Electronic health records (EHRs) are a necessary means to improving patient safety, quality, and evidence-based practice. Standardized clinical classification systems and terminologies provide the words and phrases needed to consistently define and document patient care. Consequently, terminologies and classifications are an essential ingredient of an EHR, and their selection must be driven by a clear understanding of requirements for their use (Rosenbloom, Miller, Johnson, Elkin, & Brown, 2008). Terminology implementation includes developing evidence-based clinical content through plans of care and protocols, describing and documenting care, monitoring care through decision support, satisfying quality and reimbursement reporting requirements, and analyzing care for continuing improvement. Only when requirements for standard terminology implementation are understood can an appropriate choice of clinical classification system and/or terminology be formed.

Several clinical classification systems and terminologies exist today. A sampling is illustrated in Table 1. These and potentially other global, national, or local classifications and terminologies should be part of the preliminary consideration for EHR content and terminology implementation.

Clinical Content

The choice of content for a clinical application is a major strategic decision for all EHR implementations. Clinical content

**Statement of Disclosure:** The authors reported no actual or potential conflict of interest in relation to this continuing nursing education article.

**Note:** Objectives and CNE Evaluation Form appear on page 327.
defines the material structured into the EHR to help the system
inform and guide clinical practice. Nurses are primary stake-
holders in the choice and development of EHR content and are
vital to ensure that content meets nursing information and knowl-
edge needs. Additionally, information generated by clinical doc-
umentation can enable health care providers to improve the quality
and efficiency of health care service delivery for all subjects of care
(Hovenga, Garde, & Heard, 2005).

Essential elements of clinical content for any EHR are the words
and phrases that populate the user’s view at the computer screen
(Rosenbloom et al., 2008). These words or phrases describe the assess-
ments and interventions nurses need to document care and must be defined with an appropriate
standard terminology. However, clinical content is more than
terminology. The terminology must be organized into composi-
tions that are familiar to nurses and relevant to assessing and doc-
umenting care. In this fashion, the appropriate implementation of
standard terminology can help transform and assemble concepts
within nurses’ minds into codes in computer databases (Park, Cho,
& Byeon, 2007).

The most important function of a standard clinical terminolo-
y is to define, consistently and reliably, medical and nursing
concepts presented to users and recorded as standardized data in the
EHR for multiple functions, thereby achieving semantic inter-
operability across multiple applications (Hovenga et al., 2005).
Semantic interoperability is achieved when the meaning of terms shared across applications and
their users is complete and unambiguous. Data captured for
and during patient care have many potential applications, including clinical research and
public safety. Therefore, it seems reasonable that the same termin-
ological standards would apply to health care data used by and
shared among clinicians, public health, and research professionals (Richesson & Krischer, 2007).
Clinical research is important as a means to discover new evidence of best practice, which can
subsequently be expressed and implemented as new clinical content in the EHR at the point of
care. To ensure that clinical content and data are comparable across institutions and for multi-
ple purposes, existing standardized terminologies should be
leveraged to help define clinical content during EHR system development, rather than each
institution unnecessarily creating its own set of terms.

Many sources of broader clinical content exist today. Primary sources are the independently
authored clinical literature appraisals or the clinical practice
guidelines available from organizations, such as the Society of
Urologic Nurses and Associates (SUNA), and professional practice
organizations, such as the American Nurses Association (ANA)
and the Royal College of Nursing (RCN). These evidence-based
sources are essential for providing links to the guidelines structured
within plans of care, which follow the detail specifications of the
guideline but use standard concepts with terms to codify the
knowledge. For instance, the SUNA guideline for aseptic care
of a urinary catheter contains an intervention called “exchange
catheter if infection [is] suspected” (Rahn, 2008, p. 338). The
guideline could be codified within the assessment parameters
through noticeable and defined indicators for an infection. The
characteristics of fever, pain, cloudy appearance, discolored
urine, or odor become defined assessments in a documentation
guideline when translated into the EHR to support the nurse’s
documentation.

Decision support rules can be programmed into the system to
support a notification to the nurse identifying patients with risk fac-
tors and/or when combinations of the above characteristics are doc-
umented using the standardized terminology codes that have been
applied consistently to these concepts. Sources of clinical content
are published nursing classification

<table>
<thead>
<tr>
<th>Table 1. Examples of Classifications and Terminologies</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Classifications (Interface Terminologies)</strong></td>
</tr>
<tr>
<td>• International Classification of Diseases (National Center for Health Statistics [NCHS] &amp; the Centers for Medicare and Medicaid Services [CMS], 2007)</td>
</tr>
<tr>
<td>• NANDA-I (NANDA International, 2008)</td>
</tr>
<tr>
<td>• Nursing Interventions Classification (NIC) (Institute for the Use of Nursing Interventions [IUNI], 2008)</td>
</tr>
<tr>
<td>• Nursing Outcomes Classification (NOC) (Moorhead, Johnson, Maas, &amp; Swanson, 2008)</td>
</tr>
<tr>
<td>• Clinical Care Classification (CCC) (Saba, 2006)</td>
</tr>
<tr>
<td>• The Omaha System (Martin, 2005)</td>
</tr>
<tr>
<td>• Perioperative Nursing Data Set (Association of Perioperative Registered Nurses, 2007)</td>
</tr>
<tr>
<td><strong>Source:</strong> Lundberg et al., 2008</td>
</tr>
<tr>
<td><strong>Reference Terminology</strong></td>
</tr>
<tr>
<td>• Systematized Nomenclature of Medicine-Clinical Terms (SNOMED CT) (International Health Terminology Standards Development Organization [IHTSD], 2009)</td>
</tr>
<tr>
<td>• International Classification for Nursing Practice (ICNP) (International Council of Nurses, 2008)</td>
</tr>
</tbody>
</table>


consistent clinical concepts to capture and assemble data into care plans to support practice. These sources also lend credibility to clinical applications for quality and regulatory compliance, and are generally well accepted by clinicians.

**Policy and Regulatory Compliance**

A large portion of the information captured within the EHR for the patient is driven by regulations and standards. Health care institutions are regularly under review by federal, state, accreditation organizations, and national health services. For example, in the United States, the Center for Medicare and Medicaid Services (CMS) requires that specific core measurable indicators be generated from collected electronic data. The occurrence of complications of care (such as “never events”) will result in lost funding or no funding in the absence of documentation of pre-existing conditions.

Additionally, to justify patient stays, commercial health plans and insurers demand patient information about procedures and interventions provided to patients. In recent years, health care institutions have contracted with payers for incentives known as pay-for-performance, which require data submissions on measurable indicators related to patient care with specific diagnostic groups, such as urinary tract infection. Better documented care incurs reimbursement. Thus, the use of standard terminologies to capture data within the EHR is beneficial.

The Joint Commission, an accreditation organization, develops and evaluates health care organizations in the achievement of standards, such as for information management and patient care. Patient care standards require specific interdisciplinary patient assessments for priority problems, such as urinary retention or incontinence, the plan for intermittent urinary catheterization, and teaching the patient to manage those problems. The inspector looks for the recorded documentation that the planned interventions were carried out and that the appropriate outcome was measured as part of the plan for the interdisciplinary team’s readiness for discharge planning. Each health care institution has a plan for patient care services, which includes the coordination of care within the interdisciplinary team. The institutional policies and procedures dictate requirements for documenting patient care. To the greatest extent possible, the data collected within implemented workflows should be leveraged to fulfill these documentation requirements. When it is possible to rely on standardized data elements to satisfy new or updated information requirements, the impact to caregiving staff can be minimized (Hovenga et al., 2005). Less redundant data collection work is therefore necessary. Standard terminologies make this possible.

**Impact on Clinical Practice**

Initially, nurses will need to organize assessment data, and prioritize problem lists and plans of care within the EHR to document and to reuse data for the benefit of their patients. The intelligent filtering of increased amounts of data, accessible via the EHR, presents a new challenge for clinicians, who must now sort through and prioritize multiple findings presented to them (Berner & Moss, 2005; Osheroff et al., 2007). Nursing theories, conceptual models, and empirical research are anchored using a broadly accepted nursing process to address the patient’s health within a variety of settings (Edkin, 2003; Fawcett, 2003).

Nurses also collect an established standard minimum data set that reflects the nursing process, which is efficiently and effectively recorded with standard terms that document nursing care. The nursing process provides some basic structure. However, features of EHRs, such as alerts for abnormal vital signs, critical laboratory values, and potential drug interactions, are also part of the new data, information, knowledge, and wisdom model today (Englehardt & Nelson, 2002; Graves & Corcoran, 1989; Staggers & Thompson, 2002). Prior work patterns based on paper, verbal exchange, and manual methods are being replaced with computerized systems. These are potentially less flexible because they require prescribed methods of data entry and presentation (Weir et al., 2007). However, frameworks for care process development are helpful skeletons on which to support common and reusable clinical concepts expressed in standard terminology.

Recognized frameworks exist for planning a migration from paper to electronic documentation systems, as well as for integrating care processes into an EHR. Marjory Gordon’s Functional Health Patterns (Gordon, 1994) is an identified framework that addresses the scope of nursing care for organizing the content of EHRs. For example, Functional Health Patterns provides a prototype for organizing concepts for assessment, diagnosis, planning, intervening, and evaluating care. When applying this prototype, the patient’s human responses to disease, injury, or surgery are all valued within documentation. Nurses need to collect and evaluate information about how the patient moves, relates to others, and feels, as well as the patient’s knowledge of his or her health situation and needs. Expressing what is important (valuing) and participating in decisions (choosing) are a part of the patient’s perception, which used to be narrated in nursing notes. However, in electronic systems, it is necessary for this information to be collected and com-
municated in a more structured and standardized way, thereby creating one complete, up-to-date, and accurate source of information for all providers. The patient’s knowledge level and decision-making capacity may not be documented unless the EHR is designed to accommodate a more holistic description of the patient.

One challenge in the use of electronic records is mapping how nursing process documentation is captured and used during nurses’ daily care. Outside of basic nursing care and evaluation processes, as well as broadly respected policies of care organizations, modern tools are available that allow for process mapping of an entire health care team’s management and exchange of data. Process mapping is a tool that illustrates when and how data are documented and captured within the EHR and how data are managed by all disciplines. This interdisciplinary approach may involve complex software applications that require detailed input of particular tasks and interactions that intersect with multiple providers and points in time.

Additionally, when an institution improves care processes, a group of clinicians might be asked to participate in the redesign of a better process (Brokel & Harrison, 2009). This process mapping effort is valuable in training nurses about their steps in the nursing process while documenting care in an EHR. The process map is often updated to model all future EHR changes and upgrades. Process maps can be leveraged to predict the impact of potential process changes to staffing ratios, care quality, and cost. Standard terminology is a core requirement for process mapping to consistently represent activities and decision points that cross disciplines.

**Basic Principles of Implementation**

To build on prior work that has been done in the area of nursing terminologies and evidence-based practice, nurses must now concentrate on using a process to identify, document, implement, manage, and govern the nursing knowledge domain, as well as contribute to the development of relevant international standards (Hovenga et al., 2005). Designing content consistent with an established standard should provide increased likelihood of interoperability between providers and institutions in the long term. Although consistent implementation of terminology standards will not guarantee that future requirements will be met, it does help maximize internal consistency and quality and quantity of retrievable data, and provides essential informatics infrastructure as a primary building block for evidence-based practice (Bakken, 2001).

This consistent application of terms is achieved by data standardization, which refers to the process of identifying unique concepts that have single meaning and are unambiguous. Synonymous terms are allowed to accommodate local and individual preferences, but ambiguous terms are not. Ambiguity is a common terminology and data problem. For example, what does the term “incontinence” mean? It may seem straightforward unless you have an application that uses the term “incontinence” in multiple contexts. Does it mean simply that a person lacks control of their ability to hold urine? Does it exclude fecal incontinence in certain contexts? Is there a difference between stress incontinence and general incontinence when it comes to treatment plans and interventions to care for the patient? Are these terms synonymous? One must be clear about what is implied in these circumstances to obtain proper data from the system for decision support rules, reports, and views for the bedside clinician.

Another common problem is applying terms that overlap in meaning. For example, the term “nausea with vomiting” may be added to a system’s data catalogue, when “nausea/vomiting/diarrhea” already exists. The question for the clinician is which concept truly represents what is happening with the patient when the patient is assessed for nausea without vomiting? A query to find patients who had nausea would require that each of these discrete data items be selected individually to extract data that represent what was assessed. Even then, there would be no way to easily separate those patients with nausea but not vomiting, unless a concept of nausea alone was presented and documented at the point-of-care. The goal is to retrieve only information that is complete, reliable, and with one meaning.

Data on the user screen display should provide the clinician with natural language expressions that are common at the point-of-care. This is accomplished through the application of synonyms that have equivalent meaning to the underlying clinical concepts, which in turn are linked behind the scenes to a standardized terminology code more useful for research, analysis, and clinical decision support. For example, weakness, a synonym of asthenia in SNOMED CT, could be implemented at the point-of-care to document the true complaint expressed by the patient and the more commonly understood clinical term that can be recorded by other ancillary team members. Since the system recognizes the same code for either term, the EHR can understand them interchangeably for reporting and decision support purposes. This is all invisible to caregiving staff.

Particular types of data collected in an EHR are more likely to have requirements tied to administrative coding systems. In the United States, clinicians will typically require reliable diagnosis coding to ICD codes to manage reimbursement for their
services. Similar considerations are present for procedures done in laboratories and radiologic and surgery units worldwide. These coding system requirements will vary widely from country to country. Further, federal level recommendations are becoming more common, with some countries and certification groups governing the implementation of terminology standards, and even potentially basing funding on an institution’s compliance with such recommendations. When content needs and processes are defined, data are standardized, and secondary data requirements are anticipated, terminology use is then optimized. Content and terminology comprehensiveness, understanding the organization’s business and clinical requirements, and alignment with the clinician’s necessary administrative and standard coding systems are the keys to determining which clinical terminologies will best meet your institution’s needs.

As previously mentioned and illustrated in Table 1, two basic types of coding systems exist today for EHRs: the classification system and the structured reference terminology. Classification systems are structured systems of terms and definitions that are grouped together based on research and common characteristics of origin, composition, structure, or function (Coenen, McNeil, Bakken, Bickford, & Warren, 2001). The disease classifications serve data aggregation purposes, such as morbidity/mortality reporting, comparisons to inform countries about the health of their populations, patient outcomes research to measure care quality and effectiveness, communication between caregivers via shared terms and meanings, and reimbursement. Although classification systems serve important purposes for defining research-based linking of concepts, their structures lack some ability to enable the enhanced query capabilities that a reference terminology provides by including more synonyms. Reference terminologies, such as SNOMED CT (Lundberg et al., 2008; Park, Lu, Konicek, & Delaney, 2007) and ICNP (Coenen, 2003), provide machine-readable ways of indexing, storing, retrieving, and aggregating clinical data across specialties and sites of care. The implementation of reference terminologies within EHRs supports interoperable data extraction, analysis, and messaging capabilities so information can be shared with much greater detail than a classification system is intended to provide (Coenen, Marin, Park, & Bakken, 2001).

Reference terminologies also directly integrate specialty classification systems. For instance, SNOMED CT and ICNP have both integrated nursing classification systems so that the concepts within those classification systems are also included within their terminology (Park, Lu et al., 2007). This is sometimes referred to as a harmonized or comprehensive terminology, which simply means that there is one source of information that contains concepts defined by many authors. Both SNOMED CT and ICNP have worked with NANDA-I to ensure that all nursing diagnoses in that classification are included within the SNOMED CT and ICNP terminologies.

Conclusion

Health care organizations operate in a dynamic environment and must be able to implement information or knowledge (such as evidence-based clinical or best practice guidelines as required), communicate internally and externally, and apply new or existing knowledge and process information to facilitate efficient and effective manager and clinician decision making (Hovenga et al., 2005). This investment in content and process development will be a necessary cost for many organizations. Sources of clinical content, such as reference texts, classifications systems, laboratory and drug guides, and critical appraisal, are often leveraged to contain costs and provide for a more practical basis of content for clinical users, which can later be enhanced or improved upon. As with any legal stance on practice, nurses will need and want to know the source of professional practice guidelines to provide a credible basis for the clinical documentation system and the legal record of patient care. Using valid and reliable content sources, terminology standards and collaborative process models that are agreed upon, these resources and guidelines can be translated into the EHR in the most efficient way possible. The standardized data within the clinical workflow will then provide the foundation for research and the increasingly complex and vital quality and regulatory reporting. Perhaps most importantly, it will provide continuing and evolving processes to support the bedside clinician.

It is ultimately the responsibility of each health institution to establish its own needs for clinical documentation standards, reporting requirements, and decision support priorities, as well as evaluate the content, processes, and terminologies to satisfy these requirements. However, consistency of data, and ultimately interoperability, are necessary to serve patient-centered care, where health care information exists with many providers.

Resource guidance is necessary for health care institutions to learn of solutions that leverage industry standards and offer education that promotes the broader implementation of the standards outlined in this article. Key resources, such as software providers, educators, content developers, and classification/terminology developers, all have vital roles to play in the implementation of the EHR. Software providers have
the responsibility to package quality solutions for their customers. Educators have an obligation to demonstrate and study standards implementations. Content developers have the responsibility to link to standard classification systems and terminologies. Finally, classification and terminology developers have the responsibility to analyze and understand concept meanings and progress terms with the science. Regardless, all must collaborate to achieve the desired consistency, reuse, and interoperability required to achieve these goals for applicability in the clinical setting.

References


Urologic Nursing Editorial Board Statements of Disclosure

In accordance with ANCC-COA governing rules Urologic Nursing Editorial Board statements of disclosure are published with each CNE offering. The statements of disclosure for this offer are published below.

Kay K. Gaines, MS, ARNP, CUNP, disclosed that she is on the Speakers’ Bureau for Pfizer, Inc., and Novartis Oncology.

Susanne A. Quillich, ANP-BC, NP-C, CUNP, disclosed that she is on the Consultants’ Bureau for Coloplast.

All other Urologic Nursing Editorial Board members reported no actual or potential conflict of interest in relation to this continuing nursing education article.