Carolina Health Care Workers Navigating the Adoption of Artificial Intelligence

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This article underscores the economic benefits of AI, the importance of collaborative innovation, and the need for workforce development to prepare health care professionals for an AI-enhanced future. We include guidance for strategic and ethical AI adoption while advocating for a unified approach to leveraging technology to improve patient outcomes.

Introduction

North Carolina's health care system stands at a crossroads, grappling with staffing shortages and financial strains exacerbated by a pandemic. Medicaid expansion has heightened the focus on improving access to health care services [1, 2]. Given this new landscape, the health care sector is primed for artificial intelligence (AI) solutions to transform services. AI has the potential to address pressing issues including professional burnout—a problem linked to lower care quality and safety—by streamlining operations and enhancing patient care, thus easing the immense pressure on health care workers [3–5].

To explore the role of AI, we used the concept of an "idea compass" as a guiding framework. We discuss the evolution and capacity of AI for better data management and outcomes (North). We then describe digital precedents, such as electronic health records (EHRs), which pave the way for AI (West). Next, we note continuing challenges, including the need to preserve the irreplaceable human aspects of health care by using AI primarily as a supportive tool (East). Finally, we examine the future in which AI drives predictive and personalized medicine to transform health care (South).

Hospitals and health care systems can play a pivotal role in leveraging technology to improve accessibility and equity. Several hospitals and health care systems have already led this charge by embracing innovative technology. Notably, Atrium Health Wake Forest Baptist introduced an AI-based lung cancer prediction tool, while Duke University Hospital implemented Sepsis Watch to identify the initial stages of sepsis [6, 7]. These and similar initiatives underscore the varied applications of AI in health care facilities, from enhancing diagnostic precision and patient care to increasing operational efficiency and reducing the burden of administrative tasks. This commitment to integrating AI demonstrates North Carolina's dedication to achieving superior health outcomes by using technology. To fully appreciate the impact and potential of AI in North Carolina and beyond, it is essential to consider the recent renewed interest in how AI technology can help providers gain insight and improve patient outcomes.

North: The Genesis and Acceleration of AI Integration in Health Care

AI is transforming the health care sector by improving diagnostic accuracy, personalizing care, and streamlining administrative tasks. This evolution was particularly evident during the height of the pandemic, when AI enhanced diagnostics and enabled remote monitoring, thereby reducing the burden on health care facilities and providers. AI is used across both the front and back ends of hospitals, encompassing the entire organization, including providers practicing at a particular facility. We used the term "facility" to emphasize the importance of the organization's infrastructure, which must be in place to enable technology. This is also a component severely lacking in the rural health care environment. Health care organizations encompass much more than clinical providers of care (e.g., physicians, nurses, respiratory therapists). They also rely on administrative staff members for finance and billing, quality and safety, materials management, environmental services, plant operations, and more. All these areas will use AI to streamline the workflow, if they do not already.

After several periods of fluctuating interest, known as "AI winters," AI integration in health care has recently accelerated due to technological leaps [8, 9]. Relevant advancements in computational capabilities, such as microchip

Electronically published July 10, 2024.

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N C Med J. 2024;85(4):266-269. 0029-2559/2024/85414

processors and the widespread adoption of EHR systems, facilitate broader AI applications and integration into the health care sector [10].

The pandemic has increased the need for scalable and efficient health care solutions for managing data, delivering patient care (in some cases remotely), and maintaining vital organizational processes in the face of conflicting information and dwindling resources [11]. The demand for predictive analytics illustrated the critical role of accurate and timely data in public health decisions. In November 2022, OpenAI's ChatGPT further increased the value of AI [12]. Through tools such as ChatGPT, AI has begun transforming the health care sector by improving diagnostic accuracy, personalizing care, and streamlining administrative tasks. Particularly valuable during the pandemic, AI has enhanced diagnostics and enabled remote monitoring, reducing the burden on health care organizations.

States that have expanded Medicaid are now using AI to better manage the increasing number of Medicaid recipients and ensure that health care funded by taxpayers is delivered efficiently [13]. This use of AI offers an opportunity to apply advanced algorithms for predictive analytics, which can improve early intervention strategies and health outcomes for Medicaid populations, potentially lowering overall health care costs.

Despite promising results, the shift toward AI highlights the urgent need for the health care workforce to re-skill and upskill. The North Carolina Health Care Association's Critical Workforce Needs Assessment report points out the need to continually train health care workers to deliver high-quality care amid changing demographics and technological advancements [14].

West: Charting Similar Terrains

In North Carolina's journey toward integrating AI into health care, the foundational role of EHRs serves as a pivotal guide. The Health Information Technology for Economic and Clinical Health (HITECH) Act of 2009, along with subsequent meaningful use (MU) incentives, catalyzed the widespread embrace of EHRs across health care systems in every state. It also laid the groundwork for AI applications in patient care, drug development, and improvement of health care practices. Multiple research teams, such as Adler-Milstein and colleagues (2015) and Jiang and colleagues (2023), continue to demonstrate the critical role of digital records in health care innovation [15, 16].

However, the transition to digital health care has encountered significant challenges. The prohibitive costs of adoption, inadequate support for users at the frontlines of health care, limited access to necessary technology, and gaps in computer literacy have all been barriers to effective EHR implementation [17, 18]. Challenges are particularly pronounced in rural health care settings, where the infrastructure of every kind must bridge larger distances to reach consumers. This struggle stresses the importance of continuous professional development and robust support systems to ensure that health care workers can fully leverage digital tools, to which they may have less exposure due to rurality. Digital redlining—underinvestment by internet providers in lower-income communities—is another factor that must be overcome for equitable deployment of AI technologies in health care.

Drawing lessons from EHR adoption means that we cannot assume that AI integration will automatically support the quadruple aim of decreasing workforce burnout, improving patient experiences, reducing health care costs, and enhancing population health. Despite the advantages of EHR adoption, the time spent on documentation contributes considerably to workforce burnout without accompanying policies that reduce administrative reporting requirements. AI can support the workforce by automating data collection tasks; however, the volume of data ingested by AI models introduces a new set of risks. When using AI in health care, secure, well-designed information technology (IT) infrastructure is vital for protecting patient privacy, ensuring good patient outcomes, and standardizing data for operational efficiency and cost-effectiveness [19–21]. Using AI to enhance population health will be difficult without involving all stakeholders. For example, rural hospitals continue to struggle with limited internet infrastructure, diminishing their ability to gain the benefits of EHR adoption. Without consulting a range of stakeholders, AI deployment risks similar unintended health care consequences.

East: Navigating Challenges and Obstacles

The integration of AI into health care raises the fear that technology may diminish human touch in medical care. This concern is shared by both patients and health care providers who emphasize the irreplaceable value of empathy and personal connections in treatment [22]. Maintaining the human element of care requires a careful assessment of whether ethical considerations and health care workforce training are keeping pace with technological advancements. Potential solutions include developing AI models that focus more on patient outcomes than on cost predictions and strengthening cybersecurity measures. Ignoring AI precautions carries the risk of losing patient trust in the evolving landscape of digital health care systems.

Leaders face a complex landscape of challenges and opportunities to integrate AI into health care. A particularly pressing issue is the risk of AI applications reinforcing the existing biases. The article by Obermeyer and colleagues (2019) revealed how a commonly used health care algorithm intended to allocate medical services perpetuated racial biases by underestimating the health needs of Black patients based on lower health care spending [23]. This highlights the urgent need for transparency and rigorous evaluation of how various AI applications support or impede the equity of care.

Moreover, the increasing threats to cybersecurity,

illustrated by incidents such as a significant data breach at a health care company, emphasize the urgent need for enhanced security measures to protect patient data, particularly when it is utilized in AI models [24]. These breaches not only expose sensitive personal information but also jeopardize the integrity of AI systems in health care. Robust security protocols are critical for maintaining trust in health care systems and ensuring that AI tools used for diagnosing and treating patients are built on secure, reliable data foundations. Health care providers and AI developers must prioritize comprehensive cybersecurity strategies that include data encryption, regular security audits, and adherence to strict privacy regulations to protect against such vulnerabilities.

South: Envisioning the Future of Health Care With AI

The ability of AI to preempt medical complications, such as the early detection of surgical site infections, offers significant advantages, including quicker patient recovery and reduced health care costs [25, 26]. This is particularly important in rural and underserved areas, where telehealth services have the potential to allow access to the benefits of AI applications, regardless of location [27, 28]. Tools that assist physicians and nurses in improving patient care by transforming documentation at the point of care, optimizing workflows, and reducing costs showcase the economic advantages of AI in health care. However, challenges remain in making such AI tools widely accessible and beneficial in various health care settings.

A focus on equitable workforce development is essential to ensure the successful integration of AI into health care. Ongoing professional development and education in digital competencies are vital for health care workers to effectively use AI tools and adapt to modern technologies. Proactively training health care workers in AI tools can improve patient outcomes, boost operational effectiveness, and guarantee universal health care access.

Conclusion

As North Carolina's health care sector forges ahead with AI, it is essential to learn from past experiences with EHRs and seek input from all stakeholders, including policymakers, technologists, providers, and patients. This entails involving end-users early in the development process, providing customized training, and ensuring the availability of the necessary infrastructure to support AI adoption [29, 30]. An inclusive and proactive strategy will foster a safe and efficient health care system in which technology augments personal engagement at the heart of compassionate care.

AI promises to improve diagnostic precision, enhance operational efficiency, and expand access to health care but requires considerable vigilance. Health care leaders and application developers should counteract biases that can lurk within AI tools if they are to harness the potential of AI without sacrificing equitable health care outcomes.

Addressing the concerns that AI may diminish personal touch in health care interactions and potentially create new disparities requires collaborative effort. Health care leaders, policymakers, patients, and developers must work together to balance technological innovation with compassionate care. Using AI as a tool that supports providers and patients, we can move toward an efficient, proactive, and inclusive system that ensures that advanced health care solutions are accessible to every individual. NCMJ

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Acknowledgments
The authors declare no conflicts of interest.

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