



## **Toward A National Report Card in Nursing: A Knowledge Synthesis**

**Prepared for the Planning Committee for a Think Tank entitled  
“Toward a National Report Card for Nursing”**

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## **Executive Summary**

This knowledge synthesis has been compiled on behalf of the planning committee for a Think Tank entitled “Toward a National Report Card for Nursing.” The objectives of the Think Tank are to create a shared vision and critical path for a national report card on nursing, to generate support for the work, and to outline the steps to achieve the national report card. The report card for nursing is envisioned as a selected minimum set of data on input, process and output indicators that can be collected nationally (initially using pilot sites) and benchmarked. In the future, such report card data will be used to formulate relationships between the levels of indicators, and will consequently reveal the contribution of nursing care to nursing sensitive outcomes and influence policy direction for nursing.

This knowledge synthesis identifies what is known about outcomes/performance monitoring initiatives in nursing, including specific indicators and reporting systems and what is known about the development, implementation and utilization of nursing report cards. This information supports the Think Tank objectives by providing participants with current and relevant knowledge to enable and advance their dialogue and decision-making related to a national report card for nursing.

The utilization of data in order to identify nursing’s contribution to quality care and to conduct research into patient outcomes dates back to Florence Nightingale. However, it was not until the late 1970s that efforts to systematically collect data to assess outcomes gained widespread attention. At that time concerns about quality of care prompted the development of datasets such as the “Universal Minimum Health Data Set” and the “Uniform Hospital Discharge Data Set,” now known as the “DAD” (Discharge Abstract Database). These datasets facilitated consistency in data collection amongst health care organizations by prescribing the data elements to be gathered. The aggregated data then informed the assessment of quality of care in hospitals and provided information on patients discharged from hospitals. However, these datasets did not include specific information about nursing care delivered to patients in the hospital, thereby rendering nurses’ contribution to patient, organizational and system outcomes invisible. To address that information gap, initiatives were undertaken in Canada and around the world to develop nursing minimum data sets (NMDS). These initiatives included Canada’s development of the Health Information: Nursing Components (HI:NC) system.

Building on experience with the various NMDS, nursing outcome databases were created to house clinical outcomes found to be sensitive to nursing care. Nursing sensitive outcomes were first identified for patient safety outcomes such as mortality, adverse events and complications during hospitalization. However, over time indicators reflective of improved client outcomes were identified including patients’ engagement in health care, their functional status and social and mental well-being. Initiatives to develop nursing sensitive outcomes, indicators and databases include the Health Outcomes for Better Information and Care project in Ontario (HOBIC); Canada-HOBIC (involving Saskatchewan and Manitoba); the National Database of Nursing Quality Indicators (NDNQI); the Collaborative Alliance for Nursing Outcomes California (CALNOC); the Military Nursing Outcomes Database (MilNOD); and the Veterans Affairs Nursing Outcomes Database (VANOD). These initiatives generate evidence in the form of data by which to identify a relationship between nursing care and outcomes for patients, clients and residents. Report cards were developed as a mechanism to share the results. In 2001 a

team of experienced nurse researchers in Ontario developed a nursing report which was the first step in the development of a balanced scorecard for nursing services. It provided recommendations and supporting evidence for the inclusion of nursing data in each of the four quadrants of the balanced scorecard (system integration and change; clinical utilization and outcomes; patient satisfaction; and financial performance and condition). The indicators were selected based on outcomes of care and included those experienced by the patient, nurses, informal caregivers (e.g. family and friends) and hospital. As the availability of outcomes data has increased over time, it has been used to improve the quality of care and for research examining the relationship between nursing inputs and outcomes.

Canada has many advantages that other countries do not have because of our national data sets housed at the Canadian Institute of Health Information, including the DAD, the Management Information System (MIS) and the Resident Assessment Instrument (RAI) suite of instruments. A nursing minimum data set could be linked to data within those datasets which contain the types of information about patients and facilities that are essential for risk adjustment.

The majority of NMDS focus on a core set of patient safety outcomes, such as pressure ulcers, falls, and nosocomial infections. HOBIC and C-HOBIC have taken a broader perspective to include outcomes such as functional status, symptoms, and therapeutic self-care. Several NMDS have also included a work environment survey which enables an examination of the impact of work environment change on nurse and patient outcomes. Collectively, these data elements are generally categorized according to Donabedian's well recognized "structure, process and outcome framework." Accordingly, selection of nursing sensitive outcomes for a Canadian nursing report card should encompass data from each of the three categories and should include both quality and safety indicators. Selection of report card data needs to be guided by appropriate research methods. Additionally three primary questions to guide indicator selection have been identified: 1) is the indicator meaningful, 2) feasible, and 3) actionable?

As Think Tank participants identify the next steps in advancing NMDS work in Canada the findings of this knowledge synthesis support the recommendation that the following questions be considered: 1) What data elements would constitute the minimum data set? 2) How can the data be captured in valid and reliable ways? 3) How can such data be linked to other data sets that contain information about patient and hospital characteristics? 4) How can data on nursing interventions be collected? And finally, 5) How can these data be analyzed and repackaged, not only to enable quality improvement and support for patient care decisions organization-wide, but also for application at the unit level by unit/service managers, front line nurses and other care providers at the point of service? It is also recommended that data related to nursing work environment be collected as part of the core dataset.

This knowledge synthesis provides evidence of a solid foundation of knowledge and achievements in the field of nursing outcomes measurement and reporting. The existence of reliable and valid nursing sensitive indicators and outcomes has been identified for both safety and quality outcomes for patients. Moreover, the feasibility of collecting and reporting such data has been affirmed. Data gathered in a national nursing report card could inform dialogue and planning regarding current nursing issues in Canada. The Think Tank represents a welcome and strategic opportunity to advance efforts to realize a national nursing report card.

## **Introduction**

With financial support from Health Canada, The Academy of Canadian Executive Nurses (ACEN), the Canadian Nurses Association (CNA), and Canada Health Infoway (CHI) are partnering together to host a collaborative forum of nurse leaders. This event will bring together approximately 50 nurse leaders in health services delivery from each region of the country, as well as thought leaders from other key sectors: research, education, professional associations, informatics, regulatory bodies, and federal/provincial/territorial nurse advisers.

The objectives of this joint collaborative forum are for nurse leaders to create a shared vision and critical path for a national report card on nursing, to generate support for the work amongst the nursing leadership community, and to outline the concrete steps to achieve it through collaboration with other national and quality system initiatives for health information in Canada. The report card for nursing is envisioned as a selected minimum set of data on input, process and output indicators that can be collected nationally (initially using pilot sites) and benchmarked. In the future, such a report card will be used to formulate relationships between the levels of indicators, and to use the resulting information to influence policy directions for nursing and its contribution to both nursing sensitive-clinical outcomes and quality indicators.

This synthesis was commissioned by the planning committee to summarize the state of the science in the measurement of nursing sensitive outcomes and the utilization of nursing report cards, so that the Think Tank participants can be informed of the work that is underway, and can build on that work to create a nursing report card for Canada.

## **Purpose of this Knowledge Synthesis**

The purpose of this knowledge synthesis is to describe key national and international initiatives related to the measurement of nursing sensitive outcomes and national nursing report cards. Five specific objectives have guided the development of this synthesis:

1. Generate evidence through a review of a convenience sample of published and grey literature about outcomes/ performance monitoring initiatives in nursing;
2. Identify the types of nurse sensitive indicators being measured through national reporting systems, including structure, process, and outcome indicators;
3. Describe the different uses of the nursing report cards/measurement systems at the unit, organizational, and health system levels;
4. Identify the key contact personnel for each national/international nursing report card initiative.
5. Identify the limitations and recommendations for a National Report Card in Nursing in Canada suggested by the synthesis results.

## **Methodology**

The review and synthesis information from all sources was guided by the following research questions:

1. What is known about outcomes/performance monitoring initiatives in nursing, including specific indicators and reporting systems?
2. What is known about the development, implementation and utilization of nursing report cards?

Data for the synthesis were collected through the following mechanisms:

- Review and content extraction from the textbook: “*Nursing Outcomes: State of the Science*” (Doran, 2011). NB: References cited in the textbook were accessed and reviewed for this paper unless otherwise indicated by noting “author, cited in.”
- Retrieval of key literature as suggested by experts in outcomes research
- Retrieval of additional references listed in key articles
- A search of relevant websites and review of related materials
- Information exchange with key informants knowledgeable about outcomes and report cards (e.g. associations, researchers, administrators)

### **Origins of Outcomes/Performance Monitoring**

Florence Nightingale has been credited as being the first to collect data in order to identify nursing’s contribution to quality care and to conduct research into patient outcomes (Dossey, 2000; Maas, Johnson and Moorhead, 1996; Magnello, 2010; Montalvo, 2007). However, efforts to systematically collect data to assess outcomes in more modern times did not gain widespread attention in the U.S. until the late 1970s. At that time 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, Sales, Doran, Mallette and White, 2011). These datasets facilitated consistency in data collection amongst health care organizations by prescribing the data elements to be gathered. The aggregated data were then used to inform the assessment of quality of care in hospitals and provide information on patients discharged from hospitals.

Over time other countries developed similar datasets. In Canada “Standards for Management Information Systems” (MIS) were developed in the 1980s. Upon the establishment of the Canadian Institute for Health Information (CIHI) in 1994, the MIS became a set of national standards used to collect and report financial and statistical data from health service organizations’ daily operations (Canadian Institute for Health Information, 2011). Simultaneously, CIHI implemented a national Discharge Abstract Database (DAD) which has become a key information resource. However, these datasets did not include information about nursing care delivered to patients in the hospital (Kleib et al., 2011). Without this information, the contribution of nursing care to patient, organizational and system outcomes for patients of nurses was rendered invisible. To address this key gap in information, the development of nursing minimum data sets began in Canada and many other countries around the world.

### **Overview of Nursing Minimum Data Sets**

The definition of Nursing Minimum Data Set (NMDS) most often cited in the literature is:

*“a minimum set of items of information with uniform definitions and categories concerning the specific dimension of nursing which meets the information needs of multiple data users in the health care system”* (Werley, Devine, Zorn, Ryan and Westra, 1991, p. 422).

As its name suggests, the goal in developing a NMDS is to include the fewest number of data elements/items possible (i.e. the minimum number) by which to adequately capture the nursing contribution to patient care (Butler et al., 2006). Items are kept to a minimum in order to maximize the feasibility and cost effectiveness of gathering the data. A NMDS may be created and used to:

1. Ensure the availability, accessibility and retrievability of standardized nursing data (Canadian Nurses Association, 2000).
2. Enable comparison of nursing data amongst patient populations, settings, geography and time (Butler et al., 2006).
3. Describe nursing care; identifying or projecting trends related to nursing care and resources (MacNeela et al., 2006).
4. Promote nursing research (Werley et al., 1991).
5. Provide data to “facilitate and influence clinical, administrative and health policy decision-making” (Kleib et al., 2011, p. 489), including evaluating the appropriateness of nursing care (Butler et al., 2006).
6. Differentiate nursing care from that of other health care professionals and thus making it visible (Butler et al., 2006; MacNeela et al., 2006).

As described by Kleib et al. (2011), the development of an NMDS encompasses the following four stages:

1. Data Collection. This stage includes identifying the data elements (variables), language and coding scheme, deciding on the frequency of data collection, defining the sample size and design, determining the format of data collection (paper, electronic, etc.) and developing the data collection processes.
2. Converting Data to Information. This stage involves establishing data validity and reliability and designing a database for data storage and analysis.
3. Applying the Data: Employing the data for decision-making and other applications such as quality evaluation.
4. Focused Application: Using the data to examine, inform or address a specific problem.

### **The Development of Nursing Minimum Data Sets**

Many countries throughout the world have developed nursing minimum data sets in recent decades. In Canada, increasing recognition of the need for nursing data prompted the Canadian Nurses Association to convene the first Nursing Minimum Data Set Conference in the early 1990s in order to promote the entry, accessibility and retrievability of nursing data (Haines, 1993; CNA, 2000). The resulting NMDS was named the “Health Information: Nursing Components” (HI:NC) dataset. The consensus at the Canadian MDS conference was that, unlike the United States, the data in Canada were gathered by consent rather than legislation. Many of the data elements in the U.S. NMDS were already being gathered by Canada’s Management Information System (MIS) Group (which was subsequently merged into the Canadian Health Information Institute). The following data elements were endorsed by the Canadian NMDS conference:

- Eight patient demographic items (already being gathered by MIS)
- Medical care items, such as medical diagnosis, procedures, and whether the patient is alive at the time of classification (already being gathered by MIS)
- Service elements, such as provincial/institutional chart number, doctor identifier, nurse identifier, and principle nurse provider
- Episode items, such as admission date and hour, discharge date and hour and length of stay
- Other related data such as the institution, main point of service and payer

As noted by CNA (1993; 2000), the Canadian NMDS Conference recommended the addition of the five HI:NC elements to the discharge data already being gathered, specifically:

- Nursing care elements (client status; nursing interventions; client outcome)
- Principle nurse provider (using nurse identifier), and
- Nursing intensity

Nursing leaders lobbied long and hard for the addition of these 5 elements to the CIHI DAD. Unfortunately, there was no nursing consensus on the nursing terminology standard for coding the five HI:NC data elements. Subsequently, such coding has become available for client status, nursing interventions and client outcomes through the CNA endorsement of ICNP® and the development of standardized terminology through C-HOBIC based on the HOBIC work. Some nursing workload data are available using the MIS standards gathered at CIHI. Establishment of a national nurse identifier is still outstanding. Capture and linkage of the nursing care client status and client outcomes elements with the nursing workload data has recently begun in Ontario (personal communication, K. Hannah, Feb. 1, 2011).

The progressive development of Resident Assessment Instruments is another initiative associated with minimum data sets. Resident Assessment Instrument (RAI) tools have now been developed for long term care, home care, acute care, mental health and post acute care. These instruments are utilized by health care personnel to assess functional status indicators including activities of daily living, instrumental activities of daily living and cognitive performance for patients, clients and residents. The functional status subscale of the MDS was found to be sensitive to nursing variables in two studies (Doran, 2011a). The RAI-Home Care is a key component of CIHI's "Home Care Reporting System" which captures client specific and utilization data from organizations that provide home care services.

### **NMDS Development in Other Countries**

Thailand initiated development of an NMDS in 1998 in order to ensure that nursing data were captured as part of a national health information system being designed and introduced (Volrathongchai, Delaney and Phuphaibul, 2003). In Ireland, concern about the invisibility of nursing prompted efforts to create a NMDS as a strategy to: "capture the essence of nursing... [and to support] future developments in education, informatics and management decision-making" (Butler et al., 2006, p. 366). Responding in part to the inability to compare nursing information amongst different units and hospitals, the Netherlands initiated the development of a NMDS in 1994 (Goossen et al., 2000). Belgium adopted a unique approach to data collection for its NMDS (B-NMDS) by focusing on tracking variation in practice patterns (nursing interventions) rather than changes in single data elements such as length of stay (Kleib et al., 2011). The B-NMDS was implemented in 1988, making it one of the earliest NMDSs and it is described in more detail later in this paper. NMDS initiatives have also been implemented in Finland, Brazil, Iceland and Switzerland (Kleib et al., 2011).

### **Nursing Minimum Data Sets and Classification Systems**

Nursing classification systems, standardized nursing languages or vocabularies contributed to NMDS development. Currently referred to as standardized clinical terminologies, their development and use became increasingly important as the introduction of electronic documentation and electronic health records into the health care system advanced (Rutherford,

2008). Standardized nursing terminologies enable the data elements in an NMDS to be systematically organized and cross-mapped to other nursing or health clinical terminologies. Accordingly, they facilitate accurate communication regarding nursing care as well as measurement and coding (Rutherford, 2008), and comparison of nursing information across practice settings, sectors and jurisdictions (Canadian Nurses Association, 2000; 2006). As computerization and informatics evolved, a variety of classification systems were developed in North America and around the world. Examples include the North American Nursing Diagnosis Association (NANDA), the Nursing Interventions Classification (NIC) and the Nursing Outcomes Classification (NOC). These established classification systems informed the development of new nursing minimum data sets by providing a language for classifying the concepts/phenomena of interest. For example, the Perioperative Nursing Data Set based its classification system on the NANDA taxonomy (Kleib et al., 2011). Classification systems for community based nursing were also developed and examples are now shared.

The OMAHA classification system was developed in 1975 by the Visiting Nurse Association of Omaha, Nebraska (U.S.A.). Initially developed for home care practice, it is now in use in settings across the continuum of care (Martin and Scheet, 1992; Omaha System, 2011). The American Nurses Association recognizes the OMAHA standardized language to support nursing practice, and it can be mapped to the ICNP (Omaha System, 2011). The Omaha system is comprised of three components: problem classification scheme; problem rating scale for outcomes and the intervention scheme (Martin and Scheet, 1992). The Outcome and Assessment Information Set (OASIS) was also developed specifically for the home health care sector. It is a data set that enables the standardized collection of outcomes data to facilitate quality improvement (Waggoner, 1999; Schneider, Barkauskas and Keenan, 2008; Shaughnessy et al., 2002). Originally developed for home care, the Home Health Clinical Classification system has since expanded to be applicable to all settings and is now known as the Clinical Care Classification (American Nurses Association, 2006).

Australia's Nursing Minimum Data Set (NMDSA) is used exclusively in community care settings (Goossen et al., 1998) and was designed to map to Australia's Home and Community Care (HACC) minimum data set (Ryan, Holmes and Gibson, 1999, p. 66). Data elements in the NMDSA include nursing diagnosis, nursing interventions, date of first visit and discharge date (Goossen et al., 1998). These items cross map to the HACC which includes data elements such as area of residence, living arrangements, care giver availability and type, source of referral, total nursing care received at home and total case management received (Ryan, Holmes and Gibson, 1999). Nursing data sets have also been developed for other community settings—for example Fahrenkrug (2003) described the creation of a data set for school nursing.

### **International Classification of Nursing Practice**

Recognizing the need for an over-arching classification system, the International Classification of Nursing Practice® (ICNP®) was developed under the auspices of the International Council of Nursing. The ICNP® enables organizations to use their preferred classification systems without interruption, while still achieving the benefits of broader data comparison and utilization through the cross-mapping of data to the ICNP that is recognized as the internationally acknowledged reference terminology for nursing. The Canadian Nurses Association endorsed the ICNP® as the

foundational classification system for nursing practice data in Canada (Canadian Nurses Association, 2006) as did many countries around the world.

### **From Nursing Minimum Data Sets to Nursing Outcome Databases**

Building on experience in developing, gathering and using NMDS data, nursing outcome databases began to be created. These databases generally house clinical outcomes found to be sensitive to nursing care (Doran and Pringle, 2011; Kleib et al., 2011). The measurement of outcomes has gained in importance as health care organizations focus on the areas of cost and quality, effectiveness of care and organizational performance. All practitioners in the health field are being challenged to find ways to demonstrate that the care they provide leads to improved outcomes for their patients, clients and residents (Doran, 2011; Pringle and White, 2002). Accordingly, initiatives to develop nursing sensitive outcomes and indicators have been undertaken around the globe.

### **History and Evolution of Nursing Sensitive Outcomes**

Interest and attention to nursing sensitive outcomes have steadily increased since groundbreaking work in the mid 1990s by the American Academy of Nursing's Expert Panel on Quality Health Care (Doran and Pringle, 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, p. vii). Nursing sensitive *indicators* are the data elements that are collected and analyzed to identify nursing sensitive outcomes. Reflecting Donabedian's organizing framework for factors that influence patient care quality, nursing sensitive indicators are identified from 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, as well as RN job satisfaction; and nursing sensitive patient outcomes are those that improve if more nursing care, or higher quality nursing care is provided (National Database of Nursing Quality Indicators, 2010).

The identification of specific nursing sensitive indicators was assisted by the development and testing of conceptual models such as the Quality Health Outcomes Model (Mitchell, 2001, cited in Doran and Pringle, 2011) and the Nursing Role Effectiveness Model (Irvine, Sidani and McGillis Hall, 1998). Additionally, a Delphi survey of international experts in the field of nurse staffing and patient outcomes achieved consensus amongst 85% of participants on 32 patient outcomes (Van den Heede, Clarke, Sermeus, Vleugels, and Aiken, 2007). However, as noted by Doran and Pringle (2011), the designation of outcomes as being nursing sensitive also depends on primary research. Such research is influenced by several factors, including theoretical explanations to link nursing inputs and processes to outcomes; access to and recruitment of large patient samples and the availability and use of measurement tools/instruments that have demonstrated reliability and validity.

Initial efforts to examine nursing sensitive outcomes focused on patient safety outcomes such as mortality, adverse events and complications during hospitalization (Doran and Pringle, 2011). However, over time there has been a broadening in perspective about relevant nursing sensitive outcomes for measurement. The Kaiser Permanente Medical Care Program, Northern California

Region was one of the first organizations to develop and measure positive patient outcomes such as patients' engagement in health care, their functional status and social and mental well-being (Doran and Pringle, 2011). Kaiser's initiative was very successful and in 1996 they joined the Collaborative Alliance for Nursing Outcomes, described later in this paper. Measurement of positive client outcomes related to nursing care were included in other key initiatives, for example, the Nursing Staff Mix Outcomes Study conducted in all 17 teaching hospitals in Ontario, Canada included outcomes for patient well being and satisfaction (McGillis Hall, 2003). Since those early beginnings, many initiatives related to nursing sensitive indicators and outcomes have been reported, or are underway and several are now described.

## **Nursing Sensitive Indicators and Related Initiatives**

### **Health Outcomes for Better Information and Care (HOBIC) Program**

*Website:* [http://www.health.gov.on.ca/english/providers/project/hobic/hobic\\_mn.html](http://www.health.gov.on.ca/english/providers/project/hobic/hobic_mn.html)

*Background/Description:* The HOBIC program is based in Ontario, Canada. 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. Thereafter the feasibility of collecting the nursing sensitive patient outcomes in hospital, home care, long term care and continuing complex care was tested and demonstrated (Health Outcomes for Better Information and Care, 2009). To date collection of the outcomes has been successfully implemented in over 187 institutions across four health sectors: acute care and complex continuing care (62), home care (4), and long-term care (121) (Personal communication, P. White, January 28<sup>th</sup>, 2011).

*Methodology:* HOBIC involves the collection of outcomes data by nurses at the time patients are admitted to health care services and at discharge, using standardized reliable and valid measurement tools. Staff nurses are coached on how to collect the outcomes data using the standardized tools and in how to record their assessments as part of routine documentation.

*Nurse Sensitive Indicators:* HOBIC consists of a set of generic outcomes relevant for adult populations in acute care, home care, long-term care, and complex continuing care settings. The HOBIC outcomes (see Table 1) include:

1. Functional status
2. Symptoms (pain, nausea, dyspnea, fatigue)
3. Safety (pressure ulcers, falls)
4. Therapeutic self-care

*Uses/Benefit:* HOBIC information is abstracted into a database which provides nurse executives with outcome reports that can be linked to staffing and financial information and used to examine the quality of care for their organizations and examine the effectiveness of Best Practice Guidelines. The aggregate information is abstracted into a central repository which provides the capacity for decision support, health care planning, and research. Nurses can access their patients' HOBIC outcome scores throughout the time they are receiving care, compare their patients' scores with others of similar age, gender and diagnosis, determine when they are

achieving their best outcomes and know when they are sufficiently prepared to care for themselves after discharge (Hannah, White, Nagle and Pringle, 2009; Kleib et al., 2011; White, Pringle, Doran and Hall, 2005).

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### **Canadian Health Outcomes for Better Information and Care—C-HOBIC**

*Website:* [http://www.cna-aiic.ca/c-hobic/about/default\\_e.aspx](http://www.cna-aiic.ca/c-hobic/about/default_e.aspx)

#### *Background/Description:*

The C-HOBIC project implemented the collection of standardized patient outcome data related to nursing care in Saskatchewan and Manitoba. C-HOBIC builds on the Ontario HOBIC (Health Outcomes for Better Information and Care) program described above. It is implemented in Manitoba in long-term and home care and in Saskatchewan in long-term care. The objectives of the C-HOBIC project were to:

- Standardize the language concepts used by HOBIC to the International Classification for Nursing Practice (ICNP);
- Capture patient outcome data related to nursing care across four sectors of the health system: acute care, complex continuing care, long-term care and home care; and
- Store the captured and standardized data in relevant, secure jurisdictional data repositories or databases in preparation for entry into provincial EHRs.

*Methodology:* C-HOBIC used the methodology developed in Ontario through the Nursing and Health Outcomes Project and the HOBIC program to implement the collection of outcome data in Saskatchewan and Manitoba. The outcomes have a concept definition, a valid and reliable measure, and empirical evidence linking them to nursing inputs or interventions. They are:

1. Functional status
2. Therapeutic self-care (readiness for discharge)
3. Symptom management (pain, nausea, fatigue, dyspnea)
4. Safety (falls, pressure ulcers)
5. Patient satisfaction with nursing care

*Uses/Benefits:* In addition to providing real-time information to nurses about how patients are benefiting from care, the collection of nursing-related outcomes can provide valuable information to administrators in understanding their organization's performance related to outcomes including how well they are preparing patients for discharge. Furthermore, at an aggregate level, this information is useful to researchers and policy-makers in examining how well the system is performing in meeting the health-care needs of people. The project mapped the HOBIC concepts to the standardized clinical terminology, ICNP® and produced the C-HOBIC/ICNP® Catalogue for use by vendors and facilities in implementing electronic health records (EHRs). Work is now underway to map the C-HOBIC/ICNP® Catalogue to SNOMED—CT (Systematized Nomenclature of Human and Veterinary Medicine—Clinical Terminology) which is Canada Health Infoway's standardized clinical terminology of choice for the EHR in Canada.

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### **The National Database of Nursing Quality Indicators (NDNQI)**

*Website:* <https://www.nursingquality.org/Default.aspx>

*Background/Description:* One of the earliest outcomes databases and the first national one in the U.S., the NDNQI database was established in 1996 by the American Nurses Association. It is a voluntary national nursing quality measurement program in which structure, process and outcome indicator data are collected at the nursing unit level for the purpose of evaluating nursing care. Currently, NDNQI has over 1,500 participating organizations, each of which remits an annual fee. Participation in NDNQI meets requirements for the Magnet Recognition Program and 20% of database members participate for that reason. The remaining 80% of participants participate voluntarily to inform their efforts to evaluate and improve nursing care quality and outcomes (Montalvo, 2007).

*Methodology:* Detailed guidelines for data collection including definitions and decision guides are provided by NDNQI (NDNQI, 2010). Data are submitted electronically via the web. Statistical methods such as the hierarchical mixed model are used to examine the correlation between the nursing workforce characteristics and outcomes (Montalvo, 2007). Quarterly and annual reports of structure, process and outcome indicators are available six weeks after the close of the reporting period. They are downloaded in Adobe Acrobat or Microsoft Excel files by participants. The database is housed at the Midwest Research Institute (MRI) at Kansas City, Missouri and is managed by MRI in partnership with the University of Kansas School of Nursing (Alexander, 2007).

#### *Nurse Sensitive Indicators:*

1. Nursing hours per patient day (RN hours per patient day; Licensed Practical Nurse and Licensed Vocational Nurse hours per patient day; Unlicensed Assistive Personnel hours per patient day)
2. Nursing turnover
3. Nosocomial infections
4. Patient falls
5. Patient falls with injury (and level of injury)
6. Pressure ulcer rate (community-acquired; hospital-acquired; unit-acquired)
7. Ventilator Associated Pneumonia
8. Pediatric pain assessment, intervention, reassessment (AIR) cycle
9. Pediatric peripheral intravenous infiltration
10. Psychiatric physical/sexual assault
11. RN education/certification
12. RN survey: Job satisfaction; Practice Environment Scale
13. Restraints
14. Staff mix (RN; Licensed Practical Nurse/ Licensed Vocational Nurse/ Unlicensed Assistive Personnel)

15. Percent agency staff
16. Other Data Elements Collected
17. Patient population (adult or pediatric)
18. Hospital category (e.g. teaching, nonteaching, etc.)
19. Type of unit (critical care; step-down; medical, surgical, combined medical-surgical; rehabilitation, psychiatric)
20. Number of staffed beds designated by the hospital

*Uses/Benefits:* The data inform efforts to improve the safety and quality of patient care. Data may be trended over several quarters to examine progress and establish organizational goals. Comparison reports are benchmarked to state, national and regional results.

*Key Personnel:* Nancy Dunton, PhD, Research Professor, Principal Investigator, [ndunton@kumc.edu](mailto:ndunton@kumc.edu); Diane Boyle, PhD, RN; Associate Professor, Co-Principal Investigator, <mailto:dboyle@kumc.edu>

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### **The Collaborative Alliance for Nursing Outcomes California Database Project (CALNOC)**

*Website:* [www.calnoc.org](http://www.calnoc.org)

*Background/Description:* Originally launched in 1996 as the California Nursing Outcomes Coalition (CalNOC), a statewide nursing quality report card pilot project funded by the American Nurses Association, CalNOC was a joint venture of the American Nurses Association\California and the Association of California Nurse Leaders. Membership is voluntary and is comprised of approximately 300 hospitals from the U.S., with pilot work in Sweden, England, and Australia. As its membership grew nationally, CalNOC was renamed the Collaborative Alliance for Nursing Outcomes (CALNOC). A not-for-profit corporation, member hospitals pay a size-based annual data management fee to participate and access CALNOC industry leading web-based benchmarking reporting system.

*Methodology:* Hospital-generated unit-level acute nurse staffing and workforce characteristics and processes of care data as well as key National Quality Forum endorsed nursing sensitive outcomes measures are submitted electronically via the web. In addition, the CALNOC database includes unique measures such as its Medication Administration Accuracy metric. CALNOC data are stratified by unit type and hospital characteristics and reports can be aggregated to division, hospital and system/group/geographic levels. Unit types currently included in the CALNOC dataset include adult critical care, step down and medical/surgical units; Adult post acute and rehabilitation units; pediatric critical care, step-down and medical/surgical units. CALNOC methodology informed creation of the MilNOD and VANOD databases which are described later in this paper. The following list of nurse sensitive indicators has been extracted from Kleib et al., 2011 and CALNOC, 2010).

*Nurse Sensitive Indicators***Structure Indicators:**

1. Hours per patient day (RN; LPN; UAP)
2. Skill mix
3. Nurse/patient ratios
4. Percent Contracted staff utilization (hours)
5. Staff voluntary turnover rate
6. Workload intensity (admissions, discharges, transfers)
7. Sitter hours as percent of total care hours
8. RN Characteristics (Education; Certification; Years of Experience)

**Process Indicators**

1. Risk Assessment for pressure ulcers (Braden Scale)
2. Time since last risk assessment
3. Risk score (pressure ulcers)
4. Risk status (pressure ulcers; falls)
5. Prevention protocols in place (pressure ulcers; falls)
6. Medication Administration accuracy—observed prevalence of 6 key safe practices
7. Peripherally Inserted Central Catheter (PICC) Line Insertion Practices (who inserted, where, presence of a dedicated team)
8. Restraint Use: type and clinical justification

**Outcome Measures**

9. Community acquired pressure ulcer prevalence
10. Hospital acquired pressure ulcer prevalence stage 1-4
11. Patient fall rate per 1000 patient days and consequences (injury fall rate)
12. Restraint prevalence
13. Central Line Associated Blood Stream Infections (CABSI) in PICC lines
14. Medication administration error rates

*Uses/Benefits:* CALNOC quarterly reports are used for performance trend analysis, variation analysis and assessment of staffing effectiveness. Data provided guide administrative and clinical decision-making, strategic performance improvement and public policy. The CALNOC database is also used for research purposes. For example, CALNOC investigators were the first to examine the impact of mandated staffing ratios on outcomes in California (Donaldson et al., 2005; Bolton et al., 2007) and CALNOC investigators recently examined the impact of selected medical-surgical acute care nurse characteristics and practices on patient outcomes including falls, pressure ulcers, and medication administration accuracy (Donaldson and Aydin, 2010). CALNOC member hospitals effectively use their CALNOC data in Magnet application documentation. For a minimal service fee, hospitals that concurrently participate in the NDNQI may elect to have CALNOC upload their data directly to the NDNQI.

*Key Personnel:* Nancy Donaldson, Co-Principal Investigator, University of California, San Francisco, [nancy.donaldson@nursing.ucsf.edu](mailto:nancy.donaldson@nursing.ucsf.edu)

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## **The Military Nursing Outcomes Database (MilNOD)**

*Background/Description:* The MilNOD project began in 1997 with a pilot study in a single Army hospital. Through 3 successive phases, a total of 13 military hospitals ultimately joined the database which was modeled on the CalNOC measures and methods. Nurse staffing and patient outcome data were collected from all medical and surgical, step-down and critical care units of participating facilities (Patrician, Loan, McCarthy, Brosch, and Davey, 2010). MilNOD is currently inactive because its research funding has ended.

*Methodology:* Staffing data were collected prospectively each shift. This prospective data collection differentiated MilNOD from CalNOC, which collects aggregated retrospective staffing data. The reliability of staffing data elements entered into the database was found to be extremely high (82 to 99%) and inter-rater reliability was also monitored and data scoring below the threshold of .80 were not reported (Patrician et al., 2010). Other indicator data were collected at the shift, unit and hospital levels. Instruments used included the Morse Falls Assessment Scale and the Braden Scale to predict pressure ulcers (Loan, Patrician, and McCarthy, 2011).

*Nurse Sensitive Indicators:*

### ***Structural Indicators***

1. Nursing care hours
2. Nursing staff mix
3. Staff category
4. Nursing staff education and experience

### ***Outcome Indicators***

#### ***Patient outcomes***

1. Pressure ulcer prevalence
2. Restraint use prevalence
3. Patient falls
4. Medication administration errors
5. Patient satisfaction with care
6. Patient satisfaction with planning for needs after discharge
7. Patient satisfaction with pain management
8. Patient satisfaction with education
9. Nursing outcomes
10. Nursing job satisfaction
11. Nursing needle-stick injuries

### ***Contextual Indicators***

1. Nursing work environment

### ***Explanatory Indicators***

1. Patient turnover
2. Patient acuity

*Uses/Benefits:* MilNOD data are used for decision making and to compare performance to other hospitals within the military system and external to it. Data also enable the evaluation of staffing effectiveness and patient safety (Patrician et al., 2010).

*Key Personnel:* Patricia Patrician, University of Alabama at Birmingham, School of Nursing, [ppatrici@uab.edu](mailto:ppatrici@uab.edu)

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### **The Veterans Affairs Nursing Outcome Database (VANOD)**

*Website:* No public website. Information available on website of Veterans Affairs Office of Nursing Services: <http://www.va.gov/nursing/> and at <http://www.inqri.org/uploads/INQRIVANODPanel41309FINAL.ppt>

*Background/Description:* The VANOD database project began in 2002 and was originally modeled after CalNOC, although VANOD methods have increasingly focused on extraction of data from the VA EMR as an alternative to hospital data collection efforts. An initiative of the Veterans Affairs Office of Nursing Services (ONS), VANOD is viewed as an integral part of the ONS for its utility in identifying trends and areas for nursing practice improvements and supporting the evaluation of nurse staffing and practice environments in association with patient outcomes.

*Methodology:* Data are collected at the unit and hospital-levels to facilitate evaluation of quality and enable benchmarking within and amongst Veterans Affairs facilities (Alexander, 2007). The Practice Environment Scale is used to assess RN satisfaction.

*Indicators:*

1. Nursing hours per patient day
2. Nursing hours and cost per outpatient encounter
3. Skill mix: NP, CNS, RN, LPN/LVN, UAP
4. Education and certification of RN, LPN and NAs
5. Nursing staff injuries
6. Nursing staff turnover rates
7. RN job satisfaction
8. Patient falls
9. Patient satisfaction
10. Pressure ulcer data

*Uses/Benefits:* Data are also reported as being useful for “quantifying the impact of patient care interventions; identifying successful nurse retention and recruitment strategies and health policy decision-making” (Haberfelde, Bedecarre and Buffum, 2005, cited by Kleib et al., 2011, p. 495). VANOD is also contributing to the development and introduction of a structured, standardized clinical language for use in all Veterans Affairs clinical documentation systems (Veterans Affairs Office of Nursing Services, 2009).

*Key Personnel:* Cathy Rick, Chief Nursing Officer, Veterans Affairs Office of Nursing Services, [Cathy.rick@va.gov](mailto:Cathy.rick@va.gov) ; Bonny Collins, Director, Office of Nursing Services Informatics and Veterans Affairs Outcomes Database, [bonny.collins@va.gov](mailto:bonny.collins@va.gov)

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### **The Belgium Nursing Minimum Data Set**

*Website:* No public website.

*Background/Description:* The Belgium Nursing Minimum Data Set (B-NMDS) was developed to address the absence of nursing information in the existing hospital discharge data set. From its beginnings in 1988, it has been revised in recent years and incorporates the nursing interventions classification (NIC) system (Van den Heede, Michiels, Thonon and Sermeus, 2009). Belgium has been identified as the country that has achieved the most widespread national use of NMDS data on a wide-spread basis (MacNeela et al., 2006).

*Methodology:* The participation of all Belgian hospitals is mandated by the Ministry of Health. A snapshot of data is captured for 5 days at random within the first 15 days of March, June, September and December (Van den Heede, Michiels et al., 2009). This approach to data collection makes the B-NMDS unique as data are then used to track the variability of practice patterns versus a specific performance indicator, e.g. length of stay (Kleib et al., 2011). In addition to the nursing care elements that are captured, patient demographic items and ICD-9-M codes are gathered to enable alignment of the NMDS data with the hospital discharge data set. Service data are collected including identifiers (hospital, ward), number of beds, episode of care descriptors (e.g. admission date, length of stay) and resources including the number of nursing hours available and nursing staff mix (Kleib et al., 2011).

*Indicators:* A total of 23 nursing interventions and activities of daily living are captured in the B-NMDS using prescribed response sets and these data are linked to the Belgian Hospital Discharge Dataset. The intent is to capture patient mix and intensity of service use. For example, intensity of care (i.e. service use) relating to hygiene would be coded as “No assistance; supportive assistance, partial assistance or complete assistance” (Sermeus, Delesie, Van den Heede, Diya and Lesaffre, 2008, p. 1013). The indicators are listed below.

#### *B-NMDS Indicators*

1. Care relating to hygiene
2. Care relating to mobility
3. Care relating to elimination
4. Care relating to feeding
5. Tube feeding
6. Mouth care
7. Prevention of pressure sores: changing position
8. Assistance in getting dressed
9. Care of patient with tracheotomy or endotracheal tube
10. Nursing admission assessment
11. Training in activities of daily living

12. Emotional support
13. Care of a disoriented patient
14. Isolation for preventing contamination
15. Monitoring vital signs
16. Monitoring clinical signs
17. Cast care
18. Taking blood samples
19. Medication management (Intramuscular, subcutaneous)
20. Medication management (intravenous)
21. Infusion therapy
22. Surgical wound care
23. Traumatic wound care

*Uses/Benefits:* Data from the B-NMDS are used to measure nursing care in acute hospitals and to inform decision-making related to nurse staffing and hospital financing (Sermeus et al., 2008). In more recent years it has been determined that B-NMDS data also inform examination of 10 nursing sensitive indicators (Van den Heede, Sermeus et al., 2009; Van den Heede, Lesaffre et al., 2009) as follows:

1. Pressure ulcers (safety/integrity measure)
2. Deep vein thrombosis (complication measure)
3. Shock or cardiac arrest (complication measure)
4. Postoperative respiratory failure (complication measure)
5. Urinary tract infections (postoperative complications and infections)
6. Hospital acquired pneumonia (postoperative complications and infections)
7. Ventilator-associated pneumonia (postoperative complications and infections)
8. Hospital-acquired sepsis (postoperative complications and infections)
9. In-hospital mortality, and
10. Failure to rescue

*Key Personnel:* Koen Van den Heede, Centre for Health Services and Nursing Research, Catholic University of Leuven. [koen.vandenheede@med.kuleuven.be](mailto:koen.vandenheede@med.kuleuven.be)

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### **United Kingdom Initiatives**

*Website:*

[http://www.ic.nhs.uk/webfiles/Services/Clinical%20Innovation%20Metrics/Nurse\\_Sensitive\\_Indicators\\_DH.pdf](http://www.ic.nhs.uk/webfiles/Services/Clinical%20Innovation%20Metrics/Nurse_Sensitive_Indicators_DH.pdf)

*Background/Description:* The United Kingdom (UK) recently published a national set of nurse sensitive outcome indicators for care given under the auspices of the National Health Service. These indicators (listed below) focus on quality improvement and reflect principles identified to support measurement of nursing's contribution to patient care and outcomes (Department of Health, United Kingdom, 2010; The Association of UK University Hospitals, no date).

Nurse sensitive outcomes and indicators in the specialty of ambulatory chemotherapy have also been developed in the UK (Griffiths, Richardson, and Blackwell, 2009). These indicators were

assembled by a reference group led by researchers of the National Nursing Research Unit at King's College in London, England. Membership in the reference group included experts in practice, research and quality.

*Methodology:* The development of the national set of nurse sensitive indicators was informed by previous work by CalNOC, VANOD, NDNQI and the National Forum Indicators. A detailed description of each indicator/measure has been published along with the rationale for implementing each measure and the expected outcomes.

*Indicators:*

1. Preventing Falls (number of falls in which physical injury occurs by age band per thousand bed days)
2. Pressure Ulcers (incidence of newly acquired pressure ulcers by pressure ulcer category per thousand bed days)
3. Protection from Infection (incidence of patients with an indwelling urinary catheter for less than and more than 28 days)

For the ambulatory chemotherapy nurse sensitive indicators, the evidence to support a list of proposed indicators was evaluated through scoping reviews of the literature, and consultation with clinical experts. The following 11 outcomes were ultimately endorsed for further testing of their sensitivity to nursing and feasibility of data collection:

1. Safe medication administration
2. Septicaemia
3. Experience
4. Education and communication
5. Wellbeing and function
6. Nausea and vomiting
7. Pain
8. Diarrhoea
9. Fatigue
10. Oral mucositis
11. Nutrition

*Uses/Benefits:* The data will enable comparison with outcomes nationally and will inform an understanding of the relationship between outcomes and staffing.

*Key Personnel:* Anne Marie Rafferty, Dean of the Florence Nightingale School of Nursing and Midwifery, King's College London ([audrey.dowe@kcl.ac.uk](mailto:audrey.dowe@kcl.ac.uk)). Peter Griffiths, University of Southampton School of Health Sciences, [peter.griffiths@soton.ac.uk](mailto:peter.griffiths@soton.ac.uk)

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**Table 1: Comparative Overview of Nursing Sensitive Outcome Initiatives**

Initiative	Indicators	Website & Key Contacts
<p><b>HOBIC</b> (1999) Ontario, Canada</p> <p><b>C-HOBIC</b> Manitoba Saskatchewan</p>	<ul style="list-style-type: none"> <li>• Functional Health Status</li> <li>• Therapeutic Self-Care</li> <li>• Safety                             <ul style="list-style-type: none"> <li>-Falls</li> <li>-Pressure ulcers</li> </ul> </li> </ul> <ul style="list-style-type: none"> <li>• Symptoms:                             <ul style="list-style-type: none"> <li>-Pain</li> <li>-Dyspnea</li> <li>-Fatigue</li> <li>-Nausea</li> </ul> </li> <li>• Patient satisfaction with nursing care</li> </ul>	<p><a href="http://www.health.gov.on.ca/hobic">www.health.gov.on.ca/hobic</a>.</p> <p>Peggy White, Project Manager</p> <p><a href="mailto:pwhite@hobic-outcomes.ca">pwhite@hobic-outcomes.ca</a></p>
<p><b>NDNQI</b> (1998) USA (National)</p>	<ul style="list-style-type: none"> <li>• Nursing hours/pt. day</li> <li>• Turnover</li> <li>• Nosocomial Infections</li> <li>• Pt falls</li> <li>• Pt falls with injury</li> <li>• Pressure ulcer rates</li> <li>• VAP</li> </ul> <ul style="list-style-type: none"> <li>• Pediatric pain assessment intervention &amp; reassessment</li> <li>• Pediatric peripheral IV infiltration</li> <li>• Psychiatric assault--physical/ sexual</li> <li>• RN Ed/Certification</li> <li>• RN Job satisfaction</li> <li>• RN Practice Environ.</li> <li>• Restraints</li> <li>• Staff mix</li> <li>• % agency staff</li> </ul>	<p><a href="https://www.nursingquality.org/Default.aspx">https://www.nursingquality.org/Default.aspx</a></p> <p>Nancy Dunton, Principle Investigator</p> <p><a href="mailto:ndunton@kumc.edu">ndunton@kumc.edu</a>;</p>
<p><b>CALNOC</b> (1996) USA; Europe; Australia</p> <p><b>CALNOC</b> (cont'd)</p>	<p><b>Structure</b></p> <ul style="list-style-type: none"> <li>• Nursing hours/pt. day</li> <li>• Skill mix</li> <li>• Nurse: Patient ratios</li> <li>• Contract staff use</li> <li>• Turnover</li> <li>• Workload (adm/D/Cs/, transfers)</li> <li>• Sitter use</li> <li>• RN Ed/Certif.</li> <li>• RN Exp.</li> </ul> <p><b>Process</b></p> <ul style="list-style-type: none"> <li>• Falls &amp; HAPU</li> <li>• Risk Assessment</li> <li>• Time since last risk assessment</li> <li>• Risk score (pressure ulcers)</li> <li>• Risk status (Falls &amp; HAPU)</li> <li>• Prevention protocols (Falls &amp; HAPU)</li> <li>• Medication administration-6 safe practices</li> <li>• PICC Practices</li> <li>• Restraint Use prevalence</li> </ul> <p><b>Outcome</b></p> <ul style="list-style-type: none"> <li>• Community PU prevalence</li> <li>• HAPU prevalence</li> <li>• Pt fall rate &amp; injury rate</li> <li>• Restraint prevalence</li> <li>• CABS rate in PICC lines</li> <li>• Med. Administration errors</li> </ul>	<p><a href="http://www.calnoc.org">www.calnoc.org</a></p> <p>Nancy Donaldson Co-Principal Invest.</p> <p><a href="mailto:nancy.donaldson@nursing.ucsf.edu">nancy.donaldson@nursing.ucsf.edu</a></p>

Initiative	Indicators	Website & Key Contacts
<p><b>MilNOD</b> (2001) USA: Military Hospitals</p>	<p><b>Structure</b></p> <ul style="list-style-type: none"> <li>• Nursing care hours</li> <li>• Staff mix</li> <li>• Staff category</li> <li>• Nurse Ed/Exp</li> </ul> <p><b>Outcome</b></p> <p><i>Patients</i></p> <ul style="list-style-type: none"> <li>• Pressure ulcers</li> <li>• Restraints</li> <li>• Falls</li> <li>• Med errors</li> </ul> <p><i>Nursing</i></p> <ul style="list-style-type: none"> <li>• Job satisfaction</li> <li>• Needle-stick injuries</li> </ul> <p><i>Contextual Indicators</i></p> <ul style="list-style-type: none"> <li>• Nursing work environment</li> </ul> <p><i>Explanatory Indicators</i></p> <ul style="list-style-type: none"> <li>• Patient turnover</li> <li>• Patient acuity</li> </ul> <p><i>Measurement Tools Used Include:</i></p> <ul style="list-style-type: none"> <li>• Morse Falls Assessment Scale</li> <li>• Braden Scale</li> </ul>	<p>No Longer Active</p> <p>Patricia Patrician <a href="mailto:ppatrici@uab.edu">ppatrici@uab.edu</a></p>
<p><b>VANOD</b> (2002) USA: Veterans Affairs Health Providers</p>	<ul style="list-style-type: none"> <li>• Nursing hours/pt. day</li> <li>• Nsg hrs. &amp; cost per outpatient encounter</li> <li>• Skill mix</li> <li>• RN Ed &amp; Cert</li> <li>• Nursing staff injuries</li> <li>• Nursing turnover</li> <li>• RN job satisfaction</li> <li>• Patient falls</li> <li>• Patient satisfaction</li> <li>• Pressure ulcer data</li> </ul>	<p><a href="http://www.va.gov/nursing/">http://www.va.gov/nursing/</a> Cathy Rick, CNE <a href="mailto:Cathy.rick@va.gov">Cathy.rick@va.gov</a> ; Bonny Collins, Director, VANOD <a href="mailto:bonny.collins@va.gov">bonny.collins@va.gov</a></p>
<p><b>B-NMDS</b> (1988) Belgium National (hospitals)</p>	<ul style="list-style-type: none"> <li>• Care r/t:</li> <li>-Hygiene</li> <li>-Mobility</li> <li>-Elimination</li> <li>-Feeding</li> <li>• Tube feeding</li> <li>• Mouth care</li> <li>• Pressure sore prevention</li> <li>• Assist to dress</li> <li>• Trach. Care</li> <li>• Endotrachael tube care</li> <li>• Nsg Admission</li> <li>• ADL Training</li> <li>• Emotional support</li> <li>• Care of disoriented patient</li> <li>• Isolation care</li> <li>• Monitor V/S</li> <li>• Monitor clinical signs</li> <li>• Cast care</li> <li>• Blood samples</li> <li>• Med. management (IM, Sc, IV)</li> <li>• Infusion Therapy</li> <li>• Surgical wound care</li> <li>• Trauma wound care</li> </ul>	<p>No public website</p> <p>Koen Van den Heede <a href="mailto:koen.vandenheede@med.kuleuven.be">koen.vandenheede@med.kuleuven.be</a></p>
<p><b>United Kingdom</b> (2009)</p>	<p><b>Collected Nationally</b></p> <ul style="list-style-type: none"> <li>• Falls</li> <li>• Pressure Ulcers</li> <li>• Infections</li> </ul> <p><b>Collected in Ambulatory Chemotherapy Settings:</b></p> <ul style="list-style-type: none"> <li>• Safe med administration</li> <li>• Sepsis</li> <li>• RN Experience</li> <li>• RN Education &amp; communication</li> <li>• Wellbeing and function</li> <li>• Nausea and vomiting</li> <li>• Pain</li> <li>• Diarrhoea</li> <li>• Fatigue</li> <li>• Oral mucositis</li> <li>• Nutrition</li> </ul>	<p><a href="http://www.ic.nhs.uk/webfiles/Services/Clinical%20Innovation%20Metrics/Nurse_Sensitive_Indicators_DH.pdf">http://www.ic.nhs.uk/webfiles/Services/Clinical%20Innovation%20Metrics/Nurse_Sensitive_Indicators_DH.pdf</a></p> <p>Anne Marie Rafferty, <a href="mailto:audrey.dowe@kcl.ac.uk">audrey.dowe@kcl.ac.uk</a> k Peter Griffiths, <a href="mailto:peter.griffiths@soton.ac.uk">peter.griffiths@soton.ac.uk</a></p>
<p><i>All Initiatives collect data electronically and use it for benchmarking, quality improvement and care</i></p>		

Initiative	Indicators	Website & Key Contacts
<i>planning and clinical decision making</i>		
<b>Legend:</b> CABSI = Central Line Acquired Blood Stream Infection; D/Cs = Discharges; HAPU = Hospital Acquired Pressure Ulcers; PICC = Peripherally Inserted Central Catheter; R/T = Related to; UAP = Unlicensed Assistive Personnel; VAP = Ventilator Acquired Pneumonia; V/S = Vital Signs		

**From Data to Information: Nursing Report Cards**

With the availability of data from NMDS and outcomes measurement initiatives, the next step was to turn that data into information that could be effectively reported and shared. In manufacturing and other traditional business settings, report cards were being introduced as a mechanism to track and analyze business performance. Early report cards often focused on a single parameter, usually the organization’s financial performance. However, Kaplan and Norton (1992) advocated for the evolution of report cards, to a “balanced scorecard” approach that afforded an overall view of the company. The balanced scorecard was presented in a 4-quadrant format. Data collection for each quadrant was guided by a specific question and a unique perspective:

1. How do customers see us? (Customer perspective)
2. What must we excel at? (Internal business perspective)
3. Can we continue to improve and create value? (Innovation and learning perspective)
4. How do we look to shareholders? (Financial perspective)

Several advantages of the balanced scorecard were identified: 1) Information is provided from four different perspectives; 2) the scorecard enables organizational performance to be assessed in several areas simultaneously; and, 3) the scorecard minimizes information overload by limiting the number of measures captured/reported (Kaplan and Norton, 1992).

The balanced scorecard approach soon gained the attention of the health sector and in 1998 was used in the first of a series of *Hospital Reports* in Ontario. The group of researchers who had prepared the report subsequently expanded and became the Hospital Report Research Collaborative (HRRC). In partnership with the OHA and the Ontario Ministry of Health and Long Term Care, the HRRC continued to organize its annual reports using the balanced scorecard approach, identifying the 4 quadrants as: 1) system integration and change; 2) clinical utilization and outcomes; 3) patient satisfaction; and 4) financial performance and condition (McGillis, Doran et al., 2003; Pink, Daniel, McGillis Hall and McKillop, 2007).

The HRRC’s use of the balanced scorecard format reflected its agreement with Kaplan’s and Norton’s (1992) view that gathering a core set of measures and examining them collectively enabled the overall performance of the hospital to be examined. In 2005 the core set of measures gathered and reported upon in the *Hospital Report* was rigorously reviewed and redeveloped to reflect “changes in the hospital industry, the data collected and performance criteria (Pink, Daniel, McGillis Hall and McKillop, 2007, p. 87).

Publication of the *2001 Hospital Report* reflected a key milestone for nursing as it contained a comprehensive “Nursing Report” (McGillis Hall, Doran, Laschinger, Mallette, O’Brien-Pallas and Pedersen, 2001). Developed by a team of experienced nurse researchers on behalf of the

HRRC, the nursing report was the first step in the development of a balanced scorecard for nursing services in Ontario. It provided recommendations and supporting evidence for the inclusion of key nursing data in each of the four quadrants of the balanced scorecard (system integration and change; clinical utilization and outcomes; patient satisfaction; and financial performance and condition). The specific indicators for the nursing data (Table 2) were selected based on outcomes of care and included those experienced by the patient, nurses, informal caregivers (e.g. family and friends) and hospital. Three key characteristics for the indicators of interest were identified: “(a) the indicators can be evaluated using efficient, valid and reliable methods; (b) they are relevant to the patient, informal or formal care provider, provider agency, consumer or government; and (c) they represent intended or unintended effects of hospital nursing care” (McGillis Hall et al., p. 15). The last *Hospital Report* to be published in Ontario was in 2008. A search of health care related websites in several provinces did not reveal additional specific initiatives related to stand-alone nursing or hospital report cards.

**National Report Card Initiatives**

From a national perspective, the Fraser Institute has developed hospital report cards for the provinces of Alberta, B.C., and Ontario using data submitted by those provinces to the CIHI Discharge Database (see [www.hospitalreportcards.ca](http://www.hospitalreportcards.ca)). However, there is controversy about the methodology for those report cards (Postl, Moffatt, Kreindler and Lutfiyya, 2008) and they still do not contain nursing sensitive clinical data.

The Canadian Hospital Reporting Project (CHRP) is a national initiative being led by the Canadian Institute for Health Information. Launched in 2010, the CHRP is a quality improvement tool that gathers and analyzes performance indicators in the acute care sector. The CHRP includes nursing-sensitive adverse events for medical and for surgical conditions in its data collection related to patient safety. The CHRP is also collecting inpatient nursing productivity and RN earned hours as a percentage of total inpatient nursing earned hours as indicators to inform assessment of efficiency/financial performance. These data elements are primarily drawn from the Discharge Abstract Database (clinical indicators) and the Canadian MIS Database (financial indicators). The CHRP will enable hospitals to compare their performance with other hospitals regionally, provincially and nationally.

**Table 2: Nursing Indicators Recommended for Inclusion in (Ontario’s) Hospital Reports**

*(From McGillis Hall, Doran et al., 2001, pp 50-52).*

Quadrant	Indicators
<p><b>System Integration and Change</b></p>	<ol style="list-style-type: none"> <li>1. Clinical information technology</li> <li>2. Clinical data</li> <li>3. Intensity of information use</li> <li>4. Nursing databases</li> <li>5. Development and use of clinical pathways</li> <li>6. Coordination of care</li> <li>7. Nursing-community integration</li> <li>8. Continuity of care</li> <li>9. Strategies for managing ALC patients</li> <li>10. Nursing health human resources</li> </ol> <p><i>*The authors noted that collection of data on each of these indicators was feasible for measurement at the time of the report.</i></p>

Quadrant	Indicators
<p><b>Clinical Utilization &amp; Outcomes</b></p>	<ol style="list-style-type: none"> <li>1. Functional status</li> <li>2. Self-care status</li> <li>3. Symptom control</li> <li>4. Patient falls</li> <li>5. Urinary tract infections</li> <li>6. Pneumonia</li> <li>7. Pressure ulcers</li> <li>8. Upper gastrointestinal bleeding</li> <li>9. Failure to rescue</li> </ol> <p><i>*The authors noted that collection of data on patient falls, UTIs, pneumonia and pressure ulcers was feasible at the time of the report, however data on functional status, self-care status and symptom control may not be readily available</i></p>
<p><b>Patient Satisfaction</b></p>	<ol style="list-style-type: none"> <li>1. Information you were given</li> <li>2. Instructions</li> <li>3. Ease of getting information</li> <li>4. Information given by nurses</li> <li>5. Informing family or friends</li> <li>6. Involving family or friends in your care</li> <li>7. Concern and caring by nurses</li> <li>8. Attention of nurses to your condition</li> <li>9. Recognition of your opinion</li> <li>10. Consideration of your needs</li> <li>11. The daily routine of nurses</li> <li>12. Helpfulness</li> <li>13. Nursing staff response to your calls</li> <li>14. Skill and competence of nurses</li> <li>15. Coordination of care</li> <li>16. Restful atmosphere provided by nurses</li> <li>17. Privacy</li> <li>18. Discharge instructions</li> <li>19. Coordination of care after discharge</li> <li>20. Overall quality of care and services you received</li> <li>21. Overall quality of nursing care</li> </ol> <p><i>*The authors noted that collection of data on each of the indicators was then feasible with the implementation of the Patient Judgment of Hospital Quality Survey.</i></p>

Quadrant	Indicators
<p><b>Financial Performance &amp; Condition</b></p>	<ol style="list-style-type: none"> <li>1. Inpatient nursing earned hours per inpatient weighted case</li> <li>2. RN, RPN/LPN and non-professional staff earned hours per inpatient weighted case</li> <li>3. RN staff earned hours per inpatient weighted case</li> <li>4. Percent of total inpatient nursing earned hours utilized for direct nursing care</li> <li>5. Percent professional nursing staff hours utilized for RNs</li> <li>6. Percent of direct nursing care earned hours utilized for non-professional staff</li> <li>7. Percent of nursing care earned hours utilized for full time RNs</li> <li>8. Percent of nursing care earned hours utilized for full time RPNs/LPNs</li> <li>9. Percent of nursing care earned hours utilized for full time non-professional staff</li> <li>10. Percent of nursing care earned hours utilized for part time RNs</li> <li>11. Percent of nursing care earned hours utilized for part time RPNs/LPNs</li> <li>12. Percent of nursing care earned hours utilized for part time non-professional staff</li> <li>13. Percent of nursing care earned hours utilized for casual RNs</li> <li>14. Percent of nursing care earned hours utilized for casual time RPNs/LPNs</li> <li>15. Percent of nursing care earned hours utilized for casual non-professional staff</li> <li>16. Percent nursing staff hours utilized for agency staff</li> <li>17. Percent nursing staff hours utilized for orientation</li> <li>18. Percent nursing staff hours utilized for absenteeism</li> <li>19. Percent nursing staff hours utilized for ongoing education</li> <li>20. Percent nursing staff hours utilized for overtime</li> </ol> <p><i>*The authors noted that collection of data on the first 16 indicators was then feasible; however data on the remaining indicators was not then readily available.</i></p>

**The Quality Connection**

Increasingly we are seeing examples of how the availability of data about nursing process and patient outcomes at the organizational and unit level can result in significant improvements in the quality of care—an advancement eloquently expressed in the title of an article by CALNOC researchers: *“Leveraging Nurse-Related Dashboard Benchmarks to Expedite Performance Improvement and Document Excellence”* (Donaldson, Brown, Aydin, Bolton, and Rutledge, 2005). The authors described how participants in their outcomes database collaborative have used the data to improve quality of care. For example, noting its high prevalence of hospital acquired pressure ulcers; one organization implemented a performance improvement process that was successful in reducing the incidence of pressure ulcers. Researchers associated with the MilNOD database also determined that nurse leaders found the information provided by MilNOD to be a helpful resource (Loan, Patrician, and McCarthy, 2011). The nurse leaders noted that for the most part, the only measures of staffing effectiveness they had access to were from the MilNOD. They identified many ways in which MilNOD added value to their hospital including being prompted to add risk assessments for falls and pressure ulcers to their routine care, using MilNOD data for safety initiatives and accessing it for accreditation purposes. The potential for outcome measurement to inform patient care decisions and promote evidence based practice has been described by Doran (2010; 2011). The literature clearly demonstrates quality as a central focus in today’s health care system. There is evidence that the collection, reporting and benchmarking of nursing sensitive data makes a powerful contribution to the realization of that quality.

## **Limitations and Recommendations**

In order to generate quality data to inform patient care, evaluate organizational performance, and support quality improvement it is essential that our measurement systems be valid, reliable, and capable of being risk adjusted. Risk adjustment is essential when making comparisons between units or organizations and for research purposes. A limitation of systems such as NDNQI and CALNOC is the inability to fully risk adjust for differences in patient characteristics across units and facilities because the collection of outcomes data is not linked to other databases where data that could be used for risk adjustment resides. The system in Belgium is one exception. In the Belgium Nursing Minimum Data Set (B-NMDS) patient demographic items and ICD-9-M codes are gathered to enable alignment of the NMDS data with the hospital discharge data set, thus enabling risk adjustment. A second limitation of many of the NMDS is failure to capture nursing process data such as nursing interventions. The B-NMDS is an exception because it was designed to capture nursing interventions using the Nursing Intervention Classification system (Van den Heede, Michiels, Thonon and Sermeus, 2009). Canada has many advantages that other countries do not have because of our national data sets. A nursing minimum data set could be linked to data that resides at the Canadian Institute of Health Information such as the DAD, MIS, RAI-HC, RAI-LTC, and the RAI-Mental health. These data sets contain the types of information about patients and facilities that are essential for risk adjustment. However to date it has not been possible to link such data to the nursing unit level. HOBIC is an exception because it has been designed to capture nursing sensitive outcomes observed at and responsive to nursing care and conditions at the unit level. Measurement at the unit level would need to be an essential feature of a NMDS in order to support improvements in direct care.

More specific recommendations to advance the realization of a national nursing report card in Canada are informed by commonalities in data collection across the initiatives described in this knowledge synthesis, the inclusion of indicators for structure, process and outcome, and methodological considerations related to the selection of outcomes. These factors are now briefly discussed.

Almost every initiative described in this synthesis collects data pertaining to nursing inputs/structures such as nursing hours per patient day; staff mix, nurse-patient ratio, and in some cases, nurse education and experience (e.g., MiLNOD). In Canada it is feasible to collect information about nurse staffing in acute care hospitals through the MIS. Several NMDS have also included a work environment survey which enables an examination of the impact of work environment change on nurse and patient outcomes. In the United States NMDS have included indicators about nursing process, and this has been most highly developed in Belgium where data about a core set of twenty-three nursing interventions are collected in every hospital. The majority of NMDS focus on a core set of patient safety outcomes, such as pressure ulcers, falls, and nosocomial infections. HOBIC and C-HOBIC have taken a broader perspective to include outcomes such as functional status, symptoms, and therapeutic self-care. Collectively, these data elements are generally categorized according to the well recognized “structure, process and outcome framework” as advised by Donabedian, based on his belief that “good structure increases the likelihood of good process, and good process increases the likelihood of a good outcome” (Donabedian, 1988, p. 1745). Donabedian’s belief has been tested over the years and is widely accepted. Accordingly, selection of nursing sensitive outcomes for a Canadian nursing report card should encompass data from each of the three categories. The World Health

Organization defined quality as “the degree to which health services for individuals and populations increase the likelihood of desired health outcomes and are consistent with current professional knowledge” (WHO, 2009, p. 18). Patient safety was defined as freedom for a patient from unnecessary harm (WHO, 2009). It would seem that a balanced approach to outcomes measurement should include both quality and safety indicators.

Selection of report card data also needs to be guided by appropriate research methods. In the initiatives discussed in this paper three key methods were utilized to inform data selection: 1) a literature review; 2) consultant with key informants (e.g. for the B-NMDS a Delphi process was used); and 3) identification of valid and reliable tools/instruments by which to gather the data (Doran, 2011). Herman and Palmer (2002) proposed a framework for selecting core quality measures which could be useful for guiding the selection of indicators for a national nursing report card in Canada. Their framework considers three primary questions for indicator selection: 1) is the indicator meaningful, 2) feasible, and 3) actionable?

An indicator is meaningful if it is clinically important, meets stakeholder needs and there is evidence to show the outcome is sensitive to nursing care. An indicator is feasible if data are available, or are affordable to collect and are able to be measured reliably. An indicator is actionable if the scores are under the user’s control, users are able to interpret the scores, there is demonstrated variation and/or potential for improvement, and there are established clinical recommendations/ evidence to guide practice improvement.

To summarize, in advancing NMDS work in Canada it is recommended that consideration be given to the following questions: 1) What data elements would constitute the minimum data set? 2) How can the data be captured in valid and reliable ways? 3) How can such data be linked to other data sets that contain information about patient and hospital characteristics? 4) How can data on nursing interventions be collected? And finally, 5) How can these data be analyzed and repackaged, not only to enable quality improvement and support for patient care decisions organization-wide, but also for application at the unit/service managers, front line nurses and other care providers at the point of service? It is also recommended that data related to nursing work environment be collected as part of the core dataset.

## **Conclusion**

This knowledge synthesis has found evidence of a solid foundation of knowledge and achievements in the field of nursing outcomes measurement and reporting. The existence of reliable and valid nursing sensitive indicators and outcomes has been identified for both safety and quality outcomes for patients. Moreover, the feasibility of collecting and reporting such data has been affirmed. While outcomes measurement and reporting have advanced within institutions (with a particular focus on acute care hospitals), less progress has been made in the community sector, with the exception of the HOBIC and C-HOBIC initiatives. The utility of information from the various nursing outcomes databases has been described, including examples of improved quality of care and outcomes when action is taken to address unsatisfactory performance results.

A critical mass of participating organizations is required to enable nursing sensitive outcomes to be included in national publications (e.g. Statistics Canada’s Health Indicators; the Canadian

Hospital Reporting Project) and to leverage the national Discharge Abstract Database at CIHI to incorporate nursing data in a fashion that would provide a large enough sample size to support rigorous research. Data gathered in a national nursing report card could inform dialogue and planning regarding current nursing issues in Canada including nursing staff mix, patient care delivery models, staffing ratios, and leadership span of control and positively influence the quality of clinical care and patient outcomes. Accordingly, the *“Think Tank Toward a National Report Card for Nursing”* represents a welcome and strategic opportunity for dialogue and visioning to advance efforts to realize a national nursing report card.

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