



NURSING INFORMATICS

INTRODUCTION

The Canadian Nurses Association (CNA) and the Canadian Nursing Informatics Association (CNIA) endorse the definition of nursing informatics used by the special interest nursing group of the International Medical Informatics Association (IMIA, 2009): “Nursing Informatics science and practice integrates nursing, its information and knowledge and their management with information and communication technologies to promote the health of people, families and communities worldwide” (para. 2).

Nursing informatics enhances decision-making in all direct and indirect nursing roles, through the collection, extraction, aggregation, analysis and interpretation of standardized data, using the emerging principles and methods of data science.

The appropriate use of information and communication technologies (ICTs) will add value to our health-care system while decreasing costs (Naylor et al., 2015). This view is aligned with CNA’s position on primary health care (PHC),¹ which seeks to address current challenges to our health-care system (CNA, 2015). The result will further the shift toward person-centred approaches to care delivery focused on health promotion and disease prevention. To achieve a person-centred model of health and wellness, nursing engagement with digitally connected health services environments is essential.

The concept of *digitally connected health* encompasses the use of ICTs to empower nurses and assist the Canadian health-care system in achieving a PHC focus. *Digital health* is inherently patient-centred, emphasizing the use of ICTs to help individuals and their families track, manage and improve their health (Topol, 2013). Canada Health Infoway sees patient-centred ICT solutions as a way “to improve health, transform quality and reduce health system costs” (2016, para. 2).

¹ PHC “is a principle-based, comprehensive approach. It seeks to improve the health of populations across the continuum of care (e.g., acute, community, long term, rehabilitation, hospice, corrections, etc.), from birth to death, in all settings” (CNA, 2015, p. 2).

Similarly, Caulfield and Donnelly (2013) use *connected health* to define a “technology enabled model” of patient-centred health care:

Connected Health encompasses terms such as wireless, digital, electronic, mobile, and telehealth and refers to a conceptual model for health management where devices, services or interventions are designed around the patient’s needs, and health related data is shared in such a way that the patient can receive care in the most proactive and efficient manner possible. (p. 704)

CNA AND CNIA POSITION

Using principles consistent with CNA’s PHC approach and digitally connected health, CNA and CNIA believe:

- ▶ Nursing informatics competencies are essential for nurses in all roles to function in complex, contemporary health-care environments. Moreover, there is a need to have nurses with a specialization in informatics to support decision-making relevant to the profession’s use of information and technology in digitally connected health environments.
- ▶ Systematized Nomenclature of Medicine — Clinical Terms (SNOMED CT) and the International Classification for Nursing Practice (ICNP) are the standardized clinical terminologies most capable of representing nursing documentation in electronic health records in Canada.
- ▶ The nursing profession needs to develop and adopt standardized assessment methodologies and documentation tools, such as C-HOBIC (Canadian Health Outcomes for Better Information and Care), the LOINC (Logical Observation Identifiers Names and Codes) Nursing Physiologic Assessment Panel (Regenstrief Institute, 2016), and InterRAI instruments, which nurses can use to support safe, quality patient care across the continuum.
- ▶ Nursing informatics will continue to evolve, shifting focus in response to emerging technologies and new approaches to care delivery (e.g., virtual care, robotics, genomics).

BACKGROUND

CNA’s *E-Nursing Strategy for Canada* (2006) was developed for building capacity within nursing to integrate ICT into practice. The document addressed the benefits of ICT for enhancing nursing education and practice and identified its potential impact on nursing work. Many of the e-strategy’s predictions of greater ICT integration into nurses’ practice and education have been realized and many of its objectives have been achieved. Nevertheless, much remains to be accomplished. Numerous opportunities still exist for building nursing capacity in informatics and for enhancing the use of evidence-informed practice by nurses in all areas of nursing.

With ICTs and digitally connected health applications transforming the way nurses communicate, standardized clinical terminologies are essential to discussing and

comparing like concepts across the continuum of care (Hwang & Park, 2011). In particular, since SNOMED CT and ICNP function harmoniously with each other (International Council of Nurses, 2015), CNA and CNIA have selected them as the standardized clinical terminologies best suited for documenting, communicating, aggregating and analyzing the nursing contribution to patient care. The adoption and use of these terminologies has allowed nursing data across the continuum to be linked and compared with data from other health-care professions (Häyrinen, Lammintakanen, & Saranto, 2010). Such links will be further enabled by adopting a common standardized approach to nursing documentation in all clinical practice settings across Canada, such as InterRAI, C-HOBIC and the LOINC Nursing Physiologic Assessment Panel.

The C-HOBIC project has adopted SNOMED CT and ICNP to document a standardized nursing assessment methodology that supports the demonstration and comparison of clinical patient outcomes (C-HOBIC, n.d.). Not only is this assessment useful in determining the impact of nursing care for individual patients, it also allows organizations to establish how well they are managing clinical outcomes. In complementing C-HOBIC, the LOINC Nursing Physiologic Assessment Panel provides standardized forms, formats and codes to support a head-to-toe nursing physiological assessment. In addition, LOINC can be used to document assessment scales (such as the Braden scale) as well as intake and output. Like ICNP, LOINC's terms and codes are being mapped to SNOMED CT (Vreeman, 2013). Thus the two methodologies (C-HOBIC and the LOINC Nursing Physiologic Assessment Panel) can be documented in a standardized clinical terminology (SNOMED CT), which makes it easier to document, communicate, aggregate and analyze the nursing contribution to patient care.

CNIA's resolution at CNA's 2016 annual meeting of members (subsequently presented to and passed by the CNA board) asked CNA to "advocate for the adoption of two standardized clinical reference terminologies, specifically ICNP and SNOMED CT, as well as a standardized approach to nursing documentation in all clinical practice settings across Canada, specifically C-HOBIC and LOINC Nursing Physiologic Assessment Panel" (CNA, 2016, p. 1).

Understanding how ICTs and digitally connected health applications impact clinical workflow and patient behaviour is important for improving clinical outcomes (Harrington, 2011, 2012). The development of nursing informatics knowledge will be essential in determining how best to make decisions with data coming from a variety of sources (Kerfoot, Zwieg, Mielcarek, & Beaudette, 2010). Nurses will need this knowledge for gathering and utilizing data from multiple sources to make decisions and support patients' decision-making (Brennan & Bakken, 2015).

Further, knowledge of nursing informatics will advance nurse researchers' understanding of the emerging field of data science as it pertains to knowledge development and advancements in practice, education and policy.

Nurse leaders across the health system need to realize the importance of nursing informatics knowledge so they can actively seek information using ICTs and develop informatics competency (Simpson, 2013). Nurse leaders also need to actively participate in decisions regarding the selection, implementation and use of ICTs in health care that are relevant to nurses' work.

In doing so, they must also understand that the selection of ICT solutions has implications for nursing work and influences the way nurses deliver care (American Organization of Nurse Executives, 2009). For example, ensuring that ICT systems being purchased are interoperable with existing ICT systems across care settings will become increasingly important as more patients expect their health data to be available across the continuum of care.

The use of ICTs in nursing practice is associated with increased quality, safety and efficiency in patient care delivery (Karsh, Holden, Alper, & Or, 2006; Felkey & Fox, 2015). All nurses should seek specific training and knowledge and the attainment of nursing informatics competency to ensure the realization of ICT benefits (Abdrbo, 2015). As digitally connected health continues to transform practice, there is no universal approach to its use. Nurses must develop their nursing informatics knowledge to ensure they can practice and think critically in complex environments that rely on ICT. As digitally connected health environments continue to evolve, nurses will need to adapt their practice in ways that are complemented by emerging technologies (Lilly & Eldridge, 2012). Therefore, the profession will also need nurses with advanced education and skills in informatics. Increasingly, ICTs and the information they produce will be relied on throughout nursing practice, and nurses need to be open to practice changes that will arise as a result of practice-based evidence (O'Keefe-McCarthy, 2009; Harrington, 2011, 2012). Just as ICT and digitally connected health are becoming integral to nursing practice, nursing informatics knowledge will be integral to evolving models of care (i.e., a PHC approach to Canadian health care) in digitally connected health environments that maintain the caring core of nursing (Camilli, 2014).

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Replaces: Nursing Information and Knowledge Management (2006)

REFERENCES

- Abdrbo, A. (2015). Nursing informatics competencies among nursing students and their relationship to patient safety competencies: Knowledge, attitude, and skills. *Computers, Informatics, Nursing, 33*, 509-514. doi:10.1097/CIN.0000000000000197
- American Organization of Nurse Executives. (2009). *AONE guiding principles for defining the role of the nurse executive in technology acquisition and implementation*. Retrieved from <http://www.aone.org/resources/technology-acquisition-implementation.pdf>
- Brennan, P. F., & Bakken, S. (2015). Nursing needs big data and big data needs nursing. *Journal of Nursing Scholarship, 47*, 477-484. doi:10.1111/jnu.12159
- Camilli, S. (2014). Plugging into nursing informatics: Preparation, practice, and beyond. *Canadian Journal of Nursing Informatics, 9*(1-2). Retrieved from <http://cjni.net/journal/?p=3508>
- Canada Health Infoway. (2016) Summary corporate plan 2016-2017. Retrieved from <https://www.infoway-inforoute.ca/en/component/edocman/resources/i-infoway-i-corporate/business-plans/2858-summary-corporate-plan-2016-2017?Itemid=101>
- Canadian Health Outcomes for Better Information and Care. (n.d.). About C-HOBIC. Retrieved from http://c-hobic.cna-aiic.ca/about/default_e.aspx
- Canadian Nurses Association. (2006). *E-nursing strategy for Canada*. Retrieved from <https://www.cna-aiic.ca/~media/cna/page-content/pdf-en/e-nursing-strategy-for-canada.pdf?la=en>
- Canadian Nurses Association. (2015). *Primary health care* [Position statement]. Retrieved from <https://www.cna-aiic.ca/~media/cna/page-content/pdf-en/primary-health-care-position-statement.pdf?la=en>
- Canadian Nurses Association. (2016, November). *National nursing data standards*. Resolution approved at the CNA board of directors meeting, Ottawa, Ont.
- Caulfield, B. M., & Donnelly, S. C. (2013). What is connected health and why will it change your practice? *QJM: An International Journal of Medicine, 106*, 703-707. doi:10.1093/qjmed/hct114
- Felkey, B. G., & Fox, B. I. (2015). Health information technology risks, errors, external threats, and human complacency. *Hospital Pharmacy, 50*, 550-551. doi:10.1310/hpj5006-550
- Harrington, L. (2011). Clinical intelligence. *Journal of Nursing Administration, 41*, 507-509. doi:10.1097/NNA.0b013e318237eca0
- Harrington, L. (2012). AONE Creates new position paper: Nursing informatics executive leader. *Nurse Leader, 10*(3), 17-21. doi:10.1016/j.mnl.2012.04.002
- Häyrynen, K., Lammintakanen, J., & Saranto, K. (2010). Evaluation of electronic nursing documentation — Nursing process model and standardized terminologies as keys to visible and transparent nursing. *International Journal of Medical Informatics, 79*, 554-564. doi:10.1016/j.ijmedinf.2010.05.002

- Hwang, J-I., & Park, H-A. (2011). Factors associated with nurses' informatics competency. *Computers, Informatics, Nursing*, 29, 256-262. doi:10.1097/NCN.0b013e3181fc3d24
- International Council of Nurses. (2015). *International classification for nursing practice (ICNP)* [Information sheet]. Retrieved from http://www.icn.ch/images/stories/documents/pillars/Practice/icnp/ICNP_FAQs.pdf
- International Medical Informatics Association. (2009). *IMIA-NI definition of nursing informatics updated*. Retrieved from <https://imianews.wordpress.com/2009/08/24/imia-ni-definition-of-nursing-informatics-updated/>
- Karsh, B.-T., Holden, R. J., Alper, S. J., & Or, C. K. L. (2006). A human factors engineering paradigm for patient safety: Designing to support the performance of the healthcare professional. *Quality and Safety in Health Care*, 15(Suppl 1), i59-i65. doi:10.1136/qshc.2005.015974
- Kerfoot, K. M., Zwieg, F. H., Mielcarek, F., & Beaudette, J. (2010). A clinically intelligent nursing care system: What the CNE needs to know. *Nurse Leader*, 8(4), 37-40. doi:10.1016/j.mnl.2010.05.008
- Lilly, K. D., & Eldridge, C. (2012). Healthcare informatics in 21st-century nursing: Are dermatology nurses prepared? *Journal of the Dermatology Nurses' Association*, 4, 188-194. doi:10.1097/JDN.0b013e318256b9dc
- Naylor, D., Girard, F., Mintz, J., Fraser, N., Jenkins, T. & Power, C. (2015). *Unleashing innovation: Excellent healthcare for Canada. Report of the advisory panel on healthcare innovation* (Health Canada catalogue no. H22-4/9-2015E-PDF). Retrieved from <http://www.healthycanadians.gc.ca/publications/health-system-systeme-sante/report-healthcare-innovation-rapport-soins/index-eng.php>
- O'Keefe-McCarthy, S. (2009). Technologically-mediated nursing care: The impact on moral agency. *Nursing Ethics*, 16, 786-796. doi:10.1177/0969733009343249
- Regenstrief Institute. (2016). Logical observation identifiers names and codes (LOINC) nursing physiologic assessment panel. Retrieved from <http://s.details.loinc.org/LOINC/80346-0.html?sections=Simple>
- Simpson, R. L. (2013). Chief nurse executives need contemporary informatics competencies. *Nursing Economics*, 31, 277-288. Retrieved from <http://www.nursingconomics.net/ce/2015/article3106277287.pdf>
- Topol, E. (2013). *The creative destruction of medicine: How the digital revolution will create better health care*. New York: Basic Books.
- Vreeman, D. (2013, September 19). New Regenstrief and IHTSDO agreement to make EMRs more effective at improving health care [Media release]. Retrieved from the LOINC website: <https://loinc.org/news/regenstrief-ihtsdo-agreement-to-make-emrs-more-effective.html>

Also see:

COACH: Canada's Health Informatics Association — *Guidelines for the Protection of Health Information*

Canadian Nurses Association — *Code of Ethics for Registered Nurses*

Glossary of acronyms

Systematized Nomenclature of Medicine — Clinical Terms (SNOMED-CT)

International Classification for Nursing Practice (ICNP)

Logical Observation Identifiers Names and Codes (LOINC)

Canadian Health Outcomes for Better Information and Care (C-HOBIC)

Information and Communication Technologies (ICTs)

Primary Health Care (PHC)

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