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Selecting a Standardized Terminology for the Electronic Health Record that Reveals the Impact of Nursing on Patient Care

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Abstract

Using standardized terminology within electronic health records is critical for nurses to communicate their impact on patient care to the multidisciplinary team. The universal requirement for quality patient care, internal control, efficiency and cost containment, has made it imperative to express nursing knowledge in a meaningful way that can be shared across disciplines and care settings. The documentation of nursing care, using an electronic health record, demonstrates the impact of nursing care on patient care and validates the significance of nursing practice. As key stakeholders of the American Nursing Association recognized terminologies, NANDA, NIC, NOC, Omaha System, PNDS, and SNOMED CT describe their respective classification systems to assist administrators, nursing executives, informatics nurses, nurse managers and staff nurses to make decisions concerning the selection of a nursing terminology or a combination of nursing terminologies that best meets their organizational needs.

Key Words: Nursing Terminology, Standardized nursing terminology, NANDA International, Nursing Intervention Classification (NIC), Nursing Outcome Classification (NOC), Omaha System, Perioperative Nursing Data Set (PNDS), and Systematized Nomenclature of Medicine (SNOMED CT)

Introduction

The care nurses provide to sustain life, enable recovery, alleviate suffering and promote health should be captured within the electronic health record (EHR). To share this information between clinical disciplines and care settings, data needs to be recorded and stored in a standardized form. Terminologies are one way to ensure standardization so patient care data can be stored in an unambiguous way. Nursing has numerous terminologies, each developed for a variety of care settings. Selecting the appropriate nursing terminology implementation for use in the EHR can be daunting.

This article will highlight selected American Nursing Association's (ANA) recognized nursing terminologies and their relationships to each other. This discussion will assist in making decisions about the combination of nursing terminologies that best fit your organization's practice and requirements for the EHR.

Benefits of Implementing Standardized Terminologies within Electronic Health Records

Standardized nursing terminologies provide benefits to the patient, the organization, the nursing profession, and each country. Patients benefit from continuity of care being facilitated through the use of standardized terminologies through improved and unambiguous communication between clinicians. Organizations benefit by being able to measure nursing care and its impact on patient care through queries of the patient record instead of costly manual chart audits. This determination of nursing's impact is essential to validating the contribution of nursing to healthcare and patient safety. Furthermore, the organization

benefits from the use of standard terminologies by providing administrators with the actual costs and benefits of nursing care. Then informed decisions can be made regarding staffing ratios. This strategy has been useful for physicians using the Common Procedural Terminology (CPT codes) for billing purposes (Giannangelo & Fenton, 2008). Nurse educators use standardized terminologies in the curriculum to teach nursing concepts that are critical in the nursing process and are vital to developing new nurses (Warren, Connors, & Weaver, 2002). The registered nurse benefits from the use of standardized nursing terminologies to facilitate critical thinking and decision making at the point of care (Dochterman, Titler, Wang, & Reed, 2005). The nursing profession benefits from being provided a means to document, store, and retrieve evidence-based practice in a semantic way to facilitate nursing research and reveal the impact of nursing care through electronic means (Weaver, Warren, & Delaney, 2005). Each country benefits by having retrievable coded data that can be aggregated into informative reports or data sets. These reports allow countries to compare nursing's contribution to care both nationally and internationally using the International Nursing Minimum Data Set. (Goosen, et al, 2006).

The standardized nursing terminologies, recognized by the American Nursing Association (ANA), are the vehicles for the aggregation of nursing data recorded in EHRs which can be used to improve quality of patient care and patient safety. Giannangelo and Fenton (2008) state that EHRs "must use consistent, codified terminology to eliminate ambiguity, confusion, and ensure data correctness and interoperability…standardized terminologies identify the discrete structured data that allow data capture and processing (p. 29)."

American Nursing Association Recognized Terminologies

The ANA Committee for Nursing Practice Information Infrastructure (CNPII) has defined specific criteria used to recognize standardized terminologies. These criteria are foundational to the standardization of nursing documentation and verbal communication that will lead to a reduction in errors and an increase in the quality and continuity of care (American Nursing Association [ANA], 2006, 1). The ANA criteria require that terminologies possess vocabulary that supports nursing and are clinically relevant for the nursing domain. The terminologies need to possess clear and unambiguous concepts with a coding scheme containing one unique identifier per concept. The terminologies must contain documented testing of reliability, validity and clinical usefulness in practice to become recognized (American Nursing Association [ANA], 2006, 1). The ANA recognized nursing terminologies

are listed in alphabetical order in Table 1.

Table 1: ANA recognized terminologies

ANA Recognized Terminologies	Terminology URL	Nursing Process within Terminology	Date Recognized by the ANA	Integrated Within Other Terminologies
CCC Clinical Care Classification	http://www.sabacare.com/	Diagnoses, Interventions, and Outcomes		
ICNP International Classification of Nursing Practice	http://www.icn.ch/icnp.htm	Diagnoses, Interventions, and Outcomes		
NANDA NANDA International	www.nanda.org	Nursing Diagnoses	1992	NLM- UMLS SNOMED CT PNDS HL7 NIDSEC
NIC Nursing Intervention Classification	www.nursing.uiowa.edu/cnc	Interventions	1992	NLM- UMLS SNOMED CT HL7 NIDSEC ABC Codes
NOC Nursing Outcome Classification	www.nursing.uiowa.edu/cnc	Outcomes Indicators	1998	NLM- UMLS SNOMED CT HL7 NIDSEC
Omaha System	www.omahasystem.org	Problem Classification Scheme Intervention Scheme Problem Rating Scale for Outcomes	1992	NLM- UMLS SNOMED CT HL7 NIDSEC LOINC ABC Codes
PNDS Perioperative Nursing Data Set	www.aorn.org/PracticeResources/PNDS	Diagnoses, Interventions and Outcomes	1999	NLM- UMLS SNOMED CT HL7
SNOMED CT Systematic Nomenclature of Medicine Clinical Terms	httpwww.cap.org/apps/cap.portal?_nfpb=true&_pageLabel=snomed_page	Assessment concepts, Diagnoses, Interventions, and Outcomes	2002	NLM- UMLS

Systematized Nomenclature of Medicine Clinical Terms (SNOMED CT)

SNOMED CT is a comprehensive, scientifically validated clinical terminology and infrastructure for healthcare containing a broad coverage of terminology supporting healthcare documentation through the continuum of care. SNOMED CT provides a consistent way of indexing, storing, retrieving and aggregating clinical data across specialties and sites of care. The use of SNOMED CT within electronic health records provides interoperable data extraction and analysis that can be shared across clinicians, clinical settings and organizations both nationally and internationally.

SNOMED CT is in conformance with National industry regulatory standards and the Consolidated Health Initiative (CHI) [ONC, 2006]. The National Committee on Vital and Health Statistics (NCVHS) in 2003 rated SNOMED CT highest among all terminologies evaluated for electronic health record as it met the essential criteria defined according to sound medical informatics practices (SNOMED Terminology Solutions, SNOMED CT 2007). SNOMED CT is in compliance with allied standards by enabling SNOMED CT to effectively interoperate with other standards such as the International Standards Organization (ISO), Health Language 7 (HL7) and National Quality Forum (NQF).

SNOMED CT is a clinical terminology comprised of codes, concepts and relationships used precisely in recording and representing clinical information across the scope of healthcare. SNOMED CT is concept-based, meaning each concept has a distinct definition and a unique code identifier. SNOMED CT consists of 19 top-level hierarchies, e.g.: procedures (medical and surgical procedures, laboratory and radiology procedures, interventions, education and management procedures), clinical findings, (nursing diagnoses, disorders, diseases that are necessarily abnormal, clinical observations and signs and symptoms) body structures, observable entity (concepts that represent questions being asked during an assessment), devices, substances, and medications.

SNOMED CT hierarchies are created through defining relationships linking one concept to another concept for the purpose of defining each concept down to its specific meaning. Defining concepts by using parent-child relationship begins to build vertical hierarchies within SNOMED CT. Concepts lower in the hierarchy are more specific in meaning then concepts higher up in the hierarchy, creating multiple levels of granularity. Defining relationship attributes further defines the concept's meaning by relating all that is necessary and sufficient to fully represent the concept's definition.

Table 2: SNOMED CT Example

SNOMED CT Definition of chest pain
Pain (finding)
IsA Chest pain (finding)
Finding Site: Thoracic structure (body structure)
IsA Pain of truncal structure (finding)
IsA Pain finding at anatomical site (finding)
IsA Clinical finding (finding)

The way concepts are defined in SNOMED CT makes up its logical concept definition that is necessary to extract a robust data aggregation used to support research and analysis.

Integration of the ANA recognized standardized terminologies within SNOMED Reference Terminology (SNOMED RT) began by collaborating with each of the nursing terminology developers to ensure accurate terminology representation. The SNOMED Nursing Working Group identified additional defining relationships needed to define concepts within the nursing domain. These defining relationships are consistent with the International Standard Organization (ISO) Nursing Terminology Model Standard for diagnoses and interventions.

Once the ANA recognized terminologies were integrated within SNOMED RT, and before they were released within SNOMED CT core, the terminology developers validated the mappings to ensure accurate representation of the nursing concepts and that the concepts were defined equivalently as represented within their terminology system.

The ANA recognized nursing terminologies provide nurse-sensitive terminology needed to encode the nursing domain. SNOMED CT can be used to encode nursing documentation of the full healthcare encounter e.g.: acute care, home care, hospice care, spiritual health, long-term care and health care clinic visits. SNOMED CT can be used to encode assessments, flow-sheets, education plans, care plans, task lists and nursing notes within the electronic health record. The ANA recognized terminologies that have been integrated within SNOMED CT are presented in alphabetical order in table 3.

Table 3: ANA Recognized Terminologies integrated within SNOMED CT

ANA Recognized Terminologies	Data elements integrated within SNOMED CT	Concepts in SNOMED Hierarchies
Clinical Care Classification (CCC)	Diagnoses, Interventions	Diagnoses – Clinical findings Interventions – Procedures
International Classification of Nursing	Diagnoses, Interventions, and Outcomes	Catalog Development Strategy in Process

ANA Recognized Terminologies	Data elements integrated within SNOMED CT	Concepts in SNOMED Hierarchies
Practice (ICNP)		
NANDA International (NANDA)	Nursing diagnoses	Diagnoses – Clinical findings
Nursing Intervention Classification (NIC)	Intervention labels	Interventions – Procedures
Nursing Outcome Classification (NOC)	Outcome labels	Outcome labels – Observable Entity
Omaha System	Problem Classification scheme Intervention Scheme	Problem Classification Scheme Problems and signs & symptoms—Clinical findings Intervention Scheme Procedures ---Procedures
Peri-operative Nursing Data Set (PNDS)	Diagnoses, Interventions, and Outcomes	Diagnoses – Clinical findings Interventions – Procedures Outcomes – Clinical findings

NANDA International

NANDA diagnoses are used to identify human responses to risks, disease, injury or health promotion. The nurse uses a critical thinking process to diagnose these human responses. This involves interpretation of human behaviors related to patient, family or a community's health. (Lunney, 2001). Nursing diagnoses in electronic health records provides the ability to select nursing interventions to achieve outcomes for which a nurse is accountable (NANDA, 2005, p 277). NANDA International nursing diagnoses have evolved from an alphabetical listing in the mid 1970's to a conceptual system that guide classification of nursing diagnoses in a taxonomy. The structure of the taxonomy has 3 levels, 1) domain; is an area of interest or study (functional, physiological, psychosocial, environmental), 2) class; is a division of diagnostic concepts by type of response (activity/exercise, behavior or knowledge, healthcare system), and 3) nursing diagnosis defined as "a clinical judgment about an individual, family or community responses to actual or potential health problems/life processes" (NANDA, 2007, p 332). NANDA International nursing diagnoses in an electronic healthcare record provide a framework for nursing to document and state the priority needs and problems to address within the health encounter whether in the inpatient, ambulatory or homecare/hospice setting. NANDA International nursing diagnoses are used to develop problem lists, assessments, plans of care and clinical pathways as a means to label patient conditions. Additionally, an electronic health record developer adds the

definition, defining characteristics, risk and related factors as knowledge reference text for students and novice nurses to access while using the electronic health record to guide the selection of an accurate diagnosis.

Table 4: NANDA Nursing Diagnosis Example

NANDA Nursing Diagnosis		
Ineffective breathing pattern	**Risk for Falls**	**Readiness for Enhanced Knowledge**
Is an actual diagnostic concept within Domain 4: Activity/Rest under Class 4 Cardiovascular/Pulmonary Responses	-Is a risk diagnostic concept within Domain 11: Safety/Protection under Class 2: Physical Injury	-Is a health promotion diagnostic concept within Domain 5: Perception/ Cognition under Class 4: Cognition.

Nursing Interventions Classification (NIC)

NIC is a comprehensive set of research-based nursing interventions nurses perform. The use of NIC facilitates the analysis of the impact of activities on patient outcomes. Nursing interventions are an integral part of the nursing process focused on outcome identification and evaluation. A nursing intervention is defined as any treatment, based upon clinical judgment and knowledge that a nurse performs to enhance patient/client outcomes. Nursing interventions include both direct and indirect care aimed at individuals, families and the community. The current NIC edition (2008) has 542 interventions and more than 1200 activities. Each intervention includes a label name with a definition and a unique numeric code that can be used for reimbursement of nursing interventions. The codes are used to facilitate computer use allowing communication with other coded systems, e.g. SNOMED CT, NANDA and NOC. The NIC taxonomy that describes the domain of nursing consists of 7 domains and 30 classes. The NIC domains are illustrated in table 5. NIC can be used in all clinical settings (from acute care, intensive care units, to home care, to hospice care, to long-term care and to primary care) and all specialties and has been translated into Chinese, Dutch, French, German, Portuguese, Japanese, Korean, and Spanish to support worldwide implementation.

Table 5: NIC 7 Domains

Physiological: Basic	Family
Physiological: Complex	Health System
Behavioral	Community
Safety	

The use of the NIC classification system in an electronic health record facilitates the appropriate selection of nursing interventions used to demonstrate the impact of nursing by communicating nursing interventions to other clinicians on the interdisciplinary healthcare team. A standardized nursing intervention enables researchers to examine the effectiveness and cost that can be used to allocate nursing care. The use of standardized nursing interventions in nursing education curricula facilitates the teaching of clinical decision making to nurses at the point-of-care by articulating the nursing process as it is used in clinical practice. A large research team has been working since 1987 to construct, validate, and implement NIC as a standardized language for nursing interventions using a variety of qualitative and quantitative methods including content analysis, expert surveys, hierarchical analysis and multidimensional scaling (Bulechek, Butcher, & Dochterman, 2008). These research methods are complementary to NANDA and the Nursing Outcomes Classification. A major achievement of the research project has been the testing the usefulness of NIC and its implementation in growing numbers of client populations, information systems and educational programs. The Center for Nursing Classification and Clinical Effectiveness outlines research methods for retrieving clinical nursing data from electronic systems, storing it according to privacy requirements, applying risk adjustment techniques, and analyzing the impact of nursing treatments (Dochterman, Titler, Wang, & Reed, 2005).

NIC interventions are used in electronic health record implementation of plans of care, critical pathways, order sets, patient education and data sets for the evaluation of care at the individual or unit level.

Table 6: NIC example

Intervention	**Selected Activities**
Pain Management Definition: Alleviation of pain or a reduction in pain to a level of comfort that is acceptable to the patient.	Encourage patient to use adequate pain medication Explore patient's knowledge and beliefs about pain Ensure that patient receives attentive analgesic care Teach about pharmacological methods of pain relief

	Promote adequate rest/sleep to facilitate pain relief Use pain control measures before pain becomes severe

The Nursing Outcomes Classification (NOC)

Nurses have been documenting the outcomes of their interventions for decades but the lack of common language and associated measures for outcomes has impeded data aggregation and analysis of information about the effects of nursing practice. The use of NOC allows nurses to determine the outcomes of the care they provide to individual patients. Each outcome represents a concept used to assess the state of a patient, caregiver, family, or community/population prior to and after interventions are performed. Patients are compared to a healthy person of the same age and gender. Additionally, nurses caring for patient populations can assess the effectiveness of interventions provided to patient's with similar conditions to better evaluate the variances in clinical practice resulting in an improved quality of patient care. The ability to extract standardized nursing outcomes and an outcome within an electronic health record provides the data needed to clarify nursing knowledge, advance nursing theory development, and determine the effectiveness of nursing care. The research data provides information on care quality for health care policy formulation.

NOC consists of outcomes for individual patients, families, and communities used across all clinical settings and specialties. NOC is organized using a taxonomy consisting of three levels: domains, classes, and outcomes. The outcomes are organized into 31 classes and 7 domains (Moorhead, Johnson, Maas, & Swanson, 2008). Each outcome consists of a definition, a 5-point measurement scale or combination of scales, a list of associated indicators for the outcome concept and supporting references. Every outcome, associated indicators, and measurement scale(s) are coded for use in electronic healthcare records. NOC has been translated it to Chinese, Dutch, French, German, Portuguese, Japanese, Korean, and Spanish.

NOC can be implemented in critical pathways, plans of care and patient education records. The adoption of NOC for use in electronic health records provides an opportunity to conduct effectiveness research using outcome data measured at different intervals. This effectiveness research can identify linkages among the diagnoses; interventions and outcomes for specific patient populations. NOC provides a mechanism to be compliant with

regulatory standards such as Joint Commission Standards.

Table 7: NOC example

Outcome	Scale	Selected Indicators
Pain Control Definition: Personal actions to control pain.	Never Demonstrated (1) to Consistently Demonstrated (5)	Uses preventive measures Recognizes pain onset Uses non-analgesic pain measures Uses analgesics appropriately Reports changes in pain symptoms to health care professional

The Omaha System

The Omaha System is a research-based, standardized taxonomy designed to enhance practice, documentation, and information management (The Omaha System, n.d., 1). The Omaha System is a comprehensive, yet simple, tool used by nurses and other interdisciplinary healthcare practitioners from the time of admission through discharge. Although it was initially developed for home care, public health and other community settings, its use has expanded internationally to nurse-managed centers, long-term care facilities, schools of nursing, as well as hospital-based and other case management sites (Martin, 2005).

The Omaha System consists of three components; a Problem Classification Scheme, Intervention Scheme, and Problem Rating Scale for Outcomes. When used together, the components facilitate a problem solving approach to care for individuals, families, and communities.

The Problem Classification Scheme is designed to organize assessments and includes four domains, forty-two problems, two sets of problem modifiers, and clusters of problem-specific signs and symptoms. The Intervention Scheme is used to develop, plan, and record actions taken for an identified client problem. It consists of four categories, 75 unique targets, and client-specific information. The Problem Rating Scale for Outcomes is comprised of three five-point Likert-type scales capturing client progress for the concepts of Knowledge, Behavior, and Status (Martin, 2005).

The Omaha System concepts are concise in meaning. Each concept has a code that

facilitates linking the Omaha System to other terminology systems and supports diverse nurse-sensitive outcome research studies. The Omaha System is open source, which means the terms, definitions, and codes are not held under copyright or licensed for sale so are available for use without permission.

The use of the Omaha System transforms data into powerful information. Quantitative data generated by the Omaha System is increasingly valuable to practice, education, and research. Research studies have been conducted to evaluate if the Omaha System provides terminology coverage needed to encode the discharge transfer from acute care to home care for elderly patients with cardiac problems. One study investigated whether the Omaha System enabled coding and linkages of patient signs and symptoms, problems, and nursing interventions (Bowles, 2000, 1). The use of the Omaha System was found to be effective in the transfer of care from the acute care to home care because the Omaha System consists of very clear and concise terminology in meaning and is understood by others on the interdisciplinary team who are frequently involved with the transfer of care. The study also reveled a linking between the majority of concepts needed to document the acute care discharge planning to the abstract categories in the Problem Classification Scheme providing adequate coverage for concepts described within hospital records. This study suggested the potential use of the Omaha System in the acute care setting, especially as a tool to facilitate communication and continuity of care from hospital to home care. The potential to communicate the signs and symptoms, problems, nursing interventions and the status of outcomes across settings is a valuable clinical and research tool (Bowles, 11).

When the Omaha System is used as the basis of electronic records, the Problem Classification Scheme is the organizing framework for the assessment of individuals, families, and communities; it is designed to describe client-focused health related concerns, needs and strengths. The Intervention Scheme is the organizing framework to develop plans of care and clinical pathways and to document care provided by the interdisciplinary healthcare providers. The Knowledge, Behavior, and Status subscales of the Problem Rating Scale for Outcomes operationalize the measurement of client change across points in time.

Table 8: Omaha System example

Problems	Signs/Symptoms	Categories	Targets & Client-specific Information	Ratings

Residence	unsafe mats/ throw rugs	Teaching, Guidance and Counseling	safety (remove/move mats/throw rugs)	Knowledge =4 Behavior=2 Status=3
Respiration	abnormal breath sounds	Surveillance	signs/symptoms-physical (vital signs, bibasilar crackles, changes)	Knowledge =2 Behavior=2 Status=2

Perioperative Nursing Data Set (PNDS)

The conceptual model of the PNDS was derived from a principle component factor analysis and a theoretical discussion by an expert panel. The patient and their family are at the core of the PNDS conceptual model and is the focus for perioperative nursing care. The PNDS is the only standardized nursing data set that contains a single focus of perioperative nursing and addresses the contributions of the professional nurse to the care of patients undergoing a surgical or invasive procedure. The data set is used for consistent clinical documentation, communication between clinicians in various practice settings, benchmarking activities, evaluating patient outcomes, orientation programs and competency evaluation and effectiveness research. The PNDS addresses a set of concepts that specifically describe perioperative nursing diagnoses, nursing interventions, and patient outcomes in surgical settings.

The PNDS provides a framework to standardize clinical documentation within a computerized health record. The nurse-sensitive data elements of the PNDS provide a universal language for perioperative nursing practice and education that assists in the measurement and evaluation of patient care outcomes. The PNDS consists of reproducible interventions and a patient care outcome used to guide clinical research, facilities continuity of care in the perioperative setting, assists in the development of policies and procedures, and provides valid clinical data used for decision making and policy formulation.

As a standardized nursing language, the PNDS is parsimonious, validated, reliable, and useful for clinical practice. The PNDS terminology is clearly defined and consistent across time. Each PNDS concept contains a machine-readable unique identifier code. Once this code is assigned, the unique identifier is retired and the code never is reused.

The PNDS data elements consists of 74 nursing diagnoses,

133 nursing interventions, and 28 nurse-sensitive patient outcomes arranged within patient care domains, e.g. safety, physiologic responses, and behavioral responses of the patient and family) throughout the perioperative experience. After review of the existing standardized nursing terminologies, the Association of perioperative Registered Nurses Critical Issues Committee concluded that NANDA was the only taxonomy that reflected many of the phenomena of concern to perioperative nurses [AORN], 2007) and has collaborated with NANDA International to integrate the nursing diagnoses coming from NANDA within PNDS.

The PNDS model as a whole illustrates the dynamic nature of the perioperative patient experience and nursing presence. PNDS is organized by nurse-sensitive patient outcomes that provide measurable clinical outcomes, nursing interventions statements, which are the customary data elements that are documented with associated activity statements.

Table 9: Perioperative Nursing Data Set example

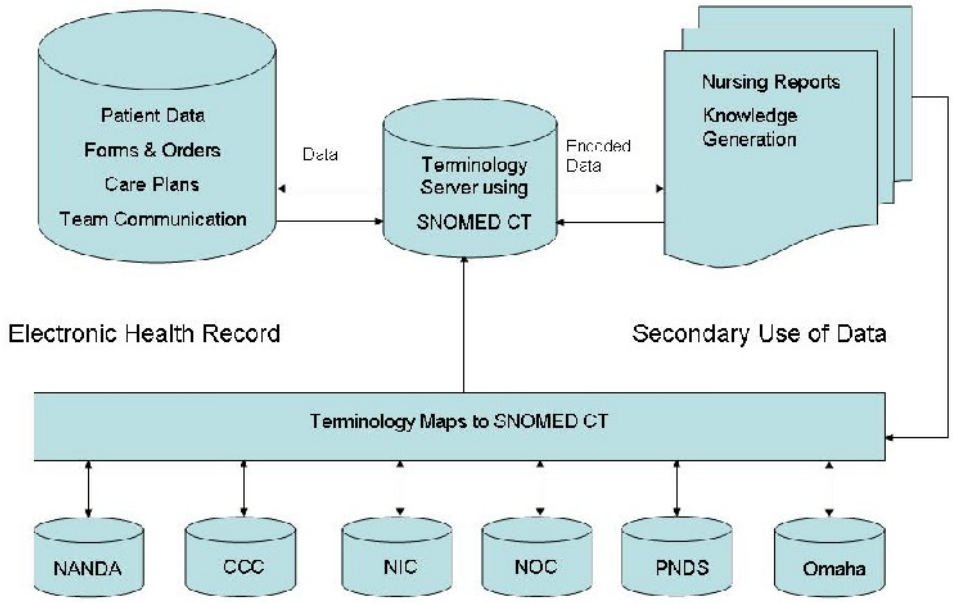
Patient Outcome	Outcome Criteria	Nursing Interventions & Activities
The patient demonstrates or reports adequate pain control throughout the perioperative period	The patient reports and demonstrates pain controlled based on recognized scale. Vital signs are within expected ranges.	▪ Assesses pain control ▪ Implements pain guidelines ▪ Evaluates responses to pain management interventions

Standardized Nursing Classification Knowledge Representation

Frequently, questions are asked regarding why an organization needs to implement the individual nursing terminology systems when they have been integrated within SNOMED CT. SNOMED CT does not contain the knowledge and explicit terminology structure represented within the standardized nursing terminologies. The recommended relationships, coming from the ANA recognized terminology systems, between the problem, intervention and outcomes lie within each of these systems. SNOMED CT only provides the concepts needed to develop this knowledge representation within electronic health records. It is the responsibility of those who build

the templates and forms within an electronic health record to create the recommended knowledge representation and relationships to be used at the point of care. Standardized nursing terminologies are critical to enhance the nursing profession and are necessary to support expanded approaches for the representation of nursing phenomena in response to implementation challenges in computer-based systems. There is a need for robust information structures concerning the way nursing phenomena are represented and managed, e.g. the relationship between nursing problems to interventions to outcomes that is critical for knowledge to be processed using a well-designed computer algorithm. The EHR is a complex collection of software and database applications. It contains not only coded patient data but the logic and supporting data structures required to present clinical users data entry forms and to produce reports in a form and in a language meaningful to the using clinician or manager. The use of SNOMED CT combined with a set of nursing languages parsed through a set of terminology maps can provide both the consistency needed for unambiguous data storage and retrieval along with the richness required for meaningful nurse clinician interaction with the data. In addition this architecture allows the coded data to be converted into meaningful reports for secondary data uses (see Figure 1).

Figure 1. The relationships between the EHR, the terminologies and the data repository.



Nursing Terminologies Used in the EHR for Data Entry, Storage, and Reports

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Conclusion

There are many decisions involved in developing and upgrading an electronic health record. Users are strongly encouraged to evaluate research findings on the terminologies currently in use and examine their organizational business requirements before choosing a terminology system. The development, application and evaluation of nursing terminology systems are priorities for the nursing profession. A critical first step in the selection of a vendor system is to ensure the vendor ontology and data storage can support the integration of the ANA recognized nursing terminologies. The challenge for vendors and informatics nurses is to ensure the consistent use of standardized terminologies within the electronic health record. The data aggregation of the standardized terminology provides nursing the ability to perform knowledge representation reliability and validity testing. This knowledge representation data extraction is used to support the development of research specific to the nursing profession. Nurse-sensitive outcomes data, documented at the point of care, will demonstrate nurses do make a difference in patient care outcomes.

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