

Measuring Outcomes of Nursing Care, Improving the Health of Canadians: NNQR (C), C-HOBIC and NQuiRE

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Abstract

The purpose of this paper is to inform the nursing community of the extraordinary progress that the Canadian National Nursing Quality Report (NNQR (C)), the Canadian Health Outcomes for Better Information and Care (C-HOBIC) and the Nursing Quality Indicators for Reporting and Evaluation (NQuIRE) have made to date, and to share our commitment to continue working together to build a strong nursing profession that, armed with evidence, will contribute to healthier Canadians.

The need for standardized information to evaluate healthcare outcomes is coming into greater focus as dialogue about healthcare reform continues across the country. Given the importance of nursing care in achieving positive patient outcomes, standardized measures are essential to evaluate nursing interventions and implement quality improvement initiatives, informed by unit-level benchmarks and national peer averages. In this paper, we highlight three Canadian initiatives that are underway to advance nursing-sensitive indicators: the Canadian National Nursing Quality Report, or NNQR (C); the Canadian Health Outcomes for Better Information and Care (C-HOBIC) program; and the Nursing Quality Indicators for Reporting and Evaluation (NQuIRE) database launched by the Registered Nurses' Association of Ontario (RNAO) with multiple partners. These three initiatives focus on specific and complementary aspects of outcome measurement, and each will advance nursing towards the common goal of quality improvement based on standardized measurement of nursing-sensitive indicators and outcome evaluation.

The momentum propelling outcomes measurement comes not from scholars but from policy makers and the public. There is a growing demand that providers justify interventions and systems of care in terms of improved patient lives. By linking the care people get to the outcomes they experience, outcomes measurement has become the key to developing better ways to monitor and improve the quality of care.

Measurement of relevant quality indicators provides evidence of the relationships between healthcare costs, the processes involved in providing care and the resulting outcomes of care. We know that nurses have an impact on patient outcomes. There is a growing body of evidence that demonstrates a relationship between nursing care and patient outcomes such as functional status, symptom control, falls, pressure ulcers, self-care, healthcare utilization and mortality (Doran 2011). Studies have consistently demonstrated the importance of healthy work environments in promoting desired patient outcomes related to pain (McGillis Hall et al. 2003) and patient safety (Laschinger and Leiter 2006), and nurse outcomes such as job satisfaction (Patrician et al. 2010; Schmalenberg and Kramer 2008) and retention (O'Brien-Pallas et al. 2010). Studies have also shown that nursing interven-

tions, such as self-care assistance, exercise promotion and symptom management, promote patients' functional health, pain and dyspnea outcomes (Doran et al. 2006a,b). Findings highlight the importance of unit-specific data to enable nursing administrators to evaluate nursing care, and put in place interventions that are appropriate and effective to optimize outcomes at the point of care delivery.

Studies also demonstrate the pivotal impact of evidence-based nursing practice on clinical outcomes. For example, a joint RNAO/Canadian Patient Safety Institute (CPSI) partnership that focused on a national falls collaborative showed that using the RNAO's falls best practice guideline (BPG) in a concerted quality improvement effort resulted in most of the 32 national participating sites meeting and sustaining the goals of 40% reduction in falls and injury from falls (MacLaurin and McConnell 2011). Another study, undertaken at a hospital in Ontario, reported a 20% reduction in the annual fall rate shortly after implementing the RNAO's BPG (Ireland et al. 2010). In another example, a recent Ontario report (OHA 2010) indicated that the high-quality patient outcomes achieved from wound care protocols based on best practices identified in RNAO's *Assessment and Management of Stage I to IV Pressure Ulcers* BPG, adopted by the Canadian Association of Wound Care, were more cost efficient compared to the traditional protocol. This finding corroborates the results of implementation of the RNAO's wound care BPGs in the province of Saskatchewan (Timmerman et al. 2007). Further research has shown that nursing practice based on the RNAO's BPGs demonstrated improvements in >50% of indicators related to guideline implementations for the topics of asthma, diabetes foot ulcers and venous leg ulcers (Davies et al. 2008).

Nursing-Sensitive Indicators

Healthcare reforms, a better informed public and scarce resources are increasingly demanding greater system and professional accountability. These trends have afforded nurses a unique opportunity to demonstrate the impact of their contribution to clinical, organizational and financial outcomes through enhanced work on nursing-sensitive indicators. Towards this end, a knowledge synthesis was conducted to identify what is known about outcomes/performance monitoring initiatives in nursing, both nationally and internationally. This synthesis included investigation of the development, implementation, utilization and reporting systems (through nursing report cards) of nursing-sensitive indicators. An abridged version of the synthesis was subsequently published in the *Canadian Journal of Nursing Leadership* (Doran et al. 2011).

While efforts to identify nursing's contribution to high-quality care and to conduct research into patient outcomes date back to Nightingale (Dossey 2000; Maas et al. 1996; Magnello 2010; Montalvo 2007), the systematic collection of data to assess outcomes did not gain widespread attention until the late 1970s,

when concerns about quality of care prompted the development of the Universal Minimum Health Data Set, which was followed shortly thereafter by the Uniform Hospital Discharge Data Set (Kleib et al. 2011).

The Canadian Nurses Association began to work on the development of a nursing minimum data set (NMDS) to ensure the availability of and accessibility to standardized nursing data in Canada (CNA 2000). At a 1997 Working Group meeting, nurses across Canada reached national consensus on five nursing care data elements: client status, nursing intervention, client outcome, primary nurse identifier and nursing intensity (Hannah and White 2012).

Interest and attention to nursing-sensitive outcomes have steadily increased since groundbreaking work in the mid-1990s by the Expert Panel on Quality Health Care of the American Academy of Nursing (Doran and Pringle 2011). Nursing outcome databases began to be created to house clinical outcomes determined to be sensitive to nursing care (Doran and Pringle 2011; Kleib et al. 2011). *Nursing-sensitive outcomes* have been described as those that are “relevant, based on nurses’ scope and domain of practice, and for which there is empirical evidence linking nursing inputs and interventions to the outcome” (Doran 2003: vii). *Nursing-sensitive indicators* are the data elements that are collected and analyzed to identify nursing-sensitive outcomes (Doran et al. 2011). Reflecting Donabedian’s (1966) organizing framework for factors that influence patient care quality, nursing-sensitive indicators are identified for the structure, process and outcomes of nursing care (Doran and Pringle 2011). Indicators of structures for nursing care (also known as inputs) encompass the supply, skill level and education/certification of nursing staff; process indicators include components of nursing care such as assessment and interventions; and nursing-sensitive patient outcomes are those that improve with more or higher-quality nursing care (NDNQI 2010). Initiatives in Canada related to nursing-sensitive indicators are underway, three of which are described below.

National Nursing Quality Report (C)

In September 2010, the Academy of Canadian Executive Nurses (ACEN) made the decision to focus on the development of a national nursing report card. This report card would contain structure, process and outcome nursing-sensitive indicators that could be used by all healthcare sectors to measure nursing care. A collaboration with the Canadian Nurses Association, support from Health Canada (Office of Nursing Policy) and participation by Canada Health Infoway and the Canadian Institute for Health Information led to the February 13, 2011 *Think Tank towards a National Report Card*. As a result of the think tank and with funding from Canada Health Infoway (Infoway), CNA and ACEN have partnered to develop a coordinated system to collect, store and retrieve nursing data in settings across Canada. The project will collect information from 10 pilot

sites on structure, process and outcome indicators to assist in evaluating the care being provided in healthcare sectors. The pilot is taking place in Saskatchewan, Manitoba, Ontario and New Brunswick, with the long-term goal of establishing a sustainable national nursing quality report for all jurisdictions in Canada. The study results and subsequent applications are expected to influence operational and healthcare policy directions across the country.

A second study has been funded by Health Canada (Office of Nursing Policy) and will enable the NNQR (C) project leaders to conduct a Delphi survey with nurse leaders across Canada to achieve consensus on the set of nursing-sensitive indicators, which will then be applied to the development of a dashboard template. This work, to occur over the next 12 months, will build on and complement the work funded by Canada Health Infoway.

In the pilot phase of the Infoway project, the NNQR (C) is collaborating with the Canadian Patient Safety Institute as host for collecting the NNQR (C) indicators through the Patient Safety Metrics system. Pilot sites include medical/surgical units, adult post-acute and rehabilitation units, and long-term care and mental health units. Unit-level nurse staffing structural indicators, and processes of care data, as well as nursing-sensitive outcomes measures, will be submitted on a quarterly basis. The NNQR (C) will also entail some primary data collection in a survey of nurse job satisfaction and work environments, which will be established as an annual, web-based survey.

The NNQR (C) will capitalize on the potential for electronic health record (EHR) systems to enable new ways of gathering and sharing data. The NNQR (C) will utilize existing sources of secure data captured in the EHR, along with other clinical and administrative data sources, to collect and analyze health information in order to significantly advance decision-making in quality improvement and resource allocation, both within and across sectors. It will generate comparative data about promising practices and new approaches related to current healthcare issues such as nursing staff mix, models of care, ratios and span of control, and enable governments and healthcare organizations to evaluate policies and new delivery arrangements designed to mitigate the impact of current or anticipated cost drivers.

C-HOBIC

Health Outcomes for Better Information and Care (HOBIC) is an initiative based in the province of Ontario that focuses on the collection of a set of patient outcomes sensitive to nursing care in acute care, long-term care, home care and chronic care settings (Pringle and Doran 2003; Pringle and White 2002). It originated with the Nursing and Health Outcomes Project, which was established in 1999 funded by the Ontario Ministry of Health and Long-Term Care (Pringle

and White 2002). Through successive phases of the program, a set of nursing-sensitive patient outcomes was identified and the feasibility of collecting them tested (HOBIC 2009). This program was developed to fill a critical information gap and make the contribution of nurses visible through the provincewide, standardized collection of evidence-based, clinical outcomes reflecting nursing practice (Hannah and White 2012). Valid and reliable scales are used to assess patients' status on admission and discharge assessments and quarterly for those in long-term care and chronic care settings. Currently in Ontario, 201 organizations across the province are collecting the standardized suite of clinical outcomes, and this information is abstracted to a provincial database that permits real-time reporting for nurses and nurse leaders (Hannah and White 2012). With HOBIC implementation, real-time, unit-level reports enable senior nursing leaders to examine the quality of care for their unit or organization. The collection of standardized outcomes allows for comparisons and benchmarking to understand the practices that lead to improved outcomes (McGillis Hall et al. 2012).

C-HOBIC builds on and expands work that was conducted in the province of Ontario. In the fall of 2006, the CNA partnered with the ministries of health in three Canadian provinces to submit a proposal to Infoway for funding to support the inclusion of standardized nursing information in electronic health records. In C-HOBIC Phase 1, the collection of the suite of clinical outcomes was extended beyond Ontario to Saskatchewan and Manitoba, in long-term care and home care. C-HOBIC introduces a systematic, structured language to patient assessments across the healthcare system, enabling this information to be abstracted into jurisdictional EHRs and available to clinicians across the healthcare system (Hannah and White 2012). Hannah and White (2012) have detailed current developments of C-HOBIC.

With recent investment from Infoway, the objective of Phase 2 is to develop, implement and evaluate a new mechanism for using C-HOBIC information to facilitate patient transitions from one sector of the healthcare delivery system to another. With the extension into the acute care sector, the Winnipeg Regional Health Authority will be positioned to make the C-HOBIC information accessible to clinicians across sectors of the health system in their electronic patient record using a synoptic report (Hannah and White 2012). In Ontario, C-HOBIC Phase 2 will also share C-HOBIC data among clinicians across sectors of the healthcare system in the same synoptic format through the use of portal technology.

On January 11, 2011, the C-HOBIC data set was endorsed by the Infoway Standards Collaborative as a Canadian Approved Standard (CAS). The CAS status for C-HOBIC will facilitate the collection of standardized patient clinical outcomes that are sensitive to nursing across Canada and will support the sharing of clinical information among clinical disciplines and care settings.

RNAO NQuIRE

With funding from the Government of Ontario, the Registered Nurses' Association of Ontario launched the Nursing Best Practice Guidelines Program in 1999 to provide nurses with best practice guidelines (Grinspun et al. 2001/2002). To date, there are 48 BPGs, with others being developed (Grinspun 2011; RNAO 2012b). A key partnership in supporting uptake of BPGs is the designated Best Practice Spotlight Organizations (BPSOs). BPSOs are healthcare and academic organizations that enter into a formal agreement with the RNAO to implement multiple RNAO BPGs and evaluate their impact on patients' clinical/health outcomes, as well as organizational and systemic performance results (RNAO 2012a). Since its inception in 2003, BPSOs are recognized globally and now involve 66 BPSOs representing 291 sites in Canada and other countries including the United States, Spain, Chile, and Australia, with many others coming on board in 2012.

To facilitate the systematic uptake of the best available evidence, the RNAO is developing evidence-based nursing intervention order sets derived from each BPG (Wilson 2012). Nursing order sets facilitate the evaluation of the implementation of BPGs in BPSOs by providing a mechanism to link specific evidence-based interventions to nursing-sensitive indicators stored in the RNAO's NQuIRE database (RNAO 2012a,b). Each nursing order set is composed of evidence-based interventions and clinical decision support resources that are derived from the BPGs. The RNAO is currently collaborating with the International Council of Nurses (ICN) to map these evidence-based interventions to existing and newly defined International Classification of Nursing Practice (ICNP) codes. The codification of these interventions promotes standardization of nursing practice and will support comparative analysis of nursing data locally, nationally and internationally (RNAO 2012a,b). Healthcare organizations across the spectrum of care will derive many benefits from implementing these order sets, which are designed to be incorporated into an electronic health record, but may also be used in a paper-based or hybrid order-entry system.

To further support BPG implementation in BPSOs, the RNAO has also launched a nursing quality improvement database to foster technology-enabled indicator measurement of client and nurse outcomes. Nursing Quality Indicators for Reporting and Evaluation, or NQuIRE, is a central data repository and e-reporting system to facilitate BPSOs in their nursing quality improvement efforts by providing national and international comparative data on RNAO BPG-directed nursing care and resultant clinical outcomes. NQuIRE will systematically collect, analyze and report comparative data on nursing-sensitive indicators reflecting the structure, process and outcomes of nursing care arising from the RNAO's BPG implementation in BPSOs (RNAO 2012b). The database is designed to align with organization-based data systems at the unit level to facilitate submission of

aggregate, de-identified data and also enable international BPSOs to converge data from their own local systems with the central NQuIRE registry for the indicators of interest (Lloyd 2012). The goals are to provide timely reports to BPSOs and enable ongoing comparative evaluations of BPG implementation impact based on a core set of quality-of-care and client outcome indicators, and to facilitate knowledge exchange and sharing of national and international best practices for the RNAO's BPG implementation among BPSOs. NQuIRE will begin to link evidence-informed nursing practice based on the BPG nursing order sets with specific patient clinical/health outcomes. Such data will inform where and how nursing best practices are providing valuable benefits to patient outcomes, and organizational and health system performance. The knowledge products through NQuIRE will guide decision-makers to feasible and practical areas for nursing best practice investments, thereby facilitating evidence-based decision-making for the design and resourcing of nursing health services.

Building on Common Goals to Strengthen Nursing and Healthcare

The partners leading these three initiatives are committed to collaborate and complement one another's initiatives. The common goals of the NNQR (C), C-HOBIC and NQuIRE are accentuated through their similar methodologies and emphasis on knowledge dissemination and exchange. All three initiatives are focused on nursing-sensitive indicators and provide foundational work in the collection of standardized information reflective of nursing practice (see the Appendix on page 37 for a summary overview of indicators). They are also consistent with the movement towards demonstrated accountability by all professionals to provide evidence of positive patient care outcomes. C-HOBIC focuses on nursing-sensitive patient outcomes indicators, which include physical function including bladder continence; symptoms such as pain, fatigue, dyspnoea and nausea; patient safety indicators such as falls and pressure ulcers; and readiness for discharge. The NNQR (C) will incorporate many of the C-HOBIC indicators, as well as structure indicators such as staff mix percentages, absenteeism, clinical unit environment and nurse satisfaction. The NQuIRE will further contribute with evidence-based nursing intervention order sets derived from each RNAO BPG, and the systematic collection, analysis and reporting of evidence-based nursing-sensitive indicators that serve to support BPG implementation and outcome evaluation.

Collection of standardized indicators across the continuum of care is a priority for ensuring effective communication during transitions and for health system improvement. Another similarity of the three initiatives is that, in the initial stages, they will collect information from the majority of healthcare sectors: acute care, long-term/complex continuing care, community care and mental health settings. The long-term goal is to ensure collection of standardized indicators to improve patient outcomes in all care settings.

The challenge for the NNQR (C), in its beginning stages, is to develop a grouping of structure/process/outcome indicators with standardized definitions, and reasonable means of data collection, that can be agreed upon by all segments of the nursing profession. Such alignment of indicators and measures will be facilitated through a consensus-building approach.

The Canadian Nurses Association recognizes that a standardized approach for collecting, storing and retrieving data about nursing practice in Canada is essential to expand knowledge, evaluate the quality and impact of nursing care, promote patient safety and support integrated health human resources planning (CNA 2006). There is agreement by leaders of these initiatives that the data collected should support decisions required in the provision of patient care, staffing and resource allocation, as well as nursing's overall contribution to healthcare. In addition, the data should be captured using standardized methods across care settings and jurisdictional boundaries to make the information useful to clinicians, administrators, researchers and decision-makers at all levels. Finally, there is agreement that the data should provide aggregated outcomes information that can be applied on a regional and systemwide basis to advance nursing practice.

Conclusion

The representatives of these three initiatives recognize that the use of evidence-based, meaningful quality indicators, in all care settings, is critical as our provinces and territories focus on high-quality performance and patient safety – essential components of accountability for a sustainable healthcare system. Above all, the aim is to contribute to the health outcomes for all Canadians through use of best evidence and its impact on patient, organizational and systemic outcomes.

The availability of standardized nursing data will facilitate comparison of outcomes within and across healthcare facilities on the use of evidence-based clinical practices, and will serve to identify additional promising clinical and work environment practices to optimize the delivery of nursing care, as well as patient, organizational and systemic outcomes. These three initiatives will also serve to provide effective input to needs-based healthcare planning across Canada. Equipped with the right information, nurses can better demonstrate their value, advocate for the impact their profession has on the entire system, and focus their efforts on those factors that have the greatest effect on healthcare outcomes, confirming that nurses make a difference.

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Appendix: Summary Table of Indicators

Indicator	NNQR (C)	HOBIC/C-HOBIC	NQuIRE
Worked hours per patient day	✓		✓
Proportion of RNs, RPNs/LPNs, Reg. Psych. Nurses to total nursing staff	✓		✓
RN-to-patient ratio			✓
Absenteeism	✓		✓
Nursing turnover	✓		✓
Model of nursing care delivery			✓
Education of nurses			✓
Fall risk assessment	✓		✓
Falls prevention			✓
Pressure ulcer risk assessment	✓		✓
Hand hygiene practice	✓		
Restraint use	✓		✓
Medication reconciliation	✓		
Pain	✓		✓
Functional status	✓	✓	✓
Therapeutic self-care	✓	✓	✓
Self-Care Index (SCI)	✓		
Aggressive behaviour	✓		✓
Falls rate	✓	✓	✓
Falls causing injury	✓		✓
Pressure ulcers	✓	✓	✓
Bladder continence		✓	✓
Fatigue		✓	✓
Dyspnoea		✓	✓
Nausea		✓	
Additional process and outcome indicators for all clinical BPGs of RNAO available; for details, contact RNAO			✓