



What Canadian Nursing Leaders Need to Know About Informatics in Digital Health

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○ Purpose

- The purpose of this lecture is to provide an overview of activities completed to support the identification of **informatics** and **digital health competences** for **Canadian nurse leaders**.

○ Digital Health Context



○ Digital Health and the Pandemic

CANADIAN STARTUP NEWS & TECH INNOVATION

BY ISABELLE KIRKWOOD / CANADIAN STARTUP NEWS / OCTOBER 15, 2020

LOBLAW PARTNERS WITH LEAGUE TO LAUNCH NEW HEALTH-FOCUSED APP

Perspective

Harvard
Business
Review

INNOVATION

How Hospitals Are Using AI to Battle Covid-19

by Kelley A. Wittbold, Colleen Carroll, Marco Iansiti, Haipeng Mark Zhang and Adam B. Landman

APRIL 03, 2020

Transformation: COVID-19 and the rise of

Mat Fudim,¹ Blake Cameron,² Ziad F. Gellad,^{3,4} Alex Cho,⁵
Mon Curtis,⁷ Matthew Roman,^{6,8} Eric G. Poon ^{5,6}
¹ Jason N. Katz,¹ and James Tcheng¹

Background

- There is growing concern that a majority of nurse leaders in Canada may not have the requisite informatics competencies to meaningfully participate in making strategic decisions related to the acquisition and use of health information technologies (HITs).
- Despite this, many Canadian healthcare organizations are in the midst of significant decision-making regarding HIT system implementation and optimization.
- Core informatics competencies for Canadian nurse leaders should be identified, validated and disseminated.



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Nursing Informatics Competency Assessment for the Nurse Leader

The Delphi Study

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OBJECTIVE: The aim of this study was to identify nursing informatics competencies perceived as relevant and required by nurse leaders.

BACKGROUND: To participate as a full partner in healthcare leadership among rapidly advancing health information technologies (HITs), nurse leaders must attain knowledge of informatics competencies related to their clinical leadership roles and responsibilities. Despite this increased need to engage in HIT-related decision making, a gap remains in validated informatics competencies specific to the needs of nurse leaders.

METHODS: An environmental scan and 3-round survey using Delphi methods used with nurse leaders for competency identification were used.

RESULTS: Between 26 and 41 participants responded to each Delphi round. Most nurse leaders acquired HIT knowledge through on-the-job training. We identified 74 competencies from an initial list of 108 competencies.

CONCLUSION: This work can advance nursing practice to move beyond "on-the-job informatics training" to a more competency-based model of nursing informatics education and practice.

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The authors declare no conflicts of interest.

In today's high-technology environment, leaders in the healthcare field encounter decisions related to health information technology (HIT). The roadmap and recommendations identified by the AMIA Electronic Health Record 2020 Task Force include simplifying and speeding up documentation, improving data exchange and interoperability, reducing data entry, focusing on patient outcomes, improving usability and safety, fostering innovation through the use of application programming interfaces and data standards, and promoting integration of electronic health records (EHRs) to include all areas of care.¹ The achievement of these recommendations to resolve complex EHR issues that bridge the clinical, policy, and technical domains will require effective collaboration between vendors, informaticians, and clinical leaders at healthcare organizations. To participate as a full partner in these collaborations, clinical leaders must attain knowledge of informatics competencies related to their clinical leadership roles and responsibilities. Nurse leaders serve as the voice for more than 3 million nurses, the largest segment of the US healthcare workforce, across hospital, ambulatory, community, home, and long-term-care settings.² According to the American Organization of Nurse Executives, the roles that represent most nurse leaders are directors (32%), managers (26%), and chief nursing officers (CNO)/chief nursing executives (CNEs) (17%).³ We believe that similar to the diffusion of evidence-based nursing practice nurse leaders' ability to make informed strategic and operational decisions related to HIT adoption, implementation, and innovation is critical, necessitating



- Progress to Date

1

Scoping Review

2

Delphi Study

3

Instrument Development & Validation

1

Scoping Review

Informatics Competencies for Nurse Leaders

○ Research Questions

- 1. What nurse leader informatics competencies have been identified in the literature?
2. What frameworks or theories have been used in the development of informatics competencies for nurse leaders?
3. What instruments have been developed and are being used to assess the informatics competencies for nurse leaders?
4. What are the psychometric properties of the instruments identified for the assessment of nurse leaders' informatics competencies?

Methodology

Scoping Review Methodology

(Arksey & O'Malley, 2005; Levac et al., 2010)

- 1 Identify the Research Question
- 2 Identify Relevant Studies
- 3 Study Selection
- 4 Data Collection
- 5 Reporting the Results

Appendix A: Medline Search Strategy (OVID)

1. nurse*.mp. (303447)
2. nurses/ or nurse administrators/ or nurse practitioners/ or nurse specialists/ or nurses, community health/ or nurses, international/ or nurses, male/ or nurses, public health/ or nursing staff, hospital/ (105987)
3. exp nurse/ (81652)
4. exp nursing staff/ (62823)
5. nurse's role/ (38554)
6. nursing informatics* .mp. (1628)
7. 1 or 2 or 3 or 4 or 5 or 6 [nurse set] (331029)
8. informatics/ or medical informatics/ or nursing informatics/ (12644)
9. health informatics.mp. (2379)
10. 8 or 9 [informatics set] (14233)
11. competenc*.mp. (158566)
12. nurse administrator (12570)
13. 7 or 12 [nursing set] (331029)
14. clinical competence/ (80867)
15. 10 and 13 (1853)
16. 11 or 14 [competency set] (158566)
17. 15 and 16 (334)
18. nurse manage*.mp. (3237)
19. 17 and 18 (7)
20. nurse leader*.mp. (1623)
21. 17 and 20 (11)
22. 17 or 19 or 21 (334)

Methodological Details

Open Access

Protocol

BMJ Open Informatics competencies for nurse leaders: protocol for a scoping review

Iman Kassam,¹ Lynn Nagle,² Gillian Strudwick³

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ABSTRACT

Introduction Globally, health information technologies are now being used by nurses in a variety of settings. However, nurse leaders often do not have the necessary strategic and tactical informatics competencies to adequately ensure their effective adoption and use. Although informatics competencies and competency frameworks have been identified and developed, to date there has not been review or consolidation of the work completed in this area. In order to address this gap, a scoping review is being conducted. The objectives of this scoping review are to: (1) identify informatics competencies of relevance to nurse leaders, (2) identify frameworks or theories that have been used to develop informatics competencies for nurse leaders, (3) identify instruments used to assess the informatics competencies of nurse leaders and (4) examine the psychometric properties of identified

Strengths and limitations of this study

- First known literature review that will consolidate nurse informatics competencies for nurse leaders.
- Search strategy developed in collaboration with a research librarian well versed in research databases.
- Only studies and documents published in English will be included.

competencies in basic nursing education at the entry-to-practice level, and often to refer to these as 'nursing informatics competencies'. Nursing informatics is defined by the American Nurses Association as: "the specialty that integrates nursing science with multiple



Informatics Competencies for Nurse Leaders

A Scoping Review

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OBJECTIVE: To consolidate informatics competencies for nurse leaders.

BACKGROUND: Nurses in leadership positions with financial and human resource responsibilities have the capacity to shape how technologies are selected, implemented, and used. Many nurse leaders are not equipped with the essential informatics competencies to do so effectively. There have been efforts to identify a set of standard informatics competencies that should be core to every nurse leader's suite of capabilities; nonetheless, these efforts have yet to be disseminated widely.

METHODS: A scoping review was conducted by: 1) identifying the research questions; 2) identifying relevant studies; 3) selecting studies; 4) extracting collected data; and 5) reporting the results.

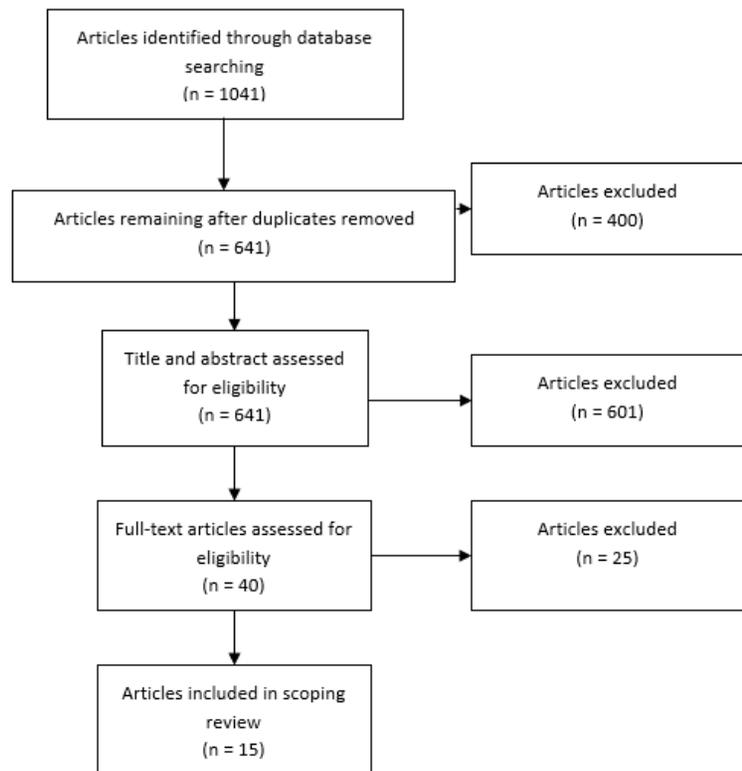
RESULTS: Fifteen articles were found, and 11 competency themes related to informatics knowledge, informatics skills, and others were identified.

CONCLUSION: Findings of this review can be used to support nursing leaders in their identification of gaps in their informatics knowledge and skill.

ensuring that nurses have the informatics competencies that enable them to function effectively in direct care roles.¹⁻⁴ In the last decade, many have engaged in the identification of "entry-to-practice" nursing informatics competencies,^{1,2,4,5} with nursing informatics being described by the American Nurses Association (ANA) and others as incorporating "the science of nursing with information, technological, communication, and analytical sciences to support the integration of data, information, knowledge, and wisdom into the provision of evidence-based nursing care."^{6,7}

Despite this focus on developing informatics competencies for nurses entering the profession, nursing interventions and outcomes are often not adequately represented within the electronic health record systems in which direct care nurses document their assessments and care.⁸ This may be a result of nursing terminologies not being linked to the various data fields where direct care nurses are required to enter information, often because nurses are either not engaged in system implementation activities or did not have the appropriate informatics knowledge to insist an appropriate

Findings



Article Characteristics	N (%)
Year of publication	
<2000	2 (13.3)
2000-2005	2 (13.3)
2006-2010	3 (20)
2011-2015	4 (26.7)
>2016	4 (26.7)
Country of publication	
Brazil	2 (13.3)
China	1 (6.7)
Finland	1 (6.7)
Germany	1 (6.7)
United States of America	10 (66.6)
Study types	
Competency inventory development	11 (73.3)
Competency measurement instrument development	1 (6.7)
Scoping review	1 (6.7)
Quasi-experimental competency assessment	2 (13.3)
Population of interest	
Nurse leaders (including directors, managers)	8 (53.3)
Nurses in executive level leadership positions	1 (6.7)
Nurses in various roles	4 (26.7)
Frameworks/processes used to inform competency identification (not mutually exclusive)	
American Organization of Nurse Executives (AONE)	2 (13.3)
Australian Health Informatics Education Council (AHIEC)	1 (6.7)
Canada's Health Informatics Association (COACH) HIP Competency	1 (6.7)
Generic organizational behaviour theories	1 (6.7)
Global Health Workforce Council (GHWC)	1 (6.7)
Information Management Framework	2 (13.3)
Informatics Research Organizing (IRO)	1 (6.7)
Technology Informatics Guiding Education Reform (TIGER)	4 (26.7)
Frameworks from prior competency research	6 (40)
Primary method used to identify competencies	
Expert Interviews	2 (13.3)
Qualitative descriptive case study	1 (6.7)
Delphi technique	5 (33.3)
Environmental scan	1 (6.7)
Surveys	5 (33.3)
Task force	1 (6.7)
Number of relevant competencies identified	
10-25	5 (33.3)
26-50	3 (20)
51-75	3 (20)
76-100	2 (13.3)
>100	2 (13.3)

○ Findings (cont'd)

Table 1. Competency Themes

Competency Domain	Competency Theme	Examples
Informatics knowledge	1. Data/information management knowledge/standardization	<ul style="list-style-type: none"> Effectively manages and shares large amounts of complex data¹⁶ Recognizes the use and/or importance of nursing data for improving practice¹⁷
	2. Information systems	<ul style="list-style-type: none"> Has knowledge of technological trends, issues, and new developments as they apply to nursing⁷
	3. Education	<ul style="list-style-type: none"> Has knowledge of the levels of informatics knowledge by roles⁷
	4. Research	<ul style="list-style-type: none"> Has knowledge of the reuse of patient/administrative data for research⁷
	5. Ethical/legal/regulatory	<ul style="list-style-type: none"> Understands the ethical issues regarding IT, security, and confidentiality²¹
	6. Privacy/security knowledge	<ul style="list-style-type: none"> Describes ways to protect data¹⁸ Participates in the development and integration of security and data protection protocols for system and personnel files²⁷
	7. Impact	<ul style="list-style-type: none"> Defines the impact of computerized information management on the role of the nurse²³
Informatics skills	8. Requirements/system selection	<ul style="list-style-type: none"> Has the ability to ensure that nursing values/requirements are represented in health IT selection and evaluation⁹
	9. Implementation	<ul style="list-style-type: none"> Develops implementation plans²⁴ Has the ability to manage the effect of change because of health IT implementation²⁶
Other (including computer skills)	10. Analysis/evaluation	<ul style="list-style-type: none"> Participates in the evaluation of information in practice settings²²
	11. Non-informatics-specific competencies	<p>Subthemes:</p> <ul style="list-style-type: none"> Leadership/administration Operations skills Interpersonal/soft skills Industrial/environment Quality management Human resource management Change management Stakeholder management Computer skills Fiscal management Information literacy Project management Competencies specific to direct care nurses, nurse teachers, and nurse researchers



2

Delphi Study

Adapting and Validating Informatics Competencies for Senior Nurse Leaders in the Canadian Context

Purpose

The purpose of this study was to identify informatics competencies of priority to Canadian nurse leaders, using competencies identified from the literature as a starting point.



Adapting and validating informatics competencies for senior nurse leaders in the Canadian context: Results of a Delphi study

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ABSTRACT

Background: Nurse leaders in senior leadership positions in various parts of the world can play an important role in the acquisition, implementation and use of health information technologies. To date, international research related to nurse leader informatics competencies has been carried out in specific healthcare delivery contexts with very specific health information technology environments. In this body of literature, the definition of a 'nurse leader' has not been clearly defined. As a result, it is challenging for senior nurse leaders in leadership and management positions in other countries to apply this research to their unique contexts.

Purpose: The objective of this study was to obtain consensus on the informatics competencies of priority to senior Canadian nurse leaders. The goal of completing this work was to adapt and validate a set of nurse leader informatics competencies to be endorsed and supported nationally.

Methods: This study used a modified Delphi technique with a panel of nurse leaders with significant informatics knowledge from across Canada. Three rounds of information gathering were completed electronically. In Round 1, participants were provided a series of 26 potential competency statements obtained from a review of the literature; they were asked to comment on the clarity and wording of each statement. Two statements were eliminated after Round 1 due to redundancy. In Rounds 2 and 3, participants rated the remaining competency statements on a 7-point Likert scale for relative priority to nurse leaders.

Results: A total of 25, 24 and 23 participants completed the survey in Rounds 1, 2 and 3 respectively. Consensus was achieved at the end of Round 3 with the inclusion of 24 competency statements. All of the statements had a mean of 5 or greater on a 7-point Likert scale (1 – low priority and 7 – high priority).

Conclusions: The study participants agreed upon 24 informatics competency statements of priority to Canadian nurse leaders. These competencies will be presented to senior national nursing leaders and nursing informatics organizations for endorsement. Inspired by work completed in the United States, the authors plan to develop a self-assessment instrument for use by Canadian nurse leaders using the identified competency statements. Future anticipated work includes identifying and creating resources for nurse leaders to develop these important informatics competencies.

○ Methodology

○ **Delphi Methodology:** Using ‘rounds’ of consultations with experts in the field, across Canada. 26 competency statements were identified from the literature review and presented to experts.

Round 1

Wording, clarity and missing competencies

Round 2

Prioritization of importance of statements for Canadian Context

Round 3

Prioritization of importance of statements for Canadian Context

Round 4

Not Required

Expert Panel (n=25) Demographics

Age	n	%
30-39	3	12
40-49	2	8
50-59	11	44
60-69	3	12
Did not disclose	6	24

# of Years of Experience in Informatics	n	%
< 5	12	48
6-10	2	8
11-15	3	12
16-20	2	8
21 +	6	24

Employment Jurisdiction	n	%
Ontario	11	44
British Columbia	5	20
Nova Scotia	4	16
Saskatchewan	3	12
Alberta	1	4
Manitoba	1	4

Highest Level of Education	n	%
Diploma	2	8
Baccalaureate	4	16
Masters	15	60
Doctorate	4	16

Area of Work (multi-select)	n	%
Nursing/Health/Clinical Informatics	15	60
Administration	7	28
Education	4	16
Policy	2	8
Clinical Practice	2	8
Consulting	1	4
Nursing Association	1	4
Undertaking Doctoral Education	1	4

Results

#	Competency Statement	Round 2			Round 3		
		Level of agreement on importance (%)	Mean	SD	Level of agreement on importance (%)	Mean	SD
1	Nurse leaders demonstrate an awareness of the CASN entry-to-practice nursing informatics competencies for direct care nurses.	95.8	6.13	0.90	91.3	6.17	0.89
2	Nurse leaders recognize their responsibility to support nurses to use and adopt information and communication technologies that enable the provision of safe, quality care delivery.	95.8	6.42	0.78	95.7	6.52	0.73
3	Nurse leaders establish clear expectations for nurses' use of information and communication technologies.	95.8	6.25	0.85	100.0	6.26	0.75
4	Nurse leaders demonstrate the knowledge to actively participate in the acquisition, design, implementation and evaluation of information and communication technologies	87.5	5.79	1.02	95.7	5.91	0.85
5	Nurse leaders apply effective change leadership and change management activities in support of information and communication technology implementation.	95.8	6.21	0.83	95.7	6.17	0.83
6	Nurse leaders publicly identify, promote and celebrate organizational and clinical achievements related to the use of information and communication technologies.	83.3	5.50	1.10	91.3	5.65	0.83
7	Nurse leaders work collaboratively with colleagues from information technology/management, informatics, finance, and other relevant departments to advocate for and ensure that technology solutions support patient care and nursing practice.	100.0	6.33	0.82	100.0	6.43	0.73

○ Competency Statements (n=24)

- 1) Nurse leaders demonstrate an awareness of the CASN entry-to-practice nursing informatics competencies for direct care nurses.
- 2) Nurse leaders recognize their responsibility to support nurses to use and adopt information and communication technologies that enable the provision of safe, quality care delivery.
- 3) Nurse leaders establish clear expectations for nurses' use of information and communication technologies.
- 4) Nurse leaders demonstrate the knowledge to actively participate in the acquisition, design, implementation and evaluation of information and communication technologies
- 5) Nurse leaders apply effective change leadership and change management activities in support of information and communication technology implementation.
- 6) Nurse leaders publicly identify, promote and celebrate organizational and clinical achievements related to the use of information and communication technologies.
- 7) Nurse leaders work collaboratively with colleagues from information technology/management, informatics, finance, and other relevant departments to advocate for and ensure that technology solutions support patient care and nursing practice.
- 8) Nurse leaders seek out and identify nurses with informatics competencies to lead and support information and communication technology initiatives.

○ Competency Statements (n=24)

○ **9)** Nurse leaders contribute to the organization's strategic directions for information and communication technology, recognizing them as key enablers of the organization's strategic plan, goals and desired outcomes.

10) Nurse leaders communicate and support the organization's information and communication technology strategic plan.

11) Nurse leaders ensure information and communication technology projects are sufficiently financed to provide adequate training, education and ongoing support for user adoption and the optimization of system and information use.

12) Nurse leaders understand and demonstrate the use of data analytics and evidence-based decision-making.

13) Nurse leaders define evaluation metrics and identify indicators to measure the impact of information and communication technologies on nursing care processes, decision-making, and outcomes.

14) Nurse leaders establish a culture of collaboration with C-suite leaders (e.g., CIO, CMIO, CNIO, CFO) and technology vendors.

15) Nurse leaders collaborate with stakeholders to identify and advocate for appropriate information and communication technology functional requirements that support nursing practice.

16) Nurse leaders advocate for information and communication technology solutions that support patient/family inclusion as active partners in their care.

○ Competency Statements (n=24)

○ **17)** Nurse leaders proactively identify technology trends and issues that impact nursing management and clinical practice.

18) Nurse leaders ensure that work process redesign occurs in conjunction with the implementation of new information and communication technology

19) Nurse leaders advocate for and advance the use of clinical and technical (interoperability) standards.

20) Nurse leaders apply ethical principles in the collection, maintenance, use, and dissemination of clinical data and information related to information and communication technologies

21) Nurse leaders recognize and manage information and communication technology 'workarounds', and the consequences of human-computer interactions on patient care.

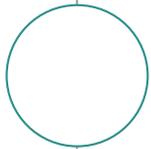
22) Nurse leaders understand and advance the importance of data quality and integrity, and ensure nursing documentation adheres to standards.

23) Nurse leaders recognize potential negative impacts of information and communication technologies, and the need for risk identification and mitigation to maintain the delivery of safe patient care.

24) Nurse leaders understand the legislative, regulatory, and ethical issues regarding information and communication technology security and privacy.

Informatics Competencies & Delivery of Compassionate Care through and with technology





The voice and influence of nursing care can be amplified in this digital future, if we are able to harness the power of this technology in advancing our abilities to provide skillful evidenced informed care. However, the opposite is also possible. Now is the time when we must commit to engaging the integration of AI into our workplaces and equip ourselves and our profession with the enhanced nursing intelligence needed to ensure future success (Risling, 2019, p. 42).

4

Nursing in the Future

Emerging Themes

○ Emerging Themes

○ We cannot predict exactly how AI and related technologies will transform healthcare. However, experts in the field expect two emerging uses of technology to scale and spread in the coming decade:

1. Leveraging data and information to generate insights, support decision-making, and optimize processes
2. Using automation and robotic technologies to support various activities of life and work

Implications discussed for clinical practice, education, leadership, research, regulation/policy, legislation and ethics.

○ Discussion

- How do we achieve uptake of these competencies by nurse leaders?
- What important partnerships should we establish?
- Identifying a 'home' for this work – thoughts?
- Who needs to know about this work?



4

Questions?

○ Acknowledgments

○ **Part 1:** Scoping Review

Gillian Strudwick, Lynn Nagle, Iman Kassam, Meera Pahwa & Lydia Sequeira

Part 2: Delphi Study

Brian Lo, Alicia Morgan, Gillian Strudwick, Lynn Nagle, Margaret Ann Kennedy, Leanne Currie & Peggy White

Part 3: Instrument Development & Validation Study

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• **Thank You**

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