

**MAPPING
CANADIAN CLINICAL OUTCOMES
IN ICNP**

Acknowledgments

This report was prepared for the Canadian Nurses Association by Margaret Ann Kennedy, RN, PhD, of Kennedy Health Informatics Inc. The development of the mapping, through research, analysis and a consensus forum, was part of a national project, Canadian Health Outcomes for Better Information and Care, led by the Canadian Nurses Association in partnership with the ministries of health of Ontario, Prince Edward Island and Saskatchewan and with investment from Canada Health Infoway's Innovation and Adoption Program.

The Canadian Nurses Association and the C-HOBIC project wish to acknowledge the extremely valuable contribution of the participants in the national forum, listed in the Appendix.

All rights reserved. No part of this document may be reproduced, stored in a retrieval system, or transcribed, in any form or by any means, electronic, mechanical, photocopying, recording, or otherwise, without written permission of the publisher.

International Classification for Nursing Practice (ICNP) is a registered trademark of the International Council of Nurses.

Published by the Canadian Nurses Association
50 Driveway
Ottawa, ON K2P 1E2

Tel.: 613-237-2133 or 1-800-361-8404
Fax: 613-237-3520
Website: www.cna-aicc.ca

April 2008

ISBN 978-1-55119-221-5

© Canada Health Infoway 2008

Canada Health Infoway is a federally funded, not-for-profit organization that is leading the development and adoption of electronic health records across Canada.

Executive Summary

In 2007, Canada Health Infoway (Infoway) provided funding to enable the Canadian Nurses Association (CNA) to partner with three provinces in collecting information on evidence-based, nursing-sensitive patient outcomes. The ministries of health of Ontario, Prince Edward Island and Saskatchewan are partners in the project to adapt nursing data collection scales and concepts already being used in the Health Outcomes for Better Information and Care (HOBIC)¹ project to strategically document, track and analyze nursing contributions to patients' health outcomes. Using International Classification for Nursing Practice® (ICNP®) Version 1.0 as the coding structure for this project, nurses in different provinces and territories, for the first time in Canadian health-care history, are able to utilize a standardized nursing documentation method for capturing, analyzing and reporting nursing-sensitive outcomes for inclusion in the pan-Canadian health record.

The project marks a watershed moment in Canadian nursing history. This work addresses gaps in health information related to nursing's contribution to patient care and also addresses the need for standardized nursing data for inclusion on patient admission and discharge summaries. The major deliverable of this project is nursing content documented in a standardized clinical terminology and coded in a format suitable for inclusion in the electronic health records being developed or implemented by the three participating provinces. Further, this work provides an opportunity for Canadian nurses to make substantive contributions to the ongoing development of the standardized clinical terminology of nursing, the International Classification for Nursing Practice.

The International Classification for Nursing Practice is the terminology endorsed by the Canadian Nurses Association for documenting professional nursing practice in Canada. 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 (ICN, 2005). Released in 2005, ICNP Version 1.0 is substantively different from previous iterations (Beta, Beta 2), and presents a new model unifying all previous ICNP axes. The new ICNP 7-axis model is used to generate statements of nursing diagnoses, nursing interventions and nursing outcomes and was developed using web ontology language (OWL) and Protégé software (ICN, 2005). Also new to Version 1.0 is the inclusion of catalogues of pre-combined terms. Catalogues, which are composed of subsets of diagnoses, actions and outcomes specific to various practice areas, continue to be developed.

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

- functional status (ability to perform various activities of daily living)
- therapeutic self care (readiness for discharge)
- symptom management (pain, nausea, fatigue, dyspnea)
- safety outcomes (falls, pressure ulcers)

¹ Health Outcomes for Better Information and Care (HOBIC) is a project of the Ontario Ministry of Health and Long-Term Care. The national project led by CNA builds on that work through the generosity of the Ontario Government. The national project is called C-HOBIC – Canadian Health Outcomes for Better Information and Care. See www.cna-aicc.ca/c-hobic/about/default_e.aspx for more information.

Mapping challenges were related to limitations inherent in the developmental stage of ICNP Version 1.0, such as a lack of granularity and comparable terms. ICNP terms were needed that would effectively capture the intent and scope of the original HOBIC concepts as well as the new C-HOBIC concepts. Such challenges provided an opportunity for Canadian nurses to contribute to the iterative development of ICNP by proposing for inclusion multiple new terms and a catalogue of pre-combined terms that are uniquely Canadian and reflect C-HOBIC concepts.

A national forum was held in Toronto on Sept. 30, 2007, to solicit feedback and foster consensus among C-HOBIC partners, nurse educators, nursing informatics experts and nurse researchers (Appendix). The initial mapping of HOBIC concepts into ICNP Version 1.0 terms was presented to participants of this forum. Canadian nurses from academic settings, government ministries, policy institutions and practice environments, as well as two international ICNP experts, engaged in a rich dialogue with extensive discussions around the original HOBIC concepts, the unique C-HOBIC terms and ICNP term equivalencies or potential new terms.

Fifty-eight (58) HOBIC concepts were matched and validated as C-HOBIC terms at the forum, thirteen (13) HOBIC concepts were partially mapped and required a new term for completion as C-HOBIC terms, twenty-four (24) new C-HOBIC terms were proposed for inclusion in ICNP and one (1) HOBIC concept (“Activity did not occur”) could not be mapped to ICNP. Additionally, two HOBIC ordinal scales were retained for use in C-HOBIC, including the pain scale and the number of falls. Consensus by the group was achieved on all terms and issues. In total, ninety-six (96) terms were addressed in this project. Critical next steps include submission of the terms identified by this project to the ICNP project for review by the ICNP review panel and the creation of the C-HOBIC catalogue.

The 96 terms mapped to ICNP in this project will be the basis of the standardized nursing data used in the C-HOBIC project.

Contents

Executive Summary i
Introduction.....1
International Classification for Nursing Practice.....3
Mapping HOBIC to ICNP Version 1.0.....6

SECTION 1 Functional Status.....7

SECTION 2 Pain11

SECTION 3 Fatigue.....13

SECTION 4 Dyspnea.....14

SECTION 5 Nausea.....15

SECTION 6 Falls.....16

SECTION 7 Pressure Ulcers.....18

SECTION 8 Readiness for Discharge19

Conclusion21
 Next Steps21
 Lessons Learned.....22

References.....23

APPENDIX National Forum Participants24

Introduction

In 2007, Canada Health Infoway (Infoway) provided funding to enable the Canadian Nurses Association (CNA) to partner with three provinces to collect information on evidence-based, nursing-sensitive patient outcomes. The ministries of health of Ontario, Prince Edward Island and Saskatchewan are partners in the project to adapt nursing data collection scales and concepts already being used in the Health Outcomes for Better Information and Care (HOBIC) project to strategically document, track and analyze nursing contributions to patients' health outcomes. This new initiative, C-HOBIC (Canadian Health Outcomes for Better Information and Care), specifically reflects terms that occur across multiple Canadian provinces and is anticipated to standardize data collection across Canada in subsequent applications. Using International Classification for Nursing Practice® (ICNP®) Version 1.0 as the coding structure for this project, the Canadian Nurses Association and its partners are able to demonstrate the feasibility and value of mapping current nursing information to a standardized terminology and position nursing-sensitive patient outcomes for inclusion in the pan-Canadian health record.

The HOBIC program of the Ontario Ministry of Health and Long-Term Care collects data from acute care, complex continuing care, and long-term care, providing valuable insights into the types of data being collected and the gaps in assessment and collection tools. In situations where nursing-sensitive patient outcomes were already being collected, the HOBIC project used existing tools or measures (Ontario Ministry of Health and Long-Term Care, 2006b). Consequently, and under the direction of an expert panel, the HOBIC project captured outcome data utilizing a variety of tools, including RAI, interRAI, MDS, the therapeutic self care (TSC) scale developed by Sidani & Doran, and a nausea scale unique to HOBIC (Ontario Ministry of Health and Long-Term Care, 2006a).

The interRAI tools arise from a network of researchers in over 20 countries. This collection of data management tools (which encompass MDS, RAI and interRAI), is designed to improve health care for persons who are elderly, frail or disabled through evidence-based clinical practice and informed policy decisions. Rather than having a separate application unique to each sector or nursing domain, the new integrated suite of tools, interRAI, shares a common language by referring to clinical concepts in the same way across all instruments and clinical settings (interRAI, 2007), thereby facilitating information exchange and comparability.

Table A. Measurement/Assessment tools used in the HOBIC project.

	Acute Care	LTC	CCC	Home Care
Functional Assessment	interRAI AC	MDS 2.0	MDS 2.0	RAI-HC
Therapeutic Self Care	Sidani & Doran	NA	NA	Sidani & Doran
Pain	Edmonton	MDS 2.0	MDS 2.0	RAI-HC
Nausea	HOBIC	HOBIC	HOBIC	HOBIC
Dyspnea	interRAI AC	interRAI LTCF	interRAI LTCF	RAI-HC
Fatigue	interRAI AC	interRAI LTCF	interRAI LTCF	RAI-HC
Falls	interRAI AC	MDS 2.0	MDS 2.0	RAI-HC
Pressure Ulcers	interRAI AC	MDS 2.0	MDS 2.0	RAI-HC

The C-HOBIC project deliberately positions ICNP Version 1.0 as the sole terminology for use in standardizing nursing data collection and representation in electronic records, across all sectors in which nurses practise, in order to facilitate comparability. The following original HOBIC concepts comprise the scope of outcomes targeted for mapping into the ICNP Version 1.0:

- functional status (ability to perform various activities of daily living)
- therapeutic self care (readiness for discharge)
- symptom management (pain, nausea, fatigue, dyspnea)
- safety outcomes (falls, pressure ulcers)

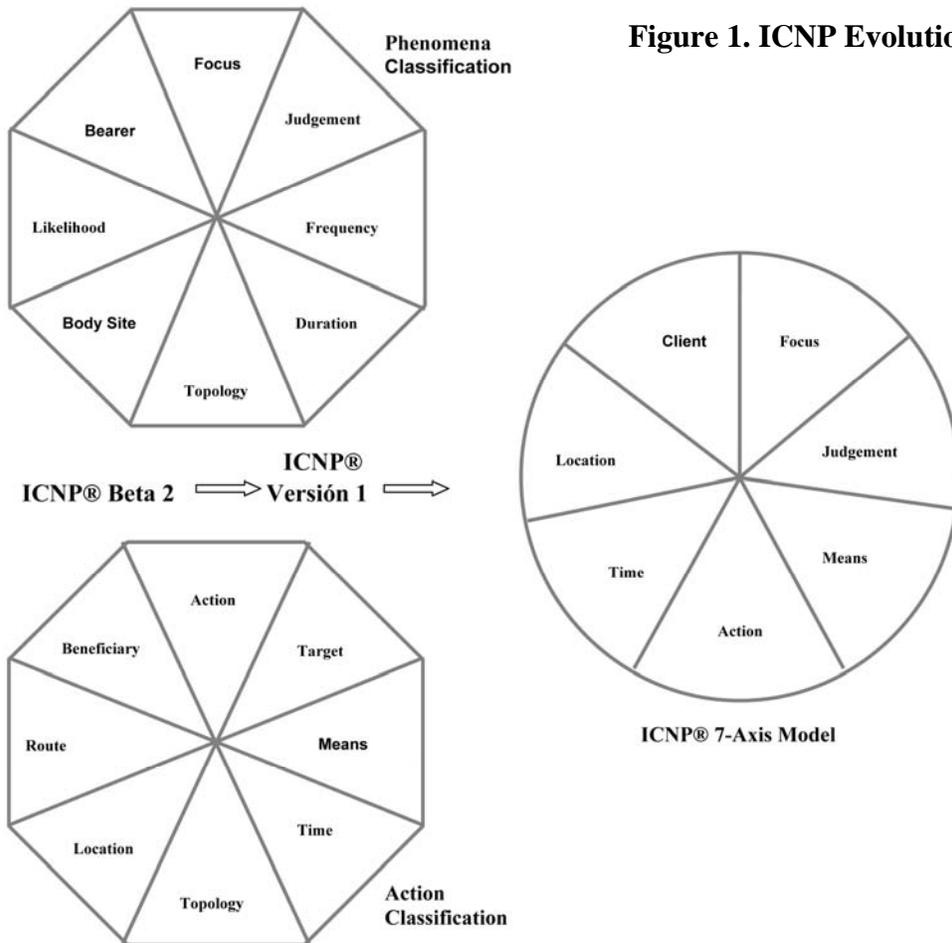
The completed mapping constitutes the C-HOBIC catalogue of pre-combined ICNP terms.

The International Classification for Nursing Practice

The International Council of Nurses (ICN) proposed development of a terminology to specifically represent nursing practice in response to growing concerns regarding the visibility of nursing contributions in health care and calls for standardization of nursing data for comparability and analysis as well as for support of the evolution toward evidence-based practice. The goals were to capture nursing practice across practice settings, cultures or languages, and geographical settings, as well as to ensure that this new terminology could communicate with the numerous nursing terminologies already in use. The International Classification for Nursing Practice (ICNP) was initially proposed and passed by resolution at the ICN 19th Quadrennial Conference in Seoul in 1989 (ICN, 2005). Development of the tool ensued and the Alpha version of ICNP was released in 1995 and pilot tested in several European countries. The Beta version was released in 1999, with a Beta 2 version following in 2001 (ICN, 2005). In each iteration of the tool, development of the axes was strengthened to enable nurses to document their nursing diagnoses, actions and outcomes. The Beta and Beta 2 versions both used two classifications – one for Phenomena (governing both diagnosis and outcome) and one for Action, with eight axes specific to each classification. Further developments resulted in the inclusion of additional terms and several translations. Additionally, centres of ICNP research & development were accredited by ICN and began to emerge in Europe, Australia, Chile and other locations (ICN, 2005).

In 2005, ICNP Version 1.0 was released. Version 1.0 is substantively different from previous iterations (Beta, Beta 2) and presents a new model unifying all previous ICNP axes. ICNP Version 1.0 uses a description logic approach to its development and was developed using web ontology language (OWL) and Protégé software (ICN, 2005). The new ICNP 7-axis model is used to generate statements of nursing diagnoses, nursing actions and nursing outcomes. Also new to Version 1.0 is the inclusion of catalogues of pre-combined terms. Catalogues, which are comprised of subsets of diagnoses, actions and outcomes specific to various practice areas or specialties, continue to be developed. To begin catalogue development, nurses knowledgeable about the health-care needs of clients being served would select a topic for catalogue development. The organization of the content of the catalogue would be determined by the nurses as ICNP diagnoses, outcomes and interventions were identified. ICN (2005) suggests that by developing ICNP catalogues, which are nursing data subsets for specified health concerns, catalogues can fill a practical need in building health information systems with all the benefits of being part of a unified nursing language.

Figure 1. ICNP Evolution (ICN, 2005, p. 28)



Reprinted with permission from the International Council of Nurses. ©2005 International Council of Nurses, 3, place Jean-Marteau, 1201 Geneva, Switzerland. All rights reserved.

ICNP is the terminology endorsed by the Canadian Nurses Association for documenting professional nursing practice in Canada (CNA, 2006). Although Canada Health Infoway, in consultation with various stakeholder groups, adopted SNOMED-CT as the terminology of choice for the pan-Canadian electronic health record, ICNP remains the preferred terminology for nursing. ICN, which holds the intellectual property rights to ICNP, is in exploratory discussions with SNOMED-CT regarding collaboration and ICNP has been included in the World Health Organization’s Family of International Classifications. ICNP has strong capacity to represent nursing concepts, its genesis and context is within the nursing perspective and ICNP has the capacity 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, facilitating harmonization of existing nursing terminologies across practice settings, countries or languages and allowing local adaptation (ICN, 2005).

As noted, Version 1.0 is constructed using seven axes. These include Focus, Judgement, Means, Action, Time, Location and Client. The table below provides definitions for each axis and an example of a term located in each.

Table B. Definitions and Terms for 7-Axis Model in ICNP Version 1.0

Axis	Definition	Sample Terms
Focus	The area of attention relevant to nursing	Elder abuse, Child Bearing, Arterial Ulcer, Fever
Judgement	Clinical opinion or determination related to the focus of nursing practice	High, Partial, Risk, Decreasing Level
Means	A manner or method of accomplishing an intervention	Wound Drainage Bag, Denture, Feeding Bottle, Cast, Nebulizer
Action	An intentional process applied to or performed by a client	Assisting, Patient Advocating, Listening, Resuscitating
Time	The point, period, interval or duration of an occurrence	Always, Onset, Situation, Appointment, Afternoon
Location	Anatomical or spatial orientation of a diagnosis or intervention	Residential building, Anterior, Supine, Abdominal cavity, Finger, Intravenous route
Client	Subject to which a diagnosis refers and who is the recipient of an intervention	Female-headed single family, Community, Elder, Infant

Source: ICN, 2005, pp. 29-30.

Terms are situated within a hierarchical construct and used to create nursing diagnoses, nursing interventions and nursing outcomes. Similar to previous iterations of ICNP, both nursing diagnoses and nursing outcomes **MUST** contain a term from the Focus axis and the Judgement axis and may include terms from additional axes as needed to fully describe the phenomenon of attention. Nursing Interventions **MUST** include a term from the Action axis and the Target axis and may include additional terms from other axes as necessary.

Some examples of nursing statements using ICNP Version 1.0 include the following:

Nursing Diagnosis: Increasing level of pain in left knee joint.

Pain is from the Focus axis.

Increasing level is from the Judgement axis.

Left and knee joint are both from the Location axis.

Nursing Intervention: Analgesic injected.

Injected/injecting is from the Action axis.

Analgesic is from the Means axis.

Nursing Outcome: Pain decreased.

Pain is from the Focus axis.

Decreased is from the Judgement axis.

As with all languages, development of ICNP is ongoing, with research underway in a myriad of countries. Version 1.0 is subjected to ongoing evaluation to refine and enhance not only terms and catalogues but also applications and translations. Collaboration and invitations for contributions to ICNP are continuous. The ICNP website provides direction on ways in which interested individuals or groups can become involved with ICNP development or establish a centre for research and development.

Mapping HOBIC to ICNP Version 1.0

The global process for mapping the original HOBIC concepts to ICNP Version 1.0 terms was conducted in a sequential process. HOBIC concepts were provided by the C-HOBIC national project director. A printed copy, as well as a CD copy of the ICNP Version 1.0 browser, was provided by the director of ICNP.

The initial step was a conceptual analysis of each original HOBIC concept. Each concept (Dyspnea, Pain, Falls, etc.) was separately analyzed, commencing with the specifications for acute care, followed by complex continuing care, long-term care and home care. The entire scope of HOBIC concepts was reviewed prior to any examination of ICNP terms. Additionally, the background of the original HOBIC project was reviewed in detail to provide an intimate working knowledge of HOBIC concepts and the intent governing each concept for documentation purposes.

Similarly, ICNP Version 1.0 was reviewed, both in content and structure. This version differs significantly from previous iterations, and a thorough review was required to ensure an effective working knowledge. Both online and CD versions of the ICNP browser were used in the mapping process, although neither was superior to the other in terms of speed or utility.

In the initial phase of identifying terms in ICNP Version 1.0 for the HOBIC concepts, definitions for each term and concept pairing were compared to facilitate confirmation of equivalencies. Both conceptual and semantic comparability were incorporated throughout the mapping process. Where both conceptual and semantic equivalencies were identified, a C-HOBIC mapping was created. In the instance of both semantic and conceptual equivalencies (i.e., dyspnea), a single C-HOBIC mapping was created. Where either multiple semantic or conceptual equivalencies existed, alternative C-HOBIC mappings were identified for future discussion and validation at the forum. According to the rules governing ICNP statement construction, statements requiring multiple terms cannot be developed using terms from only a single axis. This rule necessitates attention to ensuring that complex terms must originate across multiple axes. For example, “Health Knowledge/Medication” originates in Focus/Status/Knowledge/*Health Knowledge* and Means/Material/Drug/*Medication*.

At the forum, significant discussion validated many C-HOBIC mappings of HOBIC concepts to ICNP terms. In addition, where challenges in mapping existed, either through limitations in ICNP or the nature of the HOBIC concepts (i.e., ordinal data that are difficult to standardize) or where alternate C-HOBIC mapping options existed, participants were able to offer critical feedback to either resolve the selection of the preferred C-HOBIC mapping or strategize a resolution for the challenges of ICNP. Following the forum, discussions based on the feedback and decisions identified in the forum continued regarding the feasibility of a C-HOBIC catalogue of pre-combined ICNP terms.

SECTION 1

Functional Status

The HOBIC concept of Functional Status is reflective of the client's ability to perform activities of daily living (ADL), and the degree to which nursing assistance is required or provided. The specified activities vary slightly across domains but generally encompass hygiene/dressing, nutrition, mobility and toileting.

Functional Status is described in the HOBIC measures as the activities of daily living (ADL) self performance. During the forum, participants agreed that it is preferable to document the level of performance ability as a measure of dependence. New terms are required for ICNP to effectively capture the degrees of dependence identified in the C-HOBIC catalogue of pre-combined terms.

In addition, several new terms were suggested for inclusion in ICNP regarding mobility and location. Feedback from the forum identified including "on unit," "off unit," and "in corridor" (or "hallway") as potential new terms for ICNP. These are frequently used and widely recognized terms across multiple practice domains in Canada. These could reasonably fit under Location/Structure/Social Structure/Health-Care Facility/Health-Care Department (or even more granular to Hospital Ward). Additionally, "in the home" and "outside the home" are also suggested as potential new terms for ICNP. These could be positioned in the pathway of Location/Structure/Social Structure/Home. As an aside, although not identified in the forum, it would be advantageous to have a term for long-term care under the path of Location/Structure/Social Structure/Health-Care Facility in addition to "Nursing Home," which is identified under Location/Structure/Social Structure/Health-Care Facility/Assisted Housing. Like Health-Care Department or Hospital Ward, it would be advantageous to have "on unit" and "off unit" available as children of the main term.

Further, "Locomotion" was suggested for inclusion in ICNP as a broad term under Focus/Status/Ability/Mobility. In this case, it was suggested that "Locomotion" may include assisted ambulation with a walker, crutches or other aid. This term would supplement the current terms of "Ability to Walk," "Bed mobility" and "Wheelchair mobility."

Finally, it was noted that "Upper Body" and "Lower Body" should be new terms proposed for inclusion in ICNP. It was determined at the forum that these two terms are conceptually unique from Body/Lower and Body/Upper as they relate specifically to functional activities of daily living. Consequently, these are also added to the list of new terms proposed for inclusion in ICNP.

Table 1. Functional Status (ADL) Terms for Acute Care Domain

Item	HOBIC Concept	HOBIC Code	C-HOBIC Pre-Combined ICNP Term	C-HOBIC Pre-Combined ICNP Code
Functional Status/ADL interRAI AC: GI	AC ADL SELF-PERFORMANCE – Assess for performance over full 24 hours, considering all occurrences of activity	0- Independent	Dependent/Never	10005778/10013173
		1- Set up help Only	Dependent/Minimal	10005778/(new term)
		2- Supervision	Dependent/Minimal	10005778/(as above)
		3- Limited Assistance	Dependent/Minimal	10005778/(as above)
		4- Extensive Assistance	Dependent/Partial	10005778/(new term)
		5- Maximal Assistance	Dependent/Extensive	10005778/(new term)
		6- Total Dependence	Dependent/Complete	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	

Table 2. Functional Status (ADL) Terms for Complex Continuing Care and Long-Term Care Domains

Item	HOBIC Concept	HOBIC Code	C-HOBIC Pre-combined ICNP Term	C-HOBIC Pre-combined ICNP Code
Functional Status/ADL MDS 2.0: G1a & G2a	CCC/LTC	0- Independent	Dependent/Never	10005778/10013173
	ADL SELF-PERFORMANCE – Assess for resident’s performance over all shifts during last 7 days, not including setup	1- Supervision	Dependent/Minimal	10005778/(new term)
		2- Limited Assistance	Dependent/Minimal	10005778/(as above)
		3- Extensive Assistance	Dependent/Partial	10005778/(new term)
		4- Total Dependence	Dependent/Complete	10005778/(new term)
		8- Activity Did Not Occur		
	Bed mobility		Bed Mobility	10003181
	Transfer		Ability to Transfer	10000204
	Walk in room		Ability to Walk/In room	10000258/(new term)
	Walk in corridor		Ability to Walk/In corridor (hallway)	10000258/(new term)
Locomotion on unit		Locomotion/On unit	New term/new term	
Locomotion off unit		Locomotion/Off unit	New term/new term	
Dressing		Ability to Dress	10000145	
Eating		Ability To Feed Self	10000166	
Toilet		Ability To Toilet Self	10000197	
Personal hygiene		Ability to Groom Self	10000178	

Table 3. Functional Status (ADL) Terms for Home Care Domain

Item	HOBIC Concept	HOBIC Code	C-HOBIC Pre-combined ICNP Term	C-HOBIC Pre-combined ICNP Code
Functional Status/ADL RAI:HC H2	HC	0- Independent	Dependent/Never	10005778/10013173
	ADL SELF-PERFORMANCE – Assess for resident’s performance over all shifts during last 7 days, not including setup	1- Set up help Only	Dependent/Minimal	10005778/(new term)
		2- Supervision	Dependent/Minimal	10005778/(as above)
		3- Limited Assistance	Dependent/Minimal	10005778/(as above)
		4- Extensive Assistance	Dependent/Partial	10005778/(new term)
		5- Maximal Assistance	Dependent/Extensive	10005778/(new term)
		6- Total Dependence	Dependent/Complete	10005778/(new term)
		7- Activity did not occur		
	Bed mobility		Bed Mobility	10003181
	Transfer		Ability to Transfer	10000204
	Locomotion in Home		Locomotion/In home	(New term/new term)
	Locomotion outside of home		Locomotion/Outside home	(New term/new term)
	Dressing Upper Body		Ability to Dress/ Upper Body	10000145/(new term)
	Dressing Lower Body		Ability to Dress/ Lower Body	10000145/(new term)
	Eating		Ability To Feed Self	10000166
	Toilet		Ability To Toilet Self	10000197
	Personal hygiene		Ability to Groom Self	10000178
	Bathing		Ability to Bath	10000121

SECTION 2

Pain

The pain measures for both frequency and intensity vary among domains. ICNP Version 1.0 is unable to directly reflect the specific ordinal data collected using the HOBIC pain scales (MDS 2.0: J2a & b; RAI-HC: K4a & b), and after much discussion, it was agreed at the forum to retain the 10-point pain scale, as this type of scale has a wide degree of recognition and use. Additionally, such accepted pain intensity values of low, moderate, high and extreme were identified as acceptable options. Both “moderate” and “extreme” are new terms proposed by the group for inclusion in ICNP. Both new terms can be positioned in the Judgement/State/Absolute Level path. Similarly, the frequency with which patients/clients experience pain cannot be coded directly into ICNP Version 1.0. It was agreed at the forum to retain the frequency measures already contained in ICNP Version 1.0. Further, it was agreed that the term “never” would be used to reflect an absence of pain, rather than “none.”

Table 4. Pain Terms for Acute Care Domain

Item	HOBIC Concept	HOBIC Code	C-HOBIC Pre-combined ICNP Term	C-HOBIC Pre-combined ICNP Code
Pain InterRAI AC: J5a & b	Pain Symptoms	0- No pain	Pain/Never	10013950/10013173
	Assess for last 24 hours	1- Present but not exhibited in last 24 hours	Pain/Sometimes	10013950/10015581/10021289
		2- Exhibited in last 24 hours	Pain/Often	10013950/10015581/10019778
	Pain Intensity level	0- None		
		1		
		2		
		3		
		4		
		5		
		6		
		7		
		8		
		9		
		10- Worst		

Table 5. Pain Terms for Complex Continuing Care and Long-Term Care Domains

Item	HOBIC Concept	HOBIC Code	C-HOBIC Pre-combined ICNP Term	C-HOBIC Pre-combined ICNP Code
Pain MDS 2.0: J2a & b CCC & LTC	Frequency with which resident complains or shows evidence of pain. Assess for last 7 days.	0- No pain 1- Pain less than daily 2- Pain daily	Pain/Never Pain/Sometimes Pain/Often	10013950/10013173 10013950/10018508 10013950/10013658
	Intensity of pain	1- Mild pain 2- Moderate pain 3- Times when pain is horrible or excruciating	Pain/Low Pain/ Moderate Pain/ Extreme	10013950/10011438 10013950/(new term) 10013950/(new term)

Table 6. Pain Terms for Home Care Domain

Item	HOBIC Concept	HOBIC Code	C-HOBIC Pre-combined ICNP Term	C-HOBIC Pre-combined ICNP Code
Pain RAI-HC: K4a & b	Frequency with which client complains or shows evidence of pain: Assess for last 3 days	0- No pain 1- Less than daily 2- Daily- one period 3- Daily- multiple periods	Pain/Never Pain/Sometimes Pain/Often Pain/ Intermittent	10013950/10013173 10013950/10018508 10013950/10013658 10013950/(new term)
	Intensity of pain	0- No pain 1- Mild pain 2- Moderate pain 3- Severe 4- Times when pain is horrible or excruciating	Pain/Never Pain/Low Pain/ Moderate Pain/High Pain/ Extreme	10013950/10013173 10013950/10011438 10013950/(new term) 10013950/10009007 10013950/(new term)

SECTION 3

Fatigue

As all domains used the same measures for data collection, mapping to ICNP was relatively straightforward. Fatigue maps, both conceptually and semantically, directly into ICNP Version 1.0. The preliminary mapping of fatigue mapped to the Judgement/State path, with both Absolute Levels (low, high) and Extent (partial) used to reflect granular extent of fatigue. At the forum, the group reached consensus on low, moderate and high in the Judgement/State/Absolute Level. “None” following the Judgement/State/Extent path is used only to express no experience of fatigue.

Two new terms were proposed for inclusion in ICNP. The first new term is “moderate” and the second is “extreme.” Both terms are suggested for inclusion in the Judgement/State/Absolute Level hierarchy.

Table 7. Fatigue Terms for All Domains

Item	HOBIC Concept	HOBIC Code	C-HOBIC Pre-combined ICNP Term	C-HOBIC Pre-combined ICNP Code
Fatigue interRAI AC: J4, interRAI LTCF: J4, interRAI HC :J4	Inability to complete normal daily activities – e.g., ADLs, IADLs	0- None	Fatigue/None	10007717/10013253
	Assess for last 24 hours (AC)	1- Minimal – Diminished energy but completes normal day-to-day activities	Fatigue/Low	10007717/10011438
	Assess for last 3 days (CCC/LTC/HC)	2- Moderate – Due to diminished energy, UNABLE TO FINISH normal day-to-day activities	Fatigue/ Moderate	10007717/(new term)
		3- Severe – Due to diminished energy, UNABLE TO START SOME normal day-to-day activities	Fatigue/High	10007717/10009007
		4- Unable to commence any normal day-to-day activities – Due to diminished energy	Fatigue/ Extreme	10007717/(new term)

SECTION 4

Dyspnea

Again, all four domains used the same measurement to collect data. Dyspnea maps, both conceptually and semantically, directly into ICNP Version 1.0 for all types. It was agreed that mapping activity intolerance is unnecessary at the time. Consensus was achieved at the forum on dyspnea terms mapped to the Judgement/State/Absolute Level.

Table 8. Dyspnea Terms for All Domains

Item	HOBIC Concept	HOBIC Code	C-HOBIC Pre-combined ICNP Term	C-HOBIC Pre-combined ICNP Code
Dyspnea interRAI AC: J3, interRAI LTCF: J3, interRAI HC: J3	Assess for last 24 hours (AC)	0- Absence of symptom	Dyspnea/None	10006461/10013253
	Assess for last 3 days (CCC/LTC/HC)	1- Absent at rest, but present when performed moderate activities	Functional Dyspnea/Low	10008268/10011438
		2- Absent at rest, but present when performed normal day-to-day activities	Functional Dyspnea/High	10008268//10009007
		3- Present at rest	Resting Dyspnea	10017117

SECTION 5

Nausea

Nausea was presented in all domains using the same HOBIC-specific scale. Nausea, as a concept, mapped both conceptually and semantically directly to ICNP Version 1.0; however, the specifics of each degree of severity do not have an identical term or code. Considerable discussion occurred at the forum, which facilitated clarification of the issues surrounding the measurement of nausea.

Consensus was achieved using the same values as those used in Fatigue. Specifically, low, moderate and high were all values that were identified as being effective in measuring nausea. Again, new terms were suggested for inclusion in ICNP Version 1.0 (moderate and extreme).

Table 9. Nausea Terms for All Domains

Item	HOBIC Concept	HOBIC Code	C-HOBIC Pre-combined ICNP Term	C-HOBIC Pre-combined ICNP Code
Nausea HOBIC Scale	Assess for last 24 hours (all practice domains)	0- No nausea	Nausea/None	10012453/10013253
		1- Mild nausea: occasionally experienced but does not interfere with eating and/or activities	Nausea/Low	10012453/10011438/
		2- Moderate nausea: interferes somewhat with eating and/or some activities most days	Nausea/ Moderate	10012453/(new term)
		3- Severe nausea: interferes daily with eating and/or activities	Nausea/High	10012453/10009007
		4- Incapacitating: remains in bed part of each day due to nausea and interferes with eating and activities	Nausea/ Extreme	10012453/(new term)

SECTION 6

Falls

The ordinal nature of both the number of falls and the specific time frames of assessment is problematic in this section. “Fall” is mapped, both conceptually and semantically, into ICNP Version 1.0 under the Time/Situation/Event path. The remaining criteria of each HOBIC category do not map directly into ICNP, creating an obvious challenge. Discussion at the forum reached consensus with the recommendation that frequency should be used, with the actual numbers of Falls included.

Table 10. Falls Terms for Acute Care Domain

Item	HOBIC Concept	HOBIC Code	C-HOBIC Pre-combined ICNP Term	C-HOBIC Pre-combined ICNP Code
Falls interRAI AC: J1	AC	0- No fall in last 90 days.	Fall/ Never	10007512/10013173
		1- No fall in last 30 days, but fell 31–90 days ago	Fall/Rarely	10007512/10016374
		2- One fall in last 30 days	Fall/Sometimes	10007512/10018508
		3- Two or more falls in last 30 days	Fall/Often	10007512/10013658

Table 11. Falls Terms for Complex Continuing Care and Long-Term Care Domains

Item	HOBIC Concept	HOBIC Code	C-HOBIC Pre-combined ICNP Term	C-HOBIC Pre-combined ICNP Code
Falls interRAI AC: J1 MDS 2.0:MI	CCC/LTC	0- No falls	Fall/Never	10007512/10013173
		1- Fell in past 30 days	Fall/Often	10007512/10013658
		2- Fell in past 31–180 days	Fall/Sometimes	10007512/10018508

Table 12. Falls Terms for Home Care Domain

Item	HOBIC Term	HOBIC Code	ICNP Term	ICNP Code
Falls RAI-HC: K5	HC	0	Fall	10007512
		1		
	Score actual	2		
	number of falls in	3		
	last 90 days	4		
		5		
		6		
		7		
		8		
		9		

SECTION 7

Pressure Ulcers

Although the acute care domain used a different measurement scale than the other three domains, all were relatively amenable to mapping into ICNP. Pressure ulcer has a direct mapping, both conceptual and semantic, to the Focus axis, following the extensions Process/Body Process/Integumentary System Process/Wound/Ulcer/Pressure Ulcer. Considerable discussion was generated at the forum, and consensus was achieved. It was agreed that all domains should use the scale in the following table. It was agreed that the Braden scale was more applicable to all domains and preferable for standardization purposes.

Table 13. Pressure Ulcer Terms for All Domains

Item	HOBIC Concept	HOBIC Code	C-HOBIC Pre-combined ICNP Term	C-HOBIC Pre-combined ICNP Code
Pressure Ulcer MDS 2.0: MI, RAI-HC: N2a	CCC/LTC/HC Record the number of ulcers at each stage – regardless of cause. If none present at a stage, code 0; code 9=9 or more. Code all that apply in last 7 days	Stage 1. An area of persistent skin redness that does not disappear when pressure is relieved	Pressure Ulcer/ Stage 1	10015612/(new term)
		Stage 2. A partial thickness loss of skin layers that presents clinically as an abrasion, blister or shallow crater	Pressure Ulcer/ Stage 2	10015612/(new term)
		Stage 3. A full thickness of skin is lost, exposing the subcutaneous tissues – presents as a deep crater with or without undermining adjacent tissue	Pressure Ulcer/ Stage 3	10015612/(new term)
		Stage 4. A full thickness of skin and subcutaneous tissues is lost, exposing muscle or bone	Pressure Ulcer/ Stage 4	10015612/(new term)

SECTION 8

Readiness For Discharge

Both the acute care and home care domains are measured using a five-point scale developed by Sidani & Doran. It was agreed at the forum that this outcome is a measure of independence rather than dependence (as was the case for Functional Status). Like the dependence scales in Functional Activities of Daily Living, it was agreed that ICNP should contain child terms to capture varying degrees of independence. Further, since ICNP does not map directly to terms such as mild, moderate and severe, it was agreed that these measures should be proposed for inclusion in ICNP. Additionally, it was identified at the forum that no comparable term existed for Knowledge of Physiology of Disease or Ability to Perform Instrumental Activities of Daily Living, and the group suggested that these terms be proposed for inclusion in ICNP.

Table 14. Readiness for Discharge Terms for Acute Care and Home Care Domains

Item	HOBIC Concept	HOBIC Code	C-HOBIC Pre-combined ICNP Term	C-HOBIC Pre-combined ICNP Code
Readiness for Discharge Sidani & Doran	AC/HC Indicate how much you are able to do each care related activity	0- Not at all	Independent/Never	10005778/10013173
		1- Limited ability	Independent/ Minimal	10000075/(new term)
		2- Increased ability	Independent/Partial	10000075/ (new term)
		3- Moderate ability	Independent/Partial	10000075/(new term)
		4- Consistent ability	Independent/Extensive	10000075/(new term)
	5- Very much so	Independent/Complete	10010002/10019876	
	8- Activity did not occur			
	Knowledge of medications currently taking		Knowledge/ Medication	10011042/10011866
	Understand purpose of the medication		Health Knowledge/ Medication	10008753/10011866
	Ability to take medications as prescribed		Ability to Perform/ Medication regime	10000075/10011884
	Recognition of changes in your body (symptoms) related to your illness		Self Awareness/ Symptoms	10017642/10019368

Table 14. Readiness for Discharge Terms for Acute Care and Home Care Domains (cont'd.)

Item	HOBIC Concept	HOBIC Code	C-HOBIC Pre-combined ICNP Term	C-HOBIC Pre-combined ICNP Code
	Understand why you experience some changes in your body (symptoms) related to your illness		Health Knowledge/ Physiology of Disease	10008753/(new term)
	Knowledge of what to do (things or activities) to control these changes		Health Knowledge/Self Care/Symptoms	10008753/10017661/ 10014121
	Ability to carry out the treatments or activities that you have been taught		Ability to Manage Regime	10000068
	Ability to do things or activities to look after yourself and to maintain your health		Ability to Perform Health Maintenance	10000081
	Knowledge of whom to contact to get help in carrying out your daily activities		Health-Seeking Behaviour/Health Service	10008782/10008795
	Knowledge of whom to contact in case of a medical emergency		Health-Seeking Behaviour/ Emergency Services	10008782/(new term)
	Able to perform regular activities (such as bathing, shopping, preparing meals, visiting with friends)		Ability to Perform Instrumental Activities of Daily Living	(new term)
	Able to adjust your regular activities when you experience body changes (symptoms) related to your illness		Ability to Adjust/Self-Care	10000047/10017661

Conclusion

The previous sections have presented the process and products of mapping HOBIC concepts to ICNP Version 1.0 terms to create the C-HOBIC catalogue of pre-combined ICNP terms. In total, ninety-six (96) terms were addressed in this project. Fifty-eight (58) C-HOBIC pre-combined terms were successfully mapped and validated, thirteen (13) terms were partially mapped and required a new term for completion, twenty-four (24) new terms were proposed for inclusion in ICNP and one (1) term (“Activity did not occur”) could not be mapped.

An important outcome of this project has been the response to limitations encountered in mapping concepts to ICNP Version 1.0 terms. Canada is now taking a leadership role in contributing to ICNP development by identifying 24 new terms for inclusion in subsequent iterations of ICNP Version 1.0. These new terms include the following:

- Dependence (five new terms to capture levels of dependency)
- Independence (four new terms to capture levels of independence)
- Locomotion
- In corridor (or hallway)
- In room
- On unit
- Off unit
- In home
- Outside of Home
- Moderate
- Extreme
- Lower Body
- Upper Body
- Physiology of Disease
- Emergency Services
- Ability to Perform Instrumental Activities of Daily Living
- Long-Term Care

Next Steps

The C-HOBIC project has created the first mapping of standardized Canadian terms to ICNP. This initiative currently uses multiple codes to fully capture C-HOBIC concepts, and this use of multiple codes reflects a primitive mapping. If Canada is to adopt a set of nursing-sensitive outcome concepts required for collection (C-HOBIC concepts), it is critical to create a more sophisticated catalogue of ICNP terms that are fully reflective of the concept and the terms used in Canadian nursing data management. Consequently, the creation of a **C-HOBIC catalogue** of terms specifically pre-combined to capture complex concepts is an immediate priority. Discussions with ICN regarding the feasibility of such a catalogue in ICNP resulted in the conclusion that assignment of one code to each of the pre-combined concepts in the C-HOBIC catalogue would provide greater use among vendors, as well as a more simplified coding identification process. For example, “Independent with Activities of Daily Living” would be assigned a single code rather than a combination of codes used for single terms (“Independent,” “Activities of Daily Living”).

The following points were identified by ICN (2005) as criteria for review of terms and concepts:

- Term is within the dynamic domain of nursing.
- Term and definition are not redundant of current terms. (If the term is redundant it will be reviewed for use as a synonym term. If the term is retained as a synonym, a “preferred term” would be identified.)
- Term and definition are expressed in a clinically relevant way.
- Term and definition are congruent with scientific knowledge.
Note supporting evidence, e.g., clinical trials, validation study, literature review.
- Term does not violate the ICNP structure.

The C-HOBIC terms/concepts as expressed in ICNP will be forwarded to the ICNP director for submission to the ICNP review process.

Lessons Learned

The entire mapping process, while validating many issues around nursing documentation and clarifying what kinds of nursing data are important to capture in a pan-Canadian health record, created many learning opportunities. These lessons emerged throughout the mapping process, and most importantly, through the synergistic interactions of the C-HOBIC partners and leaders and the participants attending the forum. Much appreciation is extended to all participants for their commitment and insightful dialogue.

Among the many lessons learned from the mapping process and forum, the following were identified as the most influential:

1. If no terms currently exist in ICNP to accommodate Canadian nursing documentation needs, this should not be considered as a static condition, and HOBIC/C-HOBIC concepts should not be narrowed to “fit” into existing ICNP terms. New options must be proposed to accommodate Canadian needs, and this, in turn, will assist in the development of ICNP.
2. It is critically important to compare definitions of concepts in HOBIC/C-HOBIC and ICNP. New definitions are required for proposed new ICNP terms. Ideally, these should be developed by a team integral to the C-HOBIC project in consultation with the original HOBIC team and the provincial partners. Validation by additional nursing stakeholders should follow.
3. Outcomes must be evidence-based. The terminology for interventions must be appropriately coded using standardized nursing clinical terminology, i.e., ICNP, to support the progression toward consistent collection of comparable data for analysis.
4. As Canadian nurses, we can influence and inform international practices and knowledge. Canadian contributions are welcomed and support the development of nursing and health care practices internationally.

The C-HOBIC project has created the first mapping of standardized Canadian terms to ICNP. Canadian contributions to nursing’s international language are welcomed by the international community. Such contributions support the development of nursing knowledge and the evaluation of health-care practices both in Canada and around the world.

References

Canadian Nurses Association. (2006). *Nursing information and knowledge management* [Position statement]. Ottawa: Author.

International Council of Nurses. (2005). *International Classification for Nursing Practice, Version 1.0*. Geneva: Author.

interRAI. (2007). *An Overview of the interRAI Family of Instruments*. Retrieved September 13, 2007, from <http://www.interrai.org/section/view/?fnode=31>

Ontario Ministry of Health and Long-Term Care. (2007a). *HOBIC interface specifications*, document version: 1.7. Toronto: Author.

Ontario Ministry of Health and Long-Term Care. (2007b). *HOBIC measures*. Toronto: Author.

Ontario Ministry of Health and Long-Term Care. (2006a). *HOBIC phase 1 report, 2001*. Retrieved August 15, 2007, from <http://www.health.gov.on.ca/english/providers/project/nursing/phase1.html>

Ontario Ministry of Health and Long-Term Care. (2006b). *HOBIC update, May 2006*. Retrieved September 13, 2007, from http://www.health.gov.on.ca/english/providers/project/nursing/hobic_update/hobic_update_0506.pdf

APPENDIX

National Forum Participants

Kathryn Hannah, Executive Project Leader,
Canadian Health Outcomes for Better
Information and Care and
Health Informatics Advisor to the
Canadian Nurses Association

Lynn Nagle, Senior Nursing Consultant,
Canada Health Infoway

Dorothy Pringle, Executive Lead,
Health Outcomes for Better Information
and Care
Ontario Ministry of Health and Long-
Term Care

Margaret Ann Kennedy, Terminology
Consultant, Kennedy Health Informatics
Inc.

Amy Coenen, Director, ICNP Programme,
International Council of Nurses

Hyeoun-Ae Park, Terminology Expert
Scientist in Residence, University of
Wisconsin

Robin Carriere, President, Canadian Nursing
Informatics Association

Diane Salois-Swallow, Chief Information
Officer, Southlake Hospital and York
Central Hospital

Valerie Cartmel, Regional Leader
Clinical Informatics, Vancouver Coastal
Health

Tracey Shaben, Clinical Coordinator
Informatics, University of Alberta
Hospital/Stollery Children's Hospital,
Capital Health, Edmonton, Alberta

Sally Remus, Clinical Informatics Director,
St. Michael's Hospital, Toronto, Ontario

June Kaminski, President-Elect,
Canadian Nursing Informatics
Association

Diane Doran, Associate Professor,
Lawrence Bloomberg Faculty of
Nursing, University of Toronto

Irmajene Bajnok, Director,
International Affairs and BPG
Programmes, Registered Nurses'
Association of Ontario

Mary Ann Juurlink, Lead, e-Health
Standards, Ontario Ministry of Health
and Long-Term Care

Diane Kent, Manager Clinical Informatics,
Southlake Hospital, Ontario

Sharon Paton, National Project Manager,
Canadian Health Outcomes for Better
Information and Care

Peggy White, Program Manager, Health
Outcomes for Better Information and
Care (Ontario) and National Project
Director, C-HOBIC

