

Digital health transformation and nursing practice

The digital technology revolution is supporting the rapid and positive transformation of healthcare systems—it is facilitating the delivery of nursing care and how people engage with their health and wellness. The use of digital health technologies is part of contemporary nursing practice. Digital technologies have the potential to support equitable and universal access to health services, increase the efficiency and reliability of health systems, improve patient and health worker safety, respond to health workforce shortages, reduce costs and, ultimately, improve people’s health outcomes. Digital health can strengthen and scale up health promotion, disease prevention, diagnosis, management, rehabilitation and palliative care in a system that respects the privacy and security of patient health information and puts people at its center. The World Health Organization (WHO) believes that if implemented correctly, digital health can radically change health outcomes and is essential to achieving universal health coverage.¹

To reap these benefits, digital transformation in the health sector will require not only technical advancements but also adaptation of attitudes, skills and culture within the health workforce.² The nursing profession must contribute to and keep pace with this transformation to ensure digital health technology is developed and applied in a way that meets the needs of individuals, families, communities and the health workforce. The nursing profession will need to continue to reframe how it carries out clinical practice, education, research and policy in a digital world. Nurses are coordinators and deliverers of direct care, stewards of health systems, information workers and knowledge brokers, and as such, they must understand, value, engage with and increase competence in digital health technologies.³

Digital health is “the field of knowledge and practice associated with the development and use of digital technologies.”¹ The definition includes the concept of eHealth but goes beyond it to include individuals using smart and connected devices (“digital consumers”) and encompasses other uses of digital technologies for health such as the Internet of Things, robotics, advanced computing, big data analytics and artificial intelligence (AI). Digital technologies can enhance clinical diagnosis, data-based treatment decisions, digital therapeutics, clinical trials, self-management of care and increase evidence-based knowledge, skills and competence for professionals to

support healthcare by capturing, storing and exchanging data and information across the health ecosystem.¹

The importance of digital technology, data and innovation for resilient global health and care systems has been captured in the 2020 Riyadh Declaration. It points to key priorities and recommendations for data and digital health that need to be adopted by the global health community to address the challenges of the COVID-19 pandemic and future pandemics.⁴ As outlined in its Global Strategy on Digital Health, the WHO believes that digital health must be an integral part of health priorities and encourages countries to build a digitally-capable health workforce.¹

As countries continue to build and adapt their digital health strategies, nurses are pivotal in the development of an internationally connected and interoperable digital health ecosystem. Nurses are the primary coordinators of care and can bring stakeholders together to strengthen this ecosystem and interoperability by using international terminology standards that are essential for positive health outcomes, improving patient safety and driving models of care based on the needs of patients. AI is increasingly being used to address social, economic, environmental, health and humanitarian challenges around the globe. There is a timely need for the nursing profession to be meaningfully engaged in all stages of AI, from development to implementation, and to be leaders in discussions of AI in health systems.⁵

Nurses frequently access and use digital health technologies. Some examples include the use of electronic health records, telehealth programs and virtual care, innovative nursing education approaches and remote learning, tools such as vein-finding equipment to assist IV cannulation and artificial intelligence to improve decision-making.^{6,7} Digital technologies provide significant opportunities to improve the working lives of nurses. They allow health workers to expand their range and scope of tasks, increase efficiency through speed and travel time savings both in urban and remote settings. In addition, their portability offers flexibility and facilitates coordination of care.⁸ Virtual simulation technology through digital learning environments is increasingly being used as a nursing education tool to enhance learning and delivery of care. Facilitating the link between theory and practice, immersive simulation can enhance learner confidence and support patient and nurse safety.

Despite the many advantages of digital health, it does not come without challenges and risks. Examples include the increasing complexity of devices that increase nursing workload, poor interface between devices leading to an inability to access information, reduced patient engagement and contact, and other patient safety and privacy issues.⁹ Varying levels of digital health literacy among the health workforce impact experiences and perceptions of digital health interventions.⁸ Many digital health applications have not been designed with nursing in mind and are medically dominated, making them inefficient and complex to use and therefore an impediment to nursing care.⁹ International nursing terminology standards used to capture good and comparable data for value-based healthcare are often not used in electronic health records.¹⁰

The digital divide – the gap that exists between those who have access to modern information and communication technology and those who do not – is creating a world where the benefits of digital transformation are not equal between countries or societal groups. The ‘digital gender divide’ also occurs between genders as women and girls have increased barriers to full participation in accessing and using digital technology.¹¹ With women making up the majority of the nursing workforce, increasing the use of digital technology in the nursing workforce will help bridge this divide.

The COVID-19 pandemic resulted in an increased use of digital health technology and consequently an increased demand for nurses with skills in digital health.¹² Digital transformation of the nursing profession and the nursing profession’s contribution to the advancement of digital health are key priorities for workforce development and to support the achievement of global health priorities.

ICN Position and Recommendations

As the global voice of nursing, ICN:

- Supports the advancement of appropriate digital health to meet population health needs, strengthen health systems and as a way to respond to health workforce shortages.
- Believes that digital health must support integrated, people-centered health systems and promote health equity.

- Promotes the alignment of digital health technology to patient- and nurse-safety policy and processes: integrate digital clinical safety into healthcare culture and develop and implement digital solutions to improve the safety of healthcare.¹³
- Believes that the development of digital health technology should be supported by the use of an international terminology standard, such as the International Classification for Nursing Practice (ICNP), that facilitates the representation and comparison of the nursing domain worldwide.
- Strongly agrees that digital health should benefit people in a way that is ethical, safe, secure, reliable, equitable and sustainable and be developed with principles of transparency, accessibility, scalability, replicability, interoperability, privacy, security and confidentiality.¹
- Believes that nurses must be involved and participate in national and global digital health decision-making forums and included in the planning, design, testing and implementation of digital health products and digitized health systems.
- Believes that nurses must participate in monitoring and evaluating new and emerging digital health technologies to ensure they are positively contributing to health system and health workforce processes and health needs at all levels.
- Believes that nurse leaders play a crucial role in positively shaping the advancement of digital health and should be supported and resourced to lead the digital transformation for the nursing workforce.
- Recognises the barriers faced by some countries to implement appropriate digital health technologies, in particular least-developed countries, and believes that global collaboration and resourced mechanisms to support these countries to advance their digital health capabilities are essential to shrink the digital divide.¹
- Believes that there is an urgent need for the nursing workforce to acquire the skills and competencies to deliver high-quality, safe, optimized person-centered care in a digital health environment and to lead and participate in digital health initiatives, decision-making and evaluation.

- Encourages collaboration with other stakeholders to include opportunities to work and learn from interdisciplinary colleagues such as computer science and engineering.⁷
- Calls for an increased awareness on the environmental and health impact of digital waste and for digital health strategies to include plans to mitigate this impact.

ICN encourages national nurses' associations (NNAs), in collaboration with their respective governments, to:

- Advocate for and work with national governments to establish or strengthen national digital health strategies and competence in digitalization.
- Adopt and endorse a standardized international nursing clinical terminology for use across all digital health information systems to address the knowledge gap through a unifying and standardized approach.
- Promote the adoption of international terminology standards, such as the International Classification for Nursing Practice (ICNP), for use across all digital health information systems to address the knowledge gap through a unifying and standardized approach.
- Promote the development/adoption of international terminology standards and ontologies to ensure reliable and prompt capturing, storing and exchanging of nursing data and information across the health ecosystem to allow high levels of interoperability at national and international levels.
- Promote and support the advancement of nurse informatics specialists to champion and advocate for the role of nurses in the digital transformation of the nursing workforce.
- Develop evidence-based practice standards/guidelines to guide nursing practice in the context of a digital health environment.
- Promote ethical nursing practice in a digital health environment by updating ethical codes to include digital health ethics and contribute to legislation and policies on the ethical use of technology adapted to the health and social norms and context of the country.

- Advocate for integration of digital health content into undergraduate and postgraduate nursing education curricula and continuing professional development to develop the skills and competencies to deliver care in a digital health environment that ensures care is safe, of high quality and person-centered and that upholds the rights and privacy of individuals.
- Contribute to the development of digital health competency frameworks to inform nursing education and ensure these are integrated into the nursing continuous education pathway at the national and international levels.²
- Support the nursing profession to understand how to use data science to inform the creation of nursing knowledge to support practice.¹⁴
- Support continuing professional development for digital health skills and competencies across the nursing career trajectory.
- Lobby governments, health organizations, medical device and pharmaceutical companies to include nurses during research and development of digital health technology.
- Advocate for the prioritization of an equality impact assessment when designing and implementing digital health technologies to prevent exacerbating inequalities and to promote an inclusive digital society.¹

ICN calls on individual nurses in their roles as clinicians, educators, researchers, policy influencers or executives to:

- Uphold the ICN Code of Ethics for Nurses by ensuring that the use of technology and scientific advances are compatible with the safety, dignity and rights of people.¹⁵ Meet ethical and professional standards of practice when using digital health technology.
- Ensure that the technologies they use meet international quality and safety standards and technical specifications needed to perform in the clinical environment in which they are used.
- Support individuals, families and communities to build their digital health literacy to improve patient empowerment and engagement in health decisions

and when using health technology and to increase public awareness of digital health.

- Actively participate in digital health decision-making processes in practice and policy settings.
- Have active involvement in the organization's policies and processes related to maintenance, training, monitoring and reporting adverse events related to technology.
- Seek opportunities to evaluate the short- and long-term ethical consequences of the use of diverse technologies and emerging practices, including innovative equipment and robotics.
- Participate in professional development to develop skills and competencies in digital health.
- Carry out research on the use of digital health technology in nursing practice and its impact on health outcomes, efficiency and safety of nursing practice and its ethical, legal and social implications in nursing practice.
- Communicate to appropriate supervisors and/or authorities any risks, inappropriate behaviours or misuse of technologies that threaten people's safety and provide facts supporting this.

Adopted in 2023

References

- ¹ World Health Organization. Global strategy on digital health 2020–2025 [Internet]. Geneva: World Health Organization; 2021 [cited 2023 Jun 15]. Available from: <https://apps.who.int/iris/bitstream/handle/10665/344249/9789240020924-eng.pdf>
- ² OECD. Empowering the health workforce: Strategies to make the most of the digital revolution [Internet]. Paris: OECD Publishing; 2021 [cited 2023 June 15]. Available from: <https://www.oecd.org/health/health-systems/Empowering-Health-Workforce-Digital-Revolution.pdf>
- ³ Konttila J, Siira H, Kyngäs H, Lahtinen M, Elo S, Kääriäinen M, et al. Health care professionals' competence in digitalization: A systematic review. *J Clin Nurs* [Internet]. 2018 Oct 20 [cited 2023 Jun 15]; 28(5-6):745–761. Available from: <https://onlinelibrary.wiley.com/doi/full/10.1111/jocn.14710>
- ⁴ Al Knawy B, Adil M, Crooks G, Rhee K, Bates D, Jokhdar H, et al. The Riyadh Declaration: the role of digital health in fighting pandemics. *Lancet* [Internet]. 2020 Nov [cited 2023 Jun 15]; 396(10262):1537–1539. Available from: [https://doi.org/10.1016/S0140-6736\(20\)31978-4](https://doi.org/10.1016/S0140-6736(20)31978-4)
- ⁵ Ronquillo CE, Peltonen LM, Pruinell L, Chu CH, Bakken S, Beduschi A, et al. Artificial intelligence in nursing: Priorities and opportunities from an international invitational think-tank of the Nursing and Artificial Intelligence Leadership Collaborative. *J adv nurs* [Internet]. 2021 May 18 [cited 2023 Jun 15];77(9), 3707–3717. Available from: <https://doi.org/10.1111/jan.14855>
- ⁶ O'Connor S, Yan Y, Thilo FJS, Felzmann H, Dowding D, Lee JJ. Artificial intelligence in nursing and midwifery: A systematic review. *J Clin Nurs* [Internet]. 2022 Jul 21 [cited 2023 June 15]. Available from: <https://onlinelibrary.wiley.com/doi/epdf/10.1111/jocn.16478>
- ⁷ Booth RG, Strudwick G, McBride S, O'Connor S, Solano Lopez AL. How the nursing profession should adapt for a digital future. *BMJ* [Internet]. 2021 Jun 14 [cited 2023 Jun 15]; 373(1190). Available from: <https://doi.org/10.1136/bmj.n1190>
- ⁸ World Health Organization. WHO guideline: Recommendations on digital interventions for health system strengthening: Recommendations and justification [Internet]. Geneva: World Health Organization; 2019 [cited 2023 Jun 15]. Available from: <https://apps.who.int/iris/bitstream/handle/10665/311980/WHO-RHR-19.10-eng.pdf?sequence=1&isAllowed=y>
- ⁹ International Council of Nurses. Nursing a voice to lead: Nursing the world to health. Geneva: ICN; 2020 [cited 2023 Jun 15]. Available from: https://2020.icnvoicetolead.com/wp-content/uploads/2020/03/IND_Toolkit_120320.pdf

¹⁰ Fennelly O, Grogan L, Reed A, Hardiker NR. Use of standardized terminologies in clinical practice: A scoping review. *Int Jour Med* [Internet]. 2021 May [cited 2023 Jun 15]; 149(104431). Available from: <https://doi.org/10.1016/j.ijmedinf.2021.104431>

¹¹ Organisation for Economic Co-operation and Development. Bridging the digital gender divide: Include, upskill, innovate [Internet]. Paris: OECD Publishing; 2018 [cited 2023 Jun 15]. Available from: <https://www.oecd.org/digital/bridging-the-digital-gender-divide.pdf>

¹² Lee J, Cho HS, Shin SR. Nursing strategies for the post-COVID-19 era. *Int Nurs Rev* [Internet]. 2021 Jun [cited 2023 Jun 15]; 68(2):149-152. Available from: DOI: 10.1111/inr.12653.

¹³ World Health Organization. Global Patient Safety Action Plan 2021-2030: Towards eliminating avoidable harm in health care. Geneva: World Health Organization; 2021 [cited 2023 Jun 15]. Available from: <https://www.who.int/teams/integrated-health-services/patient-safety/policy/global-patient-safety-action-plan>

¹⁴ Pruinelli L, Johnson SG, Fesenmaier B, Winden TJ, Coviak C, Delaney CW. An applied healthcare data science roadmap for nursing leaders: A workshop development, conceptualization, and application. *Comput Inform Nurs* [Internet]. 2020 Oct [cited 2023 Jun 15]; 38(10):484-489. Available from: DOI: 10.1097/CIN.0000000000000607

¹⁵ International Council of Nurses. Code of ethics for nurses [Internet]. Geneva: International Council of Nurses; 2021 [cited 2023 Jun 18]. Available from: https://www.icn.ch/sites/default/files/2023-04/ICN_Code-of-Ethics_EN_Web_0_0.pdf