

Inclusion of Nursing-Related Patient Outcomes in Jurisdictional Electronic Health Records

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

December 2009

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Executive Summary

In the fall of 2006, the Canadian Nurses Association (CNA) partnered with three provincial ministries of health to submit a proposal to Canada Health Infoway for funding to support the inclusion of nursing-related information in electronic health records (EHRs). In May 2007, Canada Health Infoway announced funding of \$750,000 for the project. This is the first nursing project funded by Canada Health Infoway.

The Canadian Health Outcomes for Better Information and Care (C-HOBIC) initiative introduces a systematic, structured process and terminology to patient assessments. C-HOBIC measures the impact that nurses have on patient outcomes through the collection of specific information at key times during the patient's care. The goal is to build a comprehensive and reliable database of information that clinicians, planners and researchers can access and use to examine the quality of care.

The project objectives are to:

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

Implementation occurred in two provinces: Saskatchewan and Manitoba. In Saskatchewan, C-HOBIC was implemented in long-term care homes in the Saskatoon Health Region, and in Manitoba, implementation occurred in long-term care homes and home care offices in the Winnipeg Health Region. As part of the implementation, nurses in the participating provinces were provided with education about using standardized information to plan for and evaluate care.

One deliverable of C-HOBIC was to map the standardized concepts to the standardized clinical reference terminology of nursing (ICNP) in order to demonstrate the value of mapping current information and to position nursing-sensitive outcomes for inclusion in the pan-Canadian health record. This would provide an approach for coding nursing information to support interoperability, consistency and comparability of clinical information that is reflective of nursing practice across health-care system(s) and facilitate future mapping of these concepts to Systemized Nomenclature of

Medicine – Clinical Terms (SNOMED-CT). Another deliverable was an evaluation of C-HOBIC. An independent evaluation was conducted to examine the following:

- Do nurses use C-HOBIC information?
- Are nurses satisfied with C-HOBIC information?
- In what ways has practice changed as a result of C-HOBIC information?

While the sample size was small, the evaluation found that clinicians require time and resources to adopt information-intensive initiatives such as C-HOBIC and successfully incorporate them into their clinical practices. Evaluation findings are most positive in care sectors that have been involved in the initiative the longest and have focused resources on assisting clinicians to use the C-HOBIC information to improve their practice.

There are 270,845 registered nurses (CNA, 2008) and 67,300 practicing licensed practical nurses (CIHI, 2007) in Canada. If EHRs are to be utilized by nurses and other clinicians, it is important that they contain information that has value for clinicians and improves their ability to evaluate and plan care.



1. Background

In the fall of 2006, the Canadian Nurses Association (CNA) partnered with the provincial ministries of health of Ontario, Prince Edward Island and Saskatchewan to submit a proposal to Canada Health Infoway for funding to support the inclusion of nursing-related information in EHRs. Prince Edward Island was unable to participate within the required timelines for this project and Manitoba became the third province to actively engage in the collection of patient outcome information related to nursing care.

The Canadian Health Outcomes for Better Information and Care (C-HOBIC) initiative introduces a systematic, structured process and terminology to patient assessments. C-HOBIC measures the impact that nurses have on patient outcomes through the collection of specific information at key times during the patient's care. Nurses and other care providers, such as care coordinators, collect C-HOBIC information via admission and discharge assessments in acute care and home care, and admission and quarterly resident assessments in long-term care. The goal is to build a comprehensive and reliable database of information that clinicians, planners and researchers can access and use to examine the quality of care.

C-HOBIC information will be invaluable at the unit level to support patient care by nurses, at the organizational level for quality improvement initiatives, and at the provincial level for establishing benchmarks for performance. C-HOBIC information is standardized, which allows for extraction into provincial EHRs or provincial databases, and analyzed to provide feedback to nurses about patient outcomes. It is a first step in providing nurses with the tools and information needed at the point of care to continue to deliver high-quality patient care in the increasingly complex environment of modern health care.

C-HOBIC introduced a systematic, structured language to admission and discharge assessments of patients receiving acute care, and to admission, quarterly (if condition changes) and discharge assessments of patients receiving complex continuing care, long-term care or home care. The project built on a promising Ontario-based program funding the expansion of that project to Manitoba and Saskatchewan.

The project is Canadian Health Outcomes for Better Information and Care (C-HOBIC). CNA is the sponsor for C-HOBIC.

In May 2007, Canada Health Infoway announced funding of \$750,000 for the project.

2. Objectives

The project objectives are to:

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

3. Methodology and Deliverables

C-HOBIC used the methodology developed in Ontario through the Nursing and Health Outcomes Project and the Health Outcomes for Better Information and Care (HOBIC) program to implement the electronic collection of standardized clinical outcomes reflective of nursing practice in two provinces beyond Ontario. Data on the following outcomes were collected:

- functional status, including continence;
- therapeutic self-care (readiness for discharge);
- symptom management (pain, nausea, fatigue, dyspnea); and
- safety outcomes (falls, pressure ulcers).

The outcomes selected have a concept definition, a valid and reliable measure, and empirical evidence linking the patient outcomes to nursing inputs or interventions (Doran, 2003).

As part of the C-HOBIC project implementation, nurses in the participating provinces were trained to assess and document patient outcomes at the point of care using a standardized methodology.

Outcomes are assessed and documented:

- on admission and discharge for acute care;
- on admission and quarterly (if condition changes) in long-term care; and
- on admission and yearly in home care.

As part of the C-HOBIC implementation, nurses were provided education on how to use these standardized clinical outcomes to plan for and evaluate the care that was provided.

The structured language used in C-HOBIC has been mapped to the ICNP, the standardized clinical reference terminology of nursing.

4. Benefits to Canada Health Infoway

This project contributes to many of the priorities for health-care renewal in Canada, including:

- patient safety;
- outcomes related to home care;
- increased use of information technology (innovative component of the EHR and testing of the clinical terminology standard for nursing); and
- accountability.

C-HOBIC introduces a standardized model for the collection of clinical outcomes data across the health-care continuum. Standardization is essential to enable seamless communication across the continuum of health care.

Chronic health conditions require management by different health-care providers in different settings. C-HOBIC supports the collaborative model required for chronic disease management through the provision of standardized clinical outcomes information that is available to support decision-making by clinicians. Standardized information allows for improved communication among the interdisciplinary team.

Technology assists in ensuring that the right people have the right information at the right time to support decision-making. The C-HOBIC project introduces the collection and reporting of standardized clinical information that is of value to nurses and other clinicians. Nurses are the largest group of health-care providers of care and their engagement in the EHR is essential for improved, more efficient care.

5. Benefits to People within the Health-Care System

As EHRs are developed, it is vital that they include information important to patients as patients move through the health-care system. The C-HOBIC suite of health outcomes is patient-centred and can be collected in a standardized way across the system.

As people move from primary care through acute care and return home, with or without supportive care, or are admitted to other organizations, this suite of outcomes represents vital information about the health of people and the ability of the health-care system to meet the needs of people. Is the health system improving function for elderly people in all sectors? Are there best practices in the management of pain that could be transferred to other organizations or sectors? Incorporation of C-HOBIC data into an EHR will ensure that patient outcome information is available to clinicians across the continuum of care to support decision-making about patient care, best practices and management strategies.

6. Governance

CNA is the sponsor of this project. As part of this role, CNA managed the financial administration for C-HOBIC and hosted the C-HOBIC webpage on its website. Nora Hammell, Director of Nursing Policy at CNA, was CNA's lead for this project.

The C-HOBIC team comprised:

- Dr. Kathryn Hannah, Executive Project Leader
- Peggy White, RN, MN, National Project Director
- Sharon Paton, RN, MN EdD, National Project Manager
- Krista Balenko (2007-2009); Gary Tokatelian (2009). Canada Health Infoway Project Lead

A steering committee comprising representatives from participating provincial partners, Canada Health Infoway, the Canadian Institute for Health Information, Health Canada and vendors was formed to provide overall advice and direction to the C-HOBIC project team (see Appendix A). The steering committee met five times throughout the course of the project: three face-to-face meetings and two conference calls.

A provincial project manager was recruited in each participating province to (a) lead the implementation for their province; (b) coordinate the education sessions; (c) coordinate the evaluation survey; (d) provide ongoing progress reports to the national project manager; and (e) provide input into the final report. The provincial project managers were:

- Eithne Reichert, Saskatchewan
- Gary Scheurmann, Manitoba

One key learning for the team was that provincial priorities change with elections, resulting in new leaders and government parties and thereby affecting continuity in the teams and leaders taking part in the project. These changes affected the timelines for the deliverables.

7. Implementation

7.1 Saskatchewan

The province of Saskatchewan signed onto the C-HOBIC project with the goal of using an adoption/change management approach to promote the measurement and use of C-HOBIC information.

The project was supported by Lynn Digney Davis, Chief Nursing Officer, Saskatchewan Ministry of Health, Workforce Planning Branch, and Neil Gardner, CEO, Saskatchewan Health Information Network. The project was implemented in Saskatoon Health Region long-term care homes with the

goal of utilizing the processes, staff and communication vehicles to further enhance nursing staff use and understanding of the current long-term care common assessment system so as to capture assessment measures electronically for the long-term care residents.

Prior to C-HOBIC, long-term care homes in Saskatchewan utilized a quarterly patient assessment through Momentum Healthware's long-term care (LTC) application for the collection of minimum data set (MDS) information. These data are reported regionally and provincially to selected administrators. The MDS mapped to the C-HOBIC measures with the exception of three variables: fatigue, dyspnea and nausea. Implementation of the C-HOBIC measures through the existing Momentum LTC MDS application occurred in 25% of the long-term care facilities in Saskatchewan (2,131 beds) currently doing a quarterly assessment.

Long-term care homes in Saskatchewan use the MDS 2.0. The MDS mapped to the following C-HOBIC measures:

- function: RAI measure for ADL, IADL¹ and continence
- symptoms: pain RAI scale
- safety outcomes (falls & pressure ulcers): RAI measures

Three concepts (fatigue, nausea and dyspnea) were not included in the Momentum data collection, but future plans include the addition of these three measures.

As part of C-HOBIC there were enhancements to the reporting tools for nurses to use in monitoring and adjusting care based on these measurements. The C-HOBIC project furthered the use of the Saskatchewan Health LTC MDS Datamart tool and reports by long-term care nurses.

By September 1, 2009, the region had hosted 132 workshops with over 800 staff attending. The focus of the workshops was to provide nursing staff involved in resident care plans and processes with the opportunity to enhance their understanding of the nursing-sensitive outcomes, to address the influence on resident care outcomes, and to demonstrate the ability for adapting care plans in adjusting to the assessment measures.

Issues with Implementation in Saskatchewan

- The long-term care sector already had an electronic tool for assessment. Saskatchewan was using the MDS 2.0 for long-term care clients. There is considerable information in this assessment. The C-HOBIC concepts are embedded in these assessments, but they can get lost in the volume of information. Additional effort is required to assist nurses in understanding how to differentiate, select and use items of information that are relevant to clinical practice and add value to patient care. Also, the long-term care sector assessments are completed on a quarterly basis so there was less time to use the reports within the project timeline.

¹ RAI: Resident Assessment Instrument; ADL: Activities of Daily Living; IADL: Instrumental Activities of Daily Living

- An electronic care planning component is required.
Nurses in Saskatchewan identified the need for electronic care planning to support the use of assessment data related to outcome measures. The current software is limited to the long-term care sector; however, the nurses identified the need to communicate with emergency departments and hospitals. There is a need for information to flow electronically between sectors to support seamless delivery of care.
- Knowledge of nursing-sensitive outcomes is seen as very positive.
Nurses in Saskatchewan reported that knowledge about nursing-sensitive clinical outcomes is important and that this needs to be integrated into nursing documentation to fully engage other professional domains.
- Many EHR and quality improvement projects are in progress.
In Saskatchewan, the C-HOBIC project was introduced at a time when many other EHR and quality improvement initiatives were occurring. Multiple projects had an impact on resources and influenced the timelines for this project.

Saskatchewan was supportive of the collection of standardized clinical outcomes data and plans to develop a strategy for moving forward on introducing the complete set of C-HOBIC measures in all sectors as their provincial EHR is implemented.

7.2 Manitoba

The Winnipeg Regional Health Authority (WRHA) Home Care Program, the Personal Care Home Program, Project Management Office, and Manitoba eHealth signed on to participate in C-HOBIC. The project was supported by Jan Currie, Vice-President and Chief Nursing Officer, WRHA, and Roger Girard, Chief Information Officer, Manitoba eHealth. Manitoba was extended an invitation to join the project when Prince Edward Island withdrew their participation. As such, the timeline to complete the project was very compressed in order to meet the milestones imposed by funding for the national C-HOBIC project. The goal was to collect and provide information to clinicians to support more effective planning and evaluation of care. As part of C-HOBIC, information was provided to managers and executives to use when examining the quality of care provided by their units and organizations.

Implementation of the C-HOBIC measures through the existing Momentum LTC and home care applications occurred in six long-term care homes (225 nurses and 1,005 beds) and six home care offices (60 case coordinators and approximately 3,300 clients) in the Winnipeg Health Region.

In Winnipeg, the MDS tools are utilized in both long-term care and home care. The MDS mapped to the following C-HOBIC measures:

- function: RAI measure for ADL, IADL and continence
- symptoms: pain RAI scale
- safety outcomes (falls & pressure ulcers): RAI measures

Three concepts (fatigue, nausea and dyspnea) were not included in the Momentum data collection, but future plans include the addition of these three measures.

The focus of the C-HOBIC project in Manitoba was to develop and deliver new reports focused on the C-HOBIC suite of outcomes for clinical staff and management involved in care planning and interventions. The new reports are enhancing the understanding of the nursing-sensitive outcomes, the effect on resident/client care outcomes, and the ability to adapt care plans responsive to the assessment measures. Information was collected from existing databases in home care and long-term care (MDS-HC and MDS 2.0) to report on the C-HOBIC suite of standardized clinical outcomes. As the current Momentum software was not adaptable to having a new report embedded within it, assessment data were extracted to a repository and the C-HOBIC reports generated by the user utilizing a web-based process. Educational initiatives were developed to enable clinicians to use this information in the planning and evaluation of client care. In the home care sector in Manitoba, typically both nurses and social workers complete admission assessments, so in this province, social workers were included in the C-HOBIC project. Education was provided to 30 nurses, 18 social workers and one occupational therapist.

Issues with the Implementation of C-HOBIC in Manitoba

- Historical technology decisions can significantly impact delivery.
Past practice in creating generic logins to systems for nurses following accepted security standards led to a large group of clinical users without a personal network login. Lack of a login created a challenge in making the reports on standardized clinical outcomes available in some sectors.
- Site infrastructure requires appropriate connectivity and functionality.
During training sessions, networks were found to be improperly configured for providing access to reports external to the MDS application, even though the MDS application could be accessed. This impacted the education of nurses.
- A clear definition of requirements and impacts is needed by those doing development work.
Although engagement in the project occurred, the resource assigned to the project did not understand the potential volume or use of reports and did not communicate the lack of understanding until later. This highlights the need for change management activities, even in small projects, and the need for provision of significant follow-up after the implementation to ensure use and compliance.
- As the current Momentum software was not adaptable to having a new report embedded within it, the project experienced a significant reduction in frontline uptake of the C-HOBIC reports.

7.3 Ontario

Ontario began implementing the electronic collection of the standardized clinical outcomes in 2006 in four sectors: acute care, complex continuing care, long-term care and home care. Although the Ontario implementation is not funded by Canada Health Infoway, Ontario participated in this project through the provision of the background work on the identification of the clinical outcomes reflective of nursing practice. The Ontario Ministry of Health and Long-Term Care provided the intellectual property to Infoway to support this work. Further information on the background work in Ontario is available at www.health.gov.on.ca/hobic. Ontario participated in the evaluation of C-HOBIC.

In Ontario, the following measures were collected:

- function: RAI measure for ADL, IADL and continence
- therapeutic self-care (Doran & Sidani tool): acute care only
- symptoms:
 - pain: 0-10 scale in acute care and RAI scale in other sectors
 - fatigue: RAI scale
 - dyspnea: RAI scale
 - nausea: MOH² nausea scale
- safety outcomes (falls & pressure ulcers): RAI measures

As of June 30, 2009, Ontario has 125 organizations collecting the standardized suite of clinical outcomes: 38 acute/complex continuing care, and 87 long-term care homes (12,665 beds). In Ontario, the information is abstracted from clinical information systems, along with ADT information, and housed in a database at the Institute of Clinical Evaluative Sciences. There are 12,907 health-care providers (4,374 registered nurses, 2,972 registered practical nurses and 5,561 personal support workers) who have attended educational sessions regarding completing standardized assessments and accessing and using information that is available in real time to plan for and evaluate care. The current program plan will see the implementation occur in all acute/complex care organizations, all long-term care homes, and all home care provider organizations in Ontario. As part of the Ontario implementation, nurse managers and nurse executives receive unit-level aggregate reports in real time to use in examining the quality of care being provided.

² Ministry of Health

8. Mapping C-HOBIC Concepts to ICNP

One of the goals of the C-HOBIC project was to develop a consistent methodology that will contribute patient outcome data for the provincial EHRs. Although Canada Health Infoway, in consultation with various stakeholder groups, adopted SNOMED-CT as the terminology of choice for the pan-Canadian EHR, ICNP remains the preferred terminology for nursing (CNA, 2006). This choice is due to ICNP's strength of representational capacity, genesis within a nursing perspective, and the capacity of ICNP to map to other languages and terminologies. The International Council of Nurses describes ICNP as a unifying language for nursing, which may be used as a compositional vocabulary or a reference terminology, and facilitates harmonization of existing terminologies across practice settings, countries or languages, and allows local adaptation (ICN, 2005).

The following concepts from the C-HOBIC project comprise the scope of the outcomes targeted for mapping to ICNP Version 1.0:

- function: RAI measure for ADL, IADL and continence
- therapeutic self-care (Doran & Sidani tool)
- symptoms:
 - pain: 0-10 scale in acute care and RAI scale in other sectors
 - fatigue: RAI scale
 - dyspnea: RAI scale
 - nausea: MOH nausea scale
- safety outcomes (falls & pressure ulcers): RAI measures

Concept	Acute Care	Chronic Care	Long-term Care	Home Care
Functional status	interRAI	interRAI	interRAI	interRAI
Continence	interRAI	interRAI	interRAI	interRAI
Therapeutic self-care	Doran & Sidani tool	N/A	N/A	Doran & Sidani tool
Pain – Frequency	interRAI	interRAI	interRAI	interRAI
Pain – Intensity	0-10 numeric	interRAI	interRAI	interRAI
Fatigue	interRAI	interRAI	interRAI	interRAI
Dyspnea	interRAI	interRAI	interRAI	interRAI
Nausea	MOH scale	MOH scale	MOH scale	MOH scale
Falls	interRAI	interRAI	interRAI	interRAI
Pressure ulcers	interRAI	interRAI	interRAI	interRAI

Using ICNP Version 1.0 as the coding structure for this project, CNA and its partners demonstrated the value of mapping current information and are positioning nursing-sensitive outcomes for inclusion in the pan-Canadian health record.

The goals of the mapping component of the project were to:

- standardize the concepts to the standardized clinical reference terminology of nursing (ICNP);
- demonstrate the value of mapping current information;
- position nursing-sensitive outcomes for inclusion in the pan-Canadian health record;
- provide an approach for coding nursing information supporting interoperability, consistency and comparability of clinical information that is reflective of nursing practice across health-care system(s); and
- facilitate future mapping of these concepts to SNOMED-CT.

Dr. Margaret Kennedy of Kennedy & Associates was hired to complete a draft report on mapping the C-HOBIC concepts to ICNP, which was completed on September 11, 2007. Subsequent to this, a workshop was held on September 30, 2007, with representation from across Canada, as well as representatives from ICNP, to validate the mapping and initiate consensus building. Workshop attendees were provided with an interim report, and developed a final report, *Mapping Canadian Clinical Outcomes in ICNP*.

C-HOBIC Measures

Category	Sector			
	AC	CCC	LTC	HC
Functional status (ADL & IADL)				
Bathing	✓	✓	✓	✓
Personal	✓	✓	✓	✓
Walking	✓	✓	✓	✓
Toilet transfer	✓	✓	✓	✓
Toilet use	✓	✓	✓	✓
Bed mobility	✓	✓	✓	✓
Locomotion on unit	✓	✓	✓	✓
Locomotion off unit	✓	✓	✓	✓
Locomotion in home				✓
Locomotion outside of home				✓
Dressing				✓
Eating	✓	✓	✓	✓
Bladder continence	✓	✓	✓	✓
Meal preparation				✓
Ordinary housework				✓
Managing medications				✓
Pain				
Pain – Frequency	✓	✓	✓	✓
Pain – Intensity	✓	✓	✓	✓
Fatigue	✓	✓	✓	✓
Dyspnea	✓	✓	✓	✓
Falls	✓	✓	✓	✓
Pressure ulcer	✓	✓	✓	✓
Therapeutic Self-Care				
Knowledge of medications	✓			✓
Knowledge of what medications are for	✓			✓
Ability to take medications	✓			✓
Recognition of changes in body systems	✓			✓
Understanding why the symptoms occur	✓			✓
Knowledge of what to do related to symptoms	✓			✓
Ability to carry out treatments to manage symptoms	✓			✓
Ability to look after self and maintain general health	✓			✓
Knowledge of who to contact if help is needed to manage daily activities	✓			✓
Knowledge of who to contact if there is an emergency	✓			✓
Ability to perform activities such as shopping	✓			✓
Ability to adjust regular activities when you are not well	✓			✓

Mapping Process



Functional Status-ADL Terms for Mapping for Acute Care

Item	HOBIC Concept	HOBIC Code	C-HOBIC Pre-Combined ICNP® Term	C-HOBIC Pre- Combined ICNP Code
Functional Status/ADI interRAI AC:GI	AC	0 - Independent 1 - Set up help only	Dependent/Never Dependent/Minimal	10005778/10013173 10005778/(new term)
	ADL SELF-PERFORMANCE Assess for performance over full 24 hours, considering all occurrences of activity	2 - Supervision 3 - Limited Assistance 4 - Extensive Assistance 5 - Maximal Assistance 6 - Total Dependence	Dependent/Minimal Dependent/Minimal Dependent/Partial Dependent/Extensive Dependent/Complete	10005778/(as above) 10005778/(as above) 10005778/(new term) 10005778/(new term) 10005778/(new term)
	Bathing		Ability to bath	10000121
	Personal hygiene		Ability to groom self	10000178
	Walking		Ability to walk	10000258
	Transfer toilet		Ability to transfer	10000204
	Toilet use		Ability to toilet self	10000197
	Bed mobility		Bed mobility	10003181
Eating		Ability to feed self	10000166	

Mapping

Ninety-six terms were addressed in this project:

- 58 HOBIC concepts were matched and validated as C-HOBIC terms.
- 13 HOBIC concepts were partially mapped and required a new term for completion as C-HOBIC terms.
- 24 new C-HOBIC terms were proposed for inclusion in ICNP.
- 1 HOBIC concept (“Activity did not occur”) could not be mapped to ICNP.
- 2 HOBIC ordinal scales were retained for use in C-HOBIC, including the pain scale and the number of falls.

Issues with Mapping to ICNP

- Mapping the C-HOBIC measures challenged the ICNP developers to address the representation of assessment and outcome measures that use rating scales. There has been discussion about how to represent scales, especially numbers and totals within the information model.
- Representation of the same concept (e.g., pain, falls) in different domains is inconsistent given the current scales. This inconsistency is reflective of interRAI measures and makes comparison of data across care settings difficult.
- ICNP does not allow for negation (e.g., absence of (no) pain); however, 0-10 pain scales are the gold standard and are required in acute care settings. This is an area where further follow-up will be required.
- ICNP is intended to enable comparisons across geographical or practice settings. In order to do comparisons, there may be a need to “genericize” data collection so that the exact same questions are asked in each sector.
- C-HOBIC requires pre-combined codes for use in systems, and ICNP uses post-combined codes. ICNP has to address this issue.
- C-HOBIC has submitted a request to ICNP for a Canadian catalogue.

On October 6, 2009, ICN and SNOMED-CT announced a collaboration to complement each other’s terminologies used for nursing practice. SNOMED-CT is more granular and captures data at a more detailed level and may allow for classification of some of the C-HOBIC concepts that were unable to be mapped to ICNP. The collaboration of ICNP and SNOMED-CT will accommodate the limitations within SNOMED-CT in relation to nursing terms and concepts. This collaboration will strengthen the usability of SNOMED-CT for documentation in EHRs of patient care by nurses.

The complete report, *Mapping Canadian Clinical Outcomes in ICNP*, is available at http://www.cna-aicc.ca/c-hobic/presentations/default_e.aspx.

9. Engagement of Colleges and Universities

One component of the C-HOBIC project has been the engagement of faculty in colleges and universities in participating provinces regarding the incorporation of education about standardized clinical terminology, nursing-sensitive outcomes and “outcomes focused care” into their nursing curricula. The immediate goal is for academic leaders to understand what the C-HOBIC project is about and how to begin to integrate key elements into nursing programs. The longer-term goal is for graduating nurses to enter practice settings with knowledge about the benefits of standardized information in EHRs and to use outcomes-focused information to plan for and evaluate care.

Dr. Kathryn Hannah initiated this strategy by providing a keynote address at the Canadian Association of University Schools of Nursing in November 2007. In addition, meetings were held with academic leaders from Prince Edward Island, Saskatchewan and Manitoba throughout the course of this project. While academic leaders in all provinces recognized the benefit to nurses and the nursing profession through C-HOBIC, and are beginning to incorporate aspects into nursing curricula, they also identified a critical need for faculty development efforts related to informatics education.

Another barrier identified by key leaders is the limited access to information systems and technology that can improve health-care delivery. Nursing education programs rely on the practicum site to provide access to and education on EHRs. In any given practice environment, exposure to technology is limited to the systems that are currently deployed.

10. Communication Strategy

An important component of this project has been engagement of key stakeholders within the nursing community. This strategy has focused on nurses at the local level through presentations at conferences such as the Saskatchewan Registered Nurses Association Annual General Meeting, the Manitoba Nursing Informatics Conference, and the Prince Edward Island Registered Nurses Annual General Meeting. At the national level, the C-HOBIC team has met with the Office of Nursing Policy and provincial/territorial nurse advisors to apprise them of this work and seek their advice and support. In addition, the team has presented at national conferences, such as the Canadian Nursing Informatics Association Conference in October 2007, the CNA Biennial Convention in June 2008, and at the e-Health conferences in 2008 and 2009.

At the international level, the C-HOBIC team has presented at venues such as Healthcare Information and Management Systems Society (HIMSS) 2009 conference in Chicago, the ICN Quadrennial Congress 2009 in Durban, South Africa, and the International Health Terminologies Standards Development Organization (IHTSDO) semi-annual meetings. In addition, numerous international invitations to present information about C-HOBIC were received and responded to within the feasibility of the resources for the project.

The C-HOBIC team has met with health-care system vendors to provide them with the C-HOBIC standardized assessment to further the uptake regarding the need for standardized clinical information in clinical information systems that is of benefit to clinicians.

Throughout the course of this project, the C-HOBIC team has also published articles in *Canadian Nurse* to increase awareness about this exciting project. An invited article describing the C-HOBIC project was published in the July/August 2009 *Journal of the American Medical Informatics Association* (JAMIA), an international, peer-reviewed journal. This speaks to the significance of this project.

For further information on the C-HOBIC communication strategy, see Appendix B.

11. Evaluation

The C-HOBIC initiative is a first step in providing nurses with the information needed to continue to deliver high-quality patient care in the increasingly complex environment of modern health care. Nurses and other care providers collect C-HOBIC information via admission and discharge assessments in acute care and home care, and admission and quarterly resident assessments in long-term care.

C-HOBIC introduces a systematic, structured process and terminology to patient assessments. C-HOBIC information supports care planning by nurses at the patient care level, quality improvement initiatives at the organizational level, and the establishment of benchmarks for performance at the provincial level.

“[C-HOBIC] allows the nurse to understand patients’ ‘ways of knowing’ with regards to medical history and medications. It is a quick way for the nurse to assess the patient’s educational needs and lets the nurse know about family/friends the patient relies on.”

C-HOBIC User

C-HOBIC assessment data highlight the impact made by nurses that may not have previously been measured.

“C-HOBIC can elicit information not normally attained. It keeps the nursing unit updated regarding recent treatments, etc., prior to the patient’s admission.”

C-HOBIC User

C-HOBIC is being implemented in Ontario long-term care and acute care, Manitoba long-term care and home care, and Saskatchewan long-term care. At the time of data collection, the implementation of the C-HOBIC information processes had been completed in Ontario for at least one year. In Manitoba, the initial implementation was completed a few weeks after the start of the evaluation data collection. Implementation in Saskatchewan was still in progress while evaluation data collection was taking place. Development of new nursing processes, integration into local nursing workflows, and collection of sufficient data to enable aggregate analysis and reporting and take advantage of C-HOBIC information were in the early stages at all sites.

The key finding from this evaluation is that clinicians require time and resources to adopt information-intensive initiatives such as C-HOBIC and successfully incorporate them into their clinical practices. Evaluation findings are most positive in care sectors that have been involved in the initiative the longest and have focused resources on assisting clinicians to use the C-HOBIC information to improve their practice. User feedback illustrates that adoption is not complete, but incorporation of C-HOBIC data and reports is beneficial and will foster adoption among non-users.

“Have a meeting where you’ve actually seen a result and then everybody believes it; you use a report at a meeting and the family says, ‘Wow,’ [because] they’ve seen the progress made. [The nurses say] this is great.”

C-HOBIC User

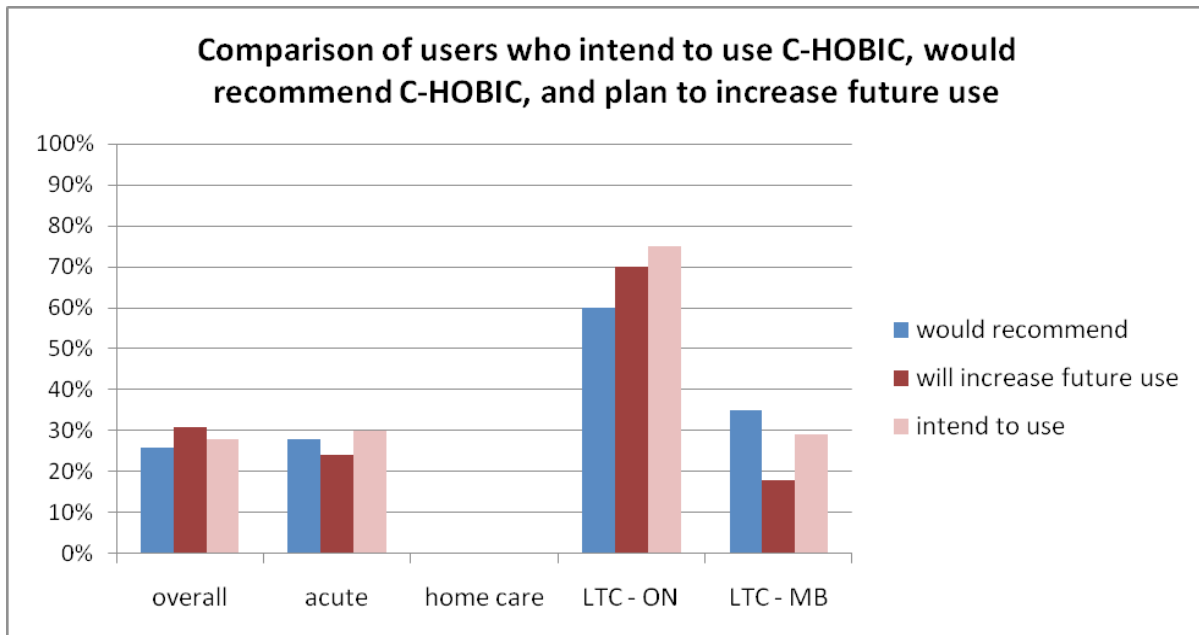
Through a stakeholder-driven prioritization process, this evaluation set out to answer three main questions:

1. Do nurses use C-HOBIC information?
2. Are nurses satisfied with C-HOBIC information?
3. In what ways has practice changed as a result of C-HOBIC information?

Data collection occurred via a 25-question C-HOBIC User Satisfaction Survey (76 responses), five focus group sessions and one key stakeholder interview. Difficulties in data collection were encountered due to insufficient infrastructure, such as lack of Internet access at nursing stations to use the electronic survey tool. This was especially true in Saskatchewan, where nurses were dealing with a number of initiatives in addition to C-HOBIC and its evaluation; there were only two survey responses received from a total of 30 sites. Many respondents also indicated they had not had time to sufficiently integrate C-HOBIC into their practice, and that the evaluation took place too soon after implementation. The timeline of the data collection for this evaluation was constrained by the requirement to table a final report in July 2009. The survey response rate should be kept in mind when considering the evaluation findings.

Survey responses indicate that at the time of data collection, 20 out of 76 (27%) users were satisfied overall with C-HOBIC. Satisfaction was highest in long-term care where C-HOBIC has been used the longest; overall satisfaction in Ontario long-term care was 50%, while overall satisfaction in Manitoba long-term care was 28%. The graph shown below is one example of higher satisfaction in Ontario long-term care – clearly illustrating that respondents who have used C-HOBIC the longest were most likely to say they would recommend it and increase future use, and had the highest intention of using it.

Differences in the types of care facilities using C-HOBIC led to differences in user satisfaction data. For example, long-term care patients have a longer length of stay than patients in acute care, allowing for a demonstration of positive trends over a longer period of time. Repeated review of C-HOBIC data and reports during care conferences allows for multiple positive encounters with the information for any one patient.



Reasons for satisfaction with C-HOBIC included opportunities for information sharing, increased productivity and increased quality of care. Seventy per cent of respondents from Ontario long-term care would recommend using C-HOBIC data and processes to other providers, and six out of 10 (60%) respondents from Ontario long-term care expect to increase their future usage. While most respondents were using the system for fewer than 10% of their patients, feedback from both acute care and long-term care indicated there was a desire among new users to increase use and incorporate C-HOBIC reports into care planning, continuous quality initiatives (CQI) and the prevention of readmissions. Focus group feedback provided rich data on reasons for user satisfaction, and quotes from users have been incorporated throughout this report.

“[C-HOBIC] is validating your visual and professional judgment from a program perspective. From a data collection point of view, it works well. From a case management perspective, you are usually right on with those tools.”

C-HOBIC User

Access to C-HOBIC influences satisfaction. When C-HOBIC was integrated into existing systems, workflow and nursing processes, satisfaction was highest. Satisfaction was lower where completion of the C-HOBIC assessments was not integrated. Satisfaction was the lowest in the home care sector, and data indicated that a major hurdle is in accessing web-based information during visits to patient homes. The lack of integration of C-HOBIC assessments with other information systems and with existing nursing processes represents the main barrier to nurse satisfaction with C-HOBIC.

In summary, early indications are that C-HOBIC has a positive impact on professional practice by enabling nurses to share information and focus on patient outcomes.

“[For us to use reports in that way will require] our staff to get used to taking these reports and really looking at the value of seeing what they have in them... actually seeing it work, having success stories come out of it, [seeing] results, progress.... Once they [the nurses] have seen this, then they’ll look at these reports and share them again at every meeting. Then they’ll use these reports over and over again.”

C-HOBIC User

However, as with other efforts to improve evidence-based care, it takes time for users to incorporate the C-HOBIC processes and use the information in professional practice. The lessons learned in C-HOBIC will be valuable to other EHR initiatives that will face similar challenges as more clinical repositories become structured and mature enough to provide a basis for aggregate data analysis and the creation of new evidence-based practices.

Based on these findings, we recommend that the C-HOBIC initiative continue with a focus on enabling the integration of C-HOBIC information within local nursing practice. In facilities where C-HOBIC information has been effectively integrated into the nursing workflow (even to small extents such as attaching a C-HOBIC report to the patient kardex), the feedback received from the participants has been clearly positive and the benefits for patient care were easily articulated. The need to address technical workflow issues causing access barriers and preventing integration with existing data collection systems is critical for future success at new and existing facilities.

The *C-HOBIC Benefits Evaluation Final Report* is available at http://www.cna-aiic.ca/c-hobic/presentations/default_e.aspx.

12. Key Learnings

▪ Nurses do matter

To date, much of the focus of EHRs has been on lab, pharmacy and diagnostics; however, C-HOBIC is changing this by focusing on nurses as end-users. There are 270,845 registered nurses (CNA, 2008) and 67,300 practicing licensed practical nurses (CIHI, 2007) in Canada. Nurses practice across the health-care continuum and play a key role in the delivery of health-care. Nurses exercise clinical judgment in the provision of quality patient care, and it is important that they have access to current information regarding the clinical status of the patients they care for at the point of care. As key members of the health-care team, they require access to view and update patient-centred information to support clinical decision-making and integrated patient management across the continuum of care.

▪ There is an impact on the workflow of clinicians

Decisions related to technology influenced the ability of health-care professionals to use C-HOBIC measures effectively. For clinicians to be engaged in the EHR, it is key that they are able to access clinically relevant information at the point-of-care. This challenges developers to design systems that can be accessed anywhere, such as at the patient's bedside and in the home. This has to be achieved without multiple logons, which currently occur due to the lack of integration in clinical systems.

In Manitoba, the historic decision to use generic logins satisfying security standards greatly limited the ability of individual nurses and other users to log on. Other issues included improper configuration of networks limiting access to reports. Overall, users in all three provinces reported a lack of access to computers, both stationary and handheld. Nurses also reported a lack of access from remote sites. These technological issues caused frustration and nurses lost faith in the opportunities of using C-HOBIC measures to achieve patient outcome information. As evidenced in the evaluation, there is a need to address technical workflow issues that currently cause barriers and prevent integration with existing data collection systems. Nurses need to be equipped to integrate technology seamlessly within their workflow, and they want better tools to work more safely and efficiently, and to communicate more effectively with the patient and other health-care providers.

▪ Change management is key

The collection of standardized clinical outcomes at different points in the health-care continuum is new. Nurses, as with other clinicians, have not had easy access to information they can use in making patient care-related decisions. Much of the information is contained in paper-based records. The collection of C-HOBIC information allows nurses to look at where a patient was

on admission related to the C-HOBIC measures of function, readiness for discharge, symptoms and safety measures, and to use this standardized information over time to see how patients are improving and identify areas where further interventions are required.

Health-care professionals from all three provinces cited a lack of understanding of the relationship between patient outcomes and nursing interventions. This lack of connection may be related to the fact that nurses have not had access to outcomes information to be able to see how their practice is impacting the health of the people to whom they provide care. The collection of standardized clinical data to generate outcomes information at different times throughout the course of care offers the opportunity to support nurses in using outcomes information to identify which best practices lead to improved outcomes.

Nurses reported a concern related to the interpretation of reports. Currently, nurses in administrative positions are primarily using the reports. This use supports the notion that it is not enough to provide clinicians with information, but that education is required to support them in using the information in their practice. For home care and long-term care where assessments are done only quarterly, the timeline of the C-HOBIC project did not allow for nurses to become familiar with the reports. While one component of the C-HOBIC project provided workshops for clinicians, one workshop was probably not adequate, and there is a need to provide further education on using standardized clinical outcomes information to look at practice.

▪ **Use standardized clinical outcomes for performance management**

The effectiveness of a health-care system should be judged by how well it improves patient function and quality of life through patient-centred, efficient and effective care. In the focus groups, nurses stated that they will use the C-HOBIC measures within the CQI teams to get reports out and share information. For example, nurses stated that if the reports demonstrated there was more skin breakdown among patients, they could target practice in this area and monitor progress.

The collection and reporting of this information at the unit and organizational level will support benchmarking and examining of best practices to support quality improvement.

▪ **Standardized clinical outcomes information does lead to improved care**

In a long-term care home in Ontario with wireless connection, nurses are taking a laptop to resident rounds, going into the database with the family and showing them where their mother was on admission for C-HOBIC scores and where she is now. The information is displayed in graphs, so it can be easily interpreted by the nurse and the family member – and since the report is standardized, it is comparable over time. Nurses in the C-HOBIC evaluation reported that having access to four assessments over a 12-month period allowed them to trend a patient over time.

Nurses reported that the assessment of pain using a scale of 1-10 allowed them to see if and when patients were improving. In the focus group, one nurse reported that on admission, the score was 9, but when the patient was discharged, the score was 2. The pain had improved. Nurses in acute care reported they could use the information to prevent readmissions. By accessing the therapeutic self-care on admission, they could identify the areas where the patient required teaching prior to discharge and focus their practice on these areas.

Some organizations reported sending C-HOBIC information when a patient was transferred from acute care to long-term care. Since the same information was being collected in acute care and long-term care, the long-term care nurses were able to see what the patient's outcomes were on admission and then discharge from acute care. Currently, this process is manual, but the opportunity exists for the electronic transmittal of these standardized data to truly have longitudinal clinical information at the point of care.

▪ **Secondary use of C-HOBIC data**

Standardized clinical information is beneficial to policy-makers and researchers. Both require information to inform the decisions they must make. These decisions may include such things as the ratio of registered nurses to practical nurses, and the number of nurses and hours of nursing care per patient day for various hospital and nursing home units caring for patients with different health problems. One of the most important factors to consider in making these types of decisions is their impact on patient clinical outcomes. However, in almost all jurisdictions, patient outcomes have not been easily available, if available at all. This lack of information has led to costs becoming the primary driver in the decisions.

The availability of standardized clinical outcomes captured in C-HOBIC changes the picture. Information can be aggregated and available to administrators and policy-makers through databases. Thus, decision-makers can examine a variety of settings with different configurations and ratios of staff and the patient outcomes associated with them. Additionally, different configurations and ratios of personnel can be put in place and patient outcomes tracked for predetermined lengths of time to see if particular configurations are associated with better patient outcomes. Comparing patient outcomes and the organization and configuration of staff from all the organizations treating similar types of patients across the health authority or jurisdiction holds the potential to identify the most productive ways of organizing staff to achieve the best outcomes. Health services researchers will benefit from these data. The primary collection of clinical outcomes data from patients is expensive and time-consuming. The availability of standardized information in databases should increase the efficiency and reduce the cost of conducting research that requires clinical patient outcomes in order to answer the research questions.

For further lessons learned throughout the course of this project, see Appendix C.

13. Recommendations

▪ Mapping from ICNP to SNOMED-CT

The *Mapping Canadian Clinical Outcomes in ICNP* report demonstrates that mapping of the C-HOBIC concepts is achievable; however, there were concepts that were unable to be mapped. ICNP representatives are extremely supportive of the work that is being done in Canada and would like to continue to collaborate with the C-HOBIC team. The collaboration between ICNP and SNOMED-CT offers the opportunity to explore mapping of the concepts so that the standardized clinical outcomes can be included in EHRs to support clinicians' decision-making for quality patient care.

▪ Build on existing strategies to address data standards as a foundation block

Clinical data standards are the building blocks toward interoperable systems, including EHRs. It is important that nurses understand the need for standards and the impact on care delivery. If standardized across an organization, nursing information can be compared to identify practices that improve patient outcomes and those that do not. Nursing data organized in a standard way can also be shared and compared across regional or national databases to identify trends, report outcomes and research new opportunities to improve nursing practice.

There is an urgent need for awareness about clinical data standards and the benefit of this information at all levels of the health-care system. The extension of the C-HOBIC project offers Canada Health Infoway the opportunity to continue connecting with provincial/territorial nursing leaders and practicing nurses across Canada.

▪ Deploy varied approaches to support nurses in making “value link” for outcomes

Nurses in all provinces cited a lack of understanding of the relationship between patient outcomes and nursing interventions. The C-HOBIC concepts have strong evidence linking them to nursing practice; however, there is a need to assist nurses in making the link between evidence-based outcomes and nursing interventions. The C-HOBIC project provided one educational session for nurses, but further work in this area is required. One suggestion by the steering committee was the development of a fact sheet. Ongoing work is required to assist nurses to use outcomes information that is available over time. Increased awareness and education regarding use of outcomes information and interpretation of reports will enhance the ability of a nurse to achieve improved patient outcomes.

▪ **Increase the time between implementing C-HOBIC and evaluating its success**

Integration of change into practice requires time. Change management is often a sorely neglected component of any implementation. The evaluation of this project was premature; several respondents indicated in their comments that they need time to change their practice and fully integrate the use of information into their patient care decision-making process. The data from Ontario long-term care clearly indicated that approximately one year is required before benefits begin to be seen. This time was not available given the duration of this project.

▪ **Continue engagement with academic leaders across Canada**

It is vital that engagement of academic leaders who are responsible for influencing and delivering nursing education continues. There is interest in standards and a willingness to incorporate information about C-HOBIC into nursing programs. This will support the sustainability of C-HOBIC as graduate nurses will understand the need for standardized information and know how to use this information in examining practice.

▪ **Involve nurses in design, deployment and use of information systems**

Nurses who participated in C-HOBIC reported issues with access to the Internet, multiple logons to different systems and inconsistent password renewal times. Nurses need to be part of the redesign of information systems so they can be efficient in the management of patient information. There is a need for information that crosses the continuum of care and is easily accessible to clinicians at the point of care. Current information systems do not meet the workflow and information flow requirements of nurses. This does and will continue to hinder the adoption of EHRs. Nurses and their interdisciplinary colleagues require innovative technology to simplify their work and provide them clinical guidance for the safety of their patients.

14. Conclusion

C-HOBIC measures are changing practice standards related to patient assessment and documentation using standardized clinical terminology to generate patient outcomes. While the timelines for this Canada Health Infoway-funded innovation and adoption project were a limitation to adoption, there is evidence that with leadership and time for integration into practice, nurses are beginning to use this standardized data to inform practice. This project has demonstrated a model for the convergence of practice and information standards – a model that can be used by other health-care professionals.



15. References

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Appendix A: C-HOBIC Steering Committee

- Lucille Auffrey, Chief Executive Officer, Canadian Nurses Association (2007-2008)
- Rachel Bard, Chief Executive Officer, Canadian Nurses Association (2009)
- Vanessa Burkoski, Provincial Chief Nursing Officer, Nursing Secretariat, Ontario Ministry of Health and Long-Term Care
- Brenda Canitz, Assistant Executive Director, Office of Nursing Policy (2007-2008); Marielle Demers, Assistant Executive Director, Office of Nursing Policy, Health Canada (2008-2009)
- Amy Coenen, Manager, International Classification for Nursing Practice, International Council of Nurses
- Jan Currie, Vice President and Chief Nursing Officer, Winnipeg Regional Health Authority
- Lynn Digney Davis, Chief Nursing Officer, Workforce Planning Branch, Saskatchewan Ministry of Health
- Brent Diverty, Director, Continuing and Specialized Care Information Services, Canadian Institute for Health Information
- Patrice Drake, Nursing Policy Analyst, Corporate Services, Prince Edward Island Ministry of Health
- Roger Girard, Chief Information Officer, Manitoba eHealth Program
- Nora Hammell, Director of Nursing Policy, Canadian Nurses Association
- Sandra MacDonald-Rencz, Executive Director, Office of Nursing Policy, Health Policy Branch, Health Canada
- John McKinley, Assistant Deputy Minister, Health Information and Investment Division, Ontario Ministry of Health and Long-Term Care
- Lynn Nagle, Principal, Nagle and Associates
- Bruce Penner, Vice President, Momentum Healthware
- Dorothy Pringle, Executive Lead, Health Outcomes for Better Information and Care
- Julie Richards, Group Director, Canada Health Infoway
- Charlotte Weaver, Senior Vice President and Chief Clinical Officer, Gentiva Health Services
- Karen Zimmer, Director, Corporate Services, Health Information Solutions Centre, Saskatchewan Ministry of Health

C-HOBIC Project Team

- Dr. Kathryn Hannah, Executive Project Leader
- Peggy White, National Project Director
- Sharon Paton, National Project Manager
- Krista Balenko (2007-2009), Gary Tokatelian (2009). Canada Health Infoway Project Lead

C-HOBIC

Appendix B: Communication Log

Communication Log	
Announcement of funding at e-Health Conference by Richard Alvarez	May 28, 2007
<i>What's New</i> – Project highlights posted on the CNA website	July 2007
Announcement about C-HOBIC mailed to 45 stakeholders	July 24, 2007
Visual for C-HOBIC developed	August 2007
<i>Nursing and Electronic Health Records</i> – Project Q&As posted on the CNA website	August 2007
Article in <i>Interchange</i> News from the Canada Health Infoway Standards Collaborative and Solution Architecture Group	Summer 2007
Backgrounder for C-HOBIC developed for distribution	August 2007
Initial steering committee representatives from participating partners	September 11, 2007
Terminology Workshop with 30 expert “informaticians” from across Canada and the U.S. Representation from ICNP	September 30, 2007
Article in <i>Canadian Nurse</i> (circulation 120,000+): CNA Takes the Lead in Canada Health Infoway C-HOBIC Project, September 2007, page 18	September 2007
Plenary session at CNIA Conference (Canadian Nursing Informatics Association) – reach 200 “informaticians” from across Canada	October 2, 2007
CNA C-HOBIC webpage (www.cna-aiic.ca/c-hobic) launched	October 4, 2007
E-mail to International Medical Informatics Association, Nursing Informatics, from Kathryn Hannah. Received interest from U.S., Norway and Holland	October 15, 2007
Presentation at Dorothy Wylie Leadership Institute – Reach 95 nurses from across Canada	October 13, 2007
Abstract submitted to e-Health for May 2008	October 21, 2007
Presentation to provincial MDS coordinators (20 people) meeting – Saskatchewan	November 7, 2007
Progress report to CNA board of directors in the CEO Report	November 22, 2007
Keynote by Kathryn Hannah at the CAUSN (Canadian Association of University Schools of Nursing) annual conference on technology and innovation – C-HOBIC	November 23, 2007
Canada Health Infoway Showcase	December 5, 2007
Presentation to CNA informatics group – informatics counterparts from CNA provincial nursing constituent organizations	December 11, 2007
ICNP bulletin – ICN webpage: article about C-HOBIC	December 2007
Article & picture from Canada Health Infoway Showcase in <i>Canadian Nurse</i>	February 2008
Update about C-HOBIC to CNA directors and CNA policy staff by Nora Hammell	February 2008
Progress report to CNA board of directors	February 2008
Nora Hammell included as highlight in CNA annual report for meeting in June 2008	February 2008
C-HOBIC project highlighted in <i>EHR News at Infoway</i>	Volume 6 - Winter 2008
Web-ex meeting with 35 representatives from Siemens International to discuss the work of C-HOBIC. Presentation by Kathryn Hannah and follow-up opportunity for questions	March 11, 2008

Appendix B, continued

Presentation by Kathryn Hannah at the Canada Health Infoway – <i>Partnership Conference Standards: Show, Share, & Celebrate Success</i>	April 7, 2009
Canada Health Infoway Partnership Conference InfoFair – booth display	April 7, 2008
Cerner Resource User Group meeting presentation	May 2, 2008
Canada Health Infoway I&A Projects workshop presentation	May 4, 2008
e-Health conference – Poster presentation	May 5-6, 2008
Canadian Nursing Informatics breakfast meeting – introduction of C-HOBIC and launch of mapping report	May 6, 2008
Presentation at Saskatchewan Registered Nurses Association Conference	May 8, 2008
Article – <i>Canadian Nurse</i> on C-HOBIC	May 2008
Community health nurses 2nd annual conference – workshop on C-HOBIC	May 29, 2008
Manitoba Nursing Informatics Association presentation	June 4, 2008
Canadian Nurses Association biennial convention – presentation on C-HOBIC	June 17, 2008
Invited to present to provincial Chief Nursing Officers meeting	June 20, 2008
Presentation to CIHI – Jean-Marie Berthelot	June 16, 2008
Presentation to RNAO e-Health Champions on C-HOBIC – 60 nurses from Ontario	June 24, 2008
Presentation at Siemens First Nursing Informatics Symposium – 105 participants from across North America	July 31, 2008
Presentation to the 1st Annual Atlantic Canada Nursing Informatics symposium – 85 participants	October 3, 2008
Presentation at Dorothy Wylie Leadership Institute – 95 nurses from across Canada	October 18, 2008
Presentation Ryerson Faculty	November 18, 2008
Presentation at 8th Edition of e-Health and Medical Records – Insight Conference	November 25, 2008
Saskatchewan Registered Nurses Association (SRNA) circulation of C-HOBIC brochure developed by Saskatchewan team to special interest groups	December 2008
E-Health 2009 Leadership in Action – concurrent session	June 1, 2009
<i>Journal of the American Medical Informatics Association</i> – Standardizing Nursing Information in Canada for Inclusion in Electronic Health Records: C-HOBIC. Hannah, Kathryn J., White, Peggy A., Nagle, Lynn M., Pringle, Dorothy M.	July/August 2009
International Council of Nurses 24th Quadrennial Conference	June 27 - July 4, 2009
Principal Nursing Officers – meeting	October 8, 2009
Fall 2009 Infoway Partnership Conference – concurrent session	November 2, 2009
Infofair Infoway Showcase of Success – display	November 2, 2009
Canadian Nurses Informatics Association (CNIA) 2009 – Nurse 2.0 – Panel presentation	November 23, 2009

Appendix C: C-HOBIC Best Practices/Lessons Learned Log

Date		Comments
July 2007	It is important to have outcomes on EHRs, but there is also a need for interventions to link with the nursing-sensitive outcomes in order to determine cause and effect relationships.	Mapping session on September 30 addressed how to move forward in this area.
July 2007	Initiating work in the summer is problematic due to the availability of the people that are needed to address issues.	
August 2007	Do not begin timelines until Project Charter and SOW completed and approved by all parties.	Deliverables for C-HOBIC began for April-June 2007 but the announcement of funding did not occur until May 28, 2007, and the Charter and SOW were not completed until September 2007. In addition, the Executive Project Leader and National Project Director contracts did not officially start until June 2007. This delayed start-up.
September 2007	It is important to have continuity in the people/teams that sign on.	In PEI and Saskatchewan, the teams that signed on initially have changed. Most of the time in the initial meetings was getting people up-to-date on what the project was about.
October 2007	Provincial priorities can change related to new leaders/new governments.	Saskatchewan has made the lab initiative a provincial priority. This impacts resources available for other initiatives.
October 2007	<p>“In-kind” time:</p> <ul style="list-style-type: none"> ▪ is a challenge to capture ▪ should be kept to a minimum in the contract to reduce pressure on the partners rather than estimating, including contributions from all levels and departments, which may be hard to track 	Three provinces and one national organization are working on this. All with many other initiatives to deal with. It is important to identify one key person within each province to take a lead on tracking in-kind.
October 2007	<p>Deliverables & SOW:</p> <ul style="list-style-type: none"> ▪ Too much detail in deliverables is restrictive and increases communication demands for altering small steps of the work. ▪ When funding is dependent on percentages, those percentages should be stated and not implied. 	Canada Health Infoway may want to consider providing guidelines and also partnering re: preparation of SOWs. While project key deliverables and timelines are important, there is a need to consider how much detail should be provided and the implications of too much detail on reporting and of receiving funds.

Appendix C, continued

November 2007	Governance models for cross-jurisdictional projects	The steering committee was structured to provide strategic direction for this project; however, it may be advisable to have 1-2 people from each province in key positions who can take ownership of this for their province, and have this group connect monthly (via conference call) throughout the remainder of the project.
November 2007	Interest from other provinces	Other provinces are interested in participating in C-HOBIC. We may need to explore ways to allow this to occur as it is important to introduce the C-HOBIC concepts when organizations are building their electronic health record.
November 2007	In-kind time	Holding a teleconference to review the importance of, and how to document, in-kind contributions with lead staff in SK was very successful.
December 2007	Decision re: notification from PEI re: Provincial EHR strategy	<ul style="list-style-type: none"> ▪ For future provinces, we may need to get approval to participate from senior team in Ministry – ADM level or higher. ▪ There was a significant delay in time from when provinces agreed to participate to when funding was approved (>1 year). Many changes occurred in priorities within this province. ▪ Interest and enthusiasm from key nursing leads in provinces may not be enough.
January 2008	Getting approvals/sign-offs within Ministries	Build extra time in the beginning to get Ministry commitment and appropriate sign-offs from each department that will be required to participate. Because of the long time from initial discussions to announcement to initiating work with the provinces, the team has had to meet/engage/involve different divisions within the Ministry. Also, different divisions are involved in different aspects of the deliverables: privacy, architecture, education, etc. This has resulted in delays in timelines and deliverables.

Appendix C, continued

February 2008	Include provincial partners in the development of the deliverables so that deliverables and timelines agreed upon by all.	Deliverables were developed based on Ontario model; however, this model is different for the other participating partners. In Saskatchewan, they are working with existing data collection and focusing on the use of the data. Include provincial partners in the development of the deliverables rather than seeking their approval afterwards, which increases the likelihood that details of the deliverables will be overlooked. This would result in deliverables and timelines that are agreed upon by all.
March 2008	Stakeholder organizations have expressed interest in incorporating these standardized concepts into their CIS, but this is not always possible due to the timelines within which they are working.	Work with vendor community to incorporate C-HOBIC concepts into CIS.
May 2008	Interest in collecting standardized information reflective of nursing across all sectors. Many not sure how to approach this and where to connect with others that are doing similar work.	Need for leadership in this area and to provide a venue for people to connect about this type of work.
June 2009	In-kind too burdensome to collect in a large multi-jurisdictional initiative.	Canada Health Infoway may want to develop guidelines for future initiatives.
January 2009	Saskatchewan identified that the knowledge of nursing-sensitive outcomes is seen as very positive regardless of the way automation occurs.	Nurses have not had access to standardized evidence-based clinical information or the opportunity to improve practice; however, there is a need for leadership that creates the 'value link' of this information and supports nurses in using it to examine practice through a variety of approaches: education, time.
January 2009	Manitoba identified that historical technology decisions can significantly impact delivery. Past practice in creating generic logins to systems by nurses following accepted security standards led to a large group of clinical users without network login.	Many logins into different systems continues to be challenge for clinicians.
January 2009	Manitoba identified that site infrastructure requires appropriate connectivity and functionality. During training sessions, networks were not configured properly to provide access to reports even though the MDS application could be accessed.	

Appendix C, continued

January 2009	Even in a small project, engage in change management activities and provide significant follow-up after the implementation to ensure use and compliance.	Change management is important. Leadership plays a key role in this area.
February 2009	In conducting the evaluation, realized that many nurses do not have access to e-mail in their organization.	Developed a process for paper-based surveys – added to cost and also time for analysis.
February 2009	Internet access for nurses and other clinicians is an issue.	If clinicians are to engage in and use EHRs, they need to be able to access information at the point of care.
March 2009	Privacy impact assessment completed in Manitoba as part of Momentum implementation, but not threat risk assessment.	Data are currently being collected as part of larger initiative but not part of electronic health record.
March 2009	Saskatchewan did not conduct PIA but rather developed DataMart agreements with each region.	Data are currently being collected as part of larger initiative but not part of electronic health record.
April 2009	Nurses see value of having this information available in planning for care.	Providing clinical information in a standardized way does add value to the quality of health care.
May 2009	Conducting evaluations in environments where there are many other things occurring (surveys, QI initiatives, research projects) is a challenge.	In Phase 2 we will need to examine the environment where evaluations are occurring and develop a strategy to engage nurses in participating in the evaluation.
June 2009	Nurses need time to make the change and begin to use outcomes information in their practice.	Evaluation supports that with time, nurses will begin to use this information.
November 2009	Follow-up from presentation to the provincial Chief Nursing Advisors and panel at the Canadian Nursing Informatics Conference – there continues to be interest in collecting standardized information that can be available to clinicians across the continuum to use in planning for and evaluating care.	Need to continue to advance this work and ensure that electronic health records contain information that is of value to all clinicians – support end user engagement.



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