# Measuring Spiritual Care With Informatics

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Nursing is at a critical juncture in creating data repositories that support nursing research and theory development, as health systems adopt and design electronic health records. This article discusses how informatics theory can be used to guide designing nursing documentation screens and analyzing the resulting data sets, while highlighting methods to maximize reliability and validity and to address measurement issues. Examples will be applied to spiritual care, a required dimension of care. These examples present methods to capture and study "soft" areas of nursing that have not traditionally been documented or measured. **Key words:** *documentation*, *electronic health records*, *informatics*, *nursing research*, *nursing theory*, *spirituality*, *standardized terminology*

**A**S health systems adopt and design electronic health records (EHRs), nursing is at a critical juncture in creating electronic data repositories that can be used to support nursing research and theory development. Today's evolution of the EHR has created an opportunity to use the health record to both study and affect care practices. The way nursing documentation screens are designed will drive the type and quality of data that nurses collect on a day-to-day basis; that is, to determine what clinical information should be assessed and what interventions should be performed. Nursing has the opportunity to design these screens so that when documentation data are aggregated, the resulting large data sets can be analyzed to identify health-promoting nursing care practice patterns and help prevent detrimental practice patterns (also called "never events").[1] To accomplish this goal, data that populate check-off lists/drop-down boxes need to be reliable, valid, and measurable.[2]

Nurses have historically documented physical data (eg, vital signs, skin condition);

however, little documentation related to psychosocial and spiritual care exists, primarily because documentation systems were not designed to capture this type of care, and psychosocial and spiritual standardized terminology were not well understood or readily available.[2] Incorporating standardized terminology into documentation screens that integrate physical, psychosocial, and spiritual care has the potential to capture the complexity of nursing care while providing a database able to derive and study practice theories to guide future evidence-based practice.

The American Nurses Association's (ANA's) "Scope and Standards of Nursing Practice,"[3] "Nurses' Social Policy Statement,"[4] and "Code of Ethics"[5] clearly emphasize the responsibility to provide not only physical care, but also psychological, social, and spiritual care. If data sets derived from day-to-day documentation are to be used to study nursing care, the documented data elements must represent the wholistic nature of nursing practice. One aspect of care that has gained more attention in the past several years is spirituality and spiritual care. Current research suggests that spirituality is associated with better physical,[6-12] psychological,[7-9,13-18] and social health indicators[14,16] for individuals with chronic illness. This research has led to The Joint Commission standard requiring

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spiritual care to be provided within a multidisciplinary environment,[19,20] the ANA's inclusion of spiritual care in the "Scope and Standards of Nursing Practice,"[3] "Nurses' Social Policy Statement,"[4] and "Code of Ethics,"[5] and the AACN inclusion of spirituality and spiritual care in the 2008 "Essentials of Baccalaureate Education."[21] Creating nursing documentation screens to capture the wholistic nature of nursing practice is a challenge, and designing the documentation screens requires thoughtful consideration about how the standardized terminology will be used.

This article discusses how informatics theory can be used to develop and study practice theories. Specific issues will also be raised related to designing the screens to maximize reliability and validity while attending to measurement issues, providing examples related to spirituality and spiritual care. Spirituality is a metaphysical concept not widely understood, but is a required aspect of care.[19,20] These examples present issues and methods to capture "soft" areas of nursing that have not traditionally been measured or documented.

## BACKGROUND: THE EVOLUTION OF THE EHR

The Department of Health and Human Services' prediction of the use of a fully automated EHR to study the impact of healthcare on patient outcomes is becoming a reality in the 21st century.[2] Historically, only data related to medical diagnoses and physician procedures were available to study healthcare trends because hospitals and physicians were required to submit these data to obtain Medicare reimbursement. Consequently, the resulting data sets were designed to support reimbursement and not to support clinical decision making.[2] Today's ability to capture clinical workflow offers nursing an opportunity to study nursing care by using nursing documentation. The American Nurses Association's database (National Database of Nursing Quality Indicators [NDNQI]), a repository of nursing-sensitive quality indicators, derived

from clinical documentation, is an example of a national nursing effort to develop databases that could be used for research.[22]

Much work over the past several decades has been dedicated to developing provider-/domain-specific standardized terminologies in medicine and nursing. Standards for nursing terminologies had been developed by the ANA's Committee on Nursing Practice Information Infrastructures.[23,24] Standardized terminologies most used in medicine include the *International Classification of Diseases, 9th Revision Clinical Modification* for medical diagnoses[25] and Current Procedural Terminology for physician procedures.[26] Nursing has formally recognized several terminologies that capture nursing diagnoses, nursing interventions, and nursing-sensitive patient outcomes.[23] Many terminology systems exist, and the federal government supports specific infrastructures to integrate these terminologies into one system as a foundational database for the EHR. One that has been supported is the Systematic Nomenclature of Medicine Clinical Terms (SNOMED CT), a comprehensive clinical healthcare terminology that enhances interoperability through a convergence of a variety of domain-specific terminologies. SNOMED CT has been designated a core terminology for the US National Health Information Infrastructure by the National Committee on Vital and Health Statistics.[27]

Although the ability to provide computerized documentation systems with an established unified infrastructure exists, it will be leaders at the health system level who determine what specific nursing terms will appear on the computer screens for point-of-care documentation in their organizations. Consequently, terms that then appear on nursing documentation screens will impact how nursing care is represented in healthcare databases and can impact workflow and practice patterns. This places these decision makers in a position of specifying what is nursing care, what research questions can be answered on the basis of nursing documentation that is captured electronically, and to a large
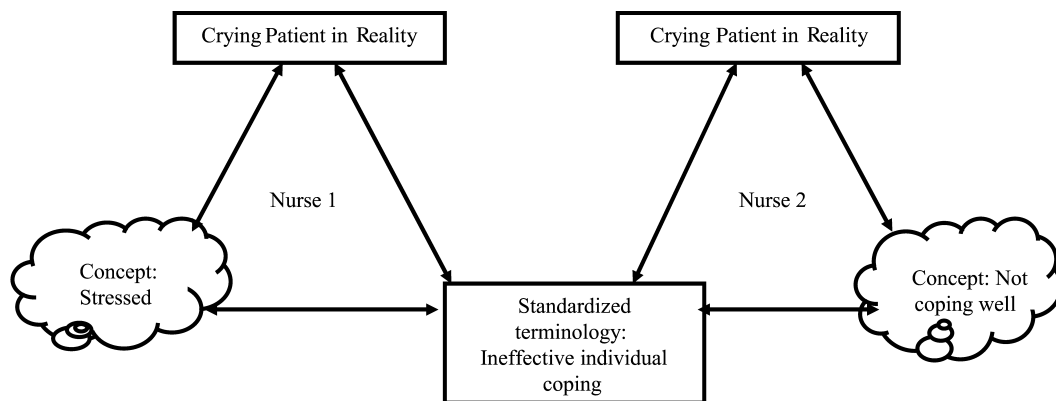
A nursing concept is a mental representation (or thought) of an issue, intervention, or outcome relevant to nursing practice. Nurses assign words to describe a concept. Standardized terminology is used to apply a consistent word for describing the concept.

**Figure 1.** Conceptual model of nursing standardized terminology.

extent how care is provided. Health systems are purchasing computerized documentation systems and adapting those systems with little guidance as to what works best to facilitate workflow and what meets the information needs of their institution. While health systems must meet clinical and regulatory requirements, they also want to capture data in a format that allows for data extraction and outcome research. Informatics theory can help guide these decisions.

## INFORMATICS THEORY

In their landmark publication, Werley and Lang[28] identified 4 categories of nursing information to be included in the EHR: nursing diagnoses, nursing interventions, nursing outcomes, and nursing intensity. Three of these categories (ie, diagnoses, interventions, and outcomes) became the foundation for nursing standardized terminologies. Standardized nursing terminologies consist of lists of words or phases agreed upon by the nursing community that represent concepts relevant to that domain of nursing practice.[2]

The development of standardized terminologies applies concept theory, Aristotelian realism,[29] and the Ogden and Richards[30]

meaning triangle. As shown in Figure 1, a nursing concept is a mental representation (or thought) of an issue, intervention, or outcome relevant to nursing practice. Nurses assign words to describe a concept. For example, one nurse may think of a crying patient as being "stressed," while another nurse may consider that same patient as "not coping well" and yet another as "in pain." Standardized terminology assigns the same word to represent the same mental thought (or concept), which in turn reflects an occurrence or entity in reality. The importance of using standardized terminology is to capture nursing concepts in a way that can be aggregated and measured. Nursing standardized terminologies are organized in a dictionary-like structure, which includes the term label, definition, and other descriptive information per term.[2]

Graves and Corcoran[31] created a metastructure, which was further expanded by Nelson and Joos,[24] for developing practice nursing theories, consisting of 4 levels of abstraction: data, information, knowledge, and wisdom.[24] Historically, nursing theory emerged from philosophical inquiry[32] or qualitative grounded theory research with follow-up quantitative validation.[33] This informatics

metastructure provided another method for theory development by studying nursing care from documented practice patterns. Nurses collect pieces of "data" (eg, signs and symptoms and laboratory, medication, and procedure data) during the head-to-toe assessment and periodically throughout the workday.[24,31] Nurses use critical thinking to interpret, organize, and structure data to identify "nursing information."[24,31] Nursing information can include nursing diagnoses, interventions, and outcome measurement at the point of care, capturing this information in a computerizable format. Identifying relationships between nursing information concepts generates "nursing knowledge."[24,31] For example, identifying what nursing interventions lead to better outcomes as documented in the EHR can reveal a beginning practice theory, which can be further studied and refined through research. This analysis can also identify practice patterns that lead to "never events" or patient events that insurers state should never happen and will not be reimbursed.[1] Developing practice theory by analyzing both effective and ineffective practice patterns has the potential to improve patient care and help identify potential strategies to prevent "never events." Once theory is generated, it is possible to apply nursing knowledge to new situations to manage and solve new problems. This final level of abstraction in this metastructure is called "wisdom."[24] If documentation systems are designed to capture nursing diagnoses, interventions, and outcomes, there are unlimited possibilities for empirically deriving beginning substantive theories reflecting best practices, which can guide future nursing research and can be the foundation for evidence-based practice.

There is great potential in using documentation databases to study nursing practice, but several design and measurement issues need to be addressed. From a research perspective, the documentation screens need to be designed to maximize validity and reliability, and data need to be collected in a measurable format that is compatible with statistical tests.

## CHOOSING THE APPROPRIATE TERMS: SUPPORTING VALIDITY

In designing documentation screens based on the informatics metastructure, decision makers need to choose what data and nursing information elements will be included on the documentation screens. Two issues are important to consider when choosing terms: accuracy of the terms and levels of granularity/abstraction of the chosen terms.

### Promoting accuracy using standardized terminologies

Standardized terminologies were created and developed by using research methods that supported validity.[23] The ANA has recognized several nursing standardized terminologies, all of which are mapped to SNOMED CT. The NANDA International system,[34] Nursing Interventions Classification,[35] and Nursing Outcomes Classification (NOC)[36] were designed to be used together to capture diagnoses, interventions, and outcomes across all nursing specialties, as each system captures 1 of the 3 categories, respectively. The Saba HHCC (Home Health Care Classification) system[37] includes diagnoses, interventions, and outcomes in one system and was originally designed to be used with home healthcare, but research also suggests that it can be used in acute care as well.[38] The Omaha system[39] also includes all 3 categories of nursing standardized terminologies and was originally designed for use in community health. SNOMED CT includes terms in all 5 systems, but also includes additional terms and research has supported its domain completeness.[40] All of these systems include physical, psychosocial, and spiritual terminology, thereby capturing the breadth and depth of nursing practice. One of the difficulties in using standardized terminologies in nursing is choosing which term to use for a given concept. There are thousands of terms available in SNOMED CT. For example, Table 1 lists terms related to spiritual care alone.[34-37,39]

Many computer vendors have created their own smaller unique databases (which may or

**Table 1.** Standardized terms associated with spirituality

| Terminology system | Nursing diagnoses | Nursing interventions | Nursing outcomes |
|---|---|---|---|
| NANDA | Spiritual distress<br>Risk for spiritual distress<br>Readiness for enhanced spiritual well-being<br>Impaired religiosity<br>Risk for impaired religiosity<br>Readiness for enhanced religiosity<br>Decisional conflict<br>Moral distress | | |
| NIC | | Presence<br>Religious addiction prevention<br>Religious ritual enhancement<br>Spiritual growth facilitation<br>Spiritual support<br>Values clarification<br>Bibliotherapy<br>Forgiveness facilitation<br>Hope inspiration<br>Decision-making support | |
| NOC | | | Suffering severity<br>Spiritual health<br>Hope<br>Acceptance: Health status<br>Dignified life closure |
| Saba HHCC | Spiritual state alteration<br>Spiritual distress<br>Decisional conflict | Spiritual comfort | Modifier to diagnosis:<br>   improved<br>   stabilized<br>   deteriorated |
| Omaha | Spiritual distress | Spiritual care | Ratings on 5-point Likert scale based on diagnosis in the areas of<br>   knowledge<br>   behavior<br>   status |
| Other<br> SNOMED CT | Spiritual problem<br>Spiritual growth<br>Spiritual strength<br>Spiritual weakness<br>Spiritual assessment | Spiritual therapy<br>Spiritual rehabilitation<br>Spiritual care treatments and procedures<br>Laying on of hands with prayer<br>Spiritual comfort | |

Abbreviations: NIC, Nursing Interventions Classification; NOC, Nursing Outcomes Classification.

may not be mapped to SNOMED CT). These vendor-designed databases may not be supported by research, which questions the validity of the terminology. When an organization or health system is choosing terms for use in its EHR, it is important that the terms clearly and accurately reflect nursing concepts and have the capability to capture the breadth of nursing practice to maximize validity.

### Appropriate levels of granularity

When choosing terms, it is also important to consider the appropriateness of the terms' "level of granularity" based on the documentation needs. Levels of granularity refer to the conceptual detail of the data. The more granular, the more detail is available to define the concept.[24]

Granularity may differ by unit, patient condition, or care provider. For example, the level of granularity for a cardiac assessment may differ between a general surgical unit (eg, heart rate, rhythm, edema) and a surgical intensive care unit (eg, also include telemetry monitoring, cardiac pressures). In each case, system designers need to choose which assessment areas are common between units and what additional assessment areas are needed per specialty unit. Also, if a patient's medical condition warrants a more detailed assessment, regardless of the unit, the EHR needs to be able to adapt to these special needs by giving the care provider the opportunity to add more detailed documentation as the patient condition warrants. For example, on a general medical floor, the neurological assessment may include general movement, sensory, and level of consciousness. If a patient is admitted with an unstable neurological condition, a full cranial nerve assessment may need to be instituted. The system needs to be able to be modified to "drill down" to a lower level of granularity as needed. Finally, the level of granularity will differ on the basis of the care provider. For example, a nursing documentation screen can include a global spiritual assessment that is available to all healthcare providers, while chaplains may also include additional in-depth spiritual assessment and intervention options. In this case, all healthcare provider documentation screens can include a one-item global spiritual assessment measure, while the chaplain screens include both the global spiritual assessment item and a more detailed assessment and intervention list. In all 3 cases described, it is important to identify what documentation areas are common to all screens. These "common items" are the research variables that allow for comparison across units, patient diagnosis, and provider.

Accurately identifying assessment and intervention items at varying levels of granularity requires clinical expertise. When designing these screens, it is critical that practicing clinicians decide what data categories appear and what terms are used to represent the relevant concepts.[1] End-user nurses need to participate in the initial nursing documentation screen design to maximize the screen's accuracy and usability.

## DEFINING AND DOCUMENTING TERMS CONSISTENTLY: SUPPORTING RELIABILITY

To support reliability, the chosen data elements must be defined, universally understood, and applied consistently. Two important areas need to be considered to maximize reliability: designing screens based on workflow to promote usability and training users to promote clarity and consistency.

### Workflow

Ideally, documentation screens are designed on the basis of nursing workflow; that is, the information to be documented is available and can be easily documented at a given point in the process of patient care.[24] Many EHRs organize nursing documentation based on the nursing process; primarily because the assessment, diagnosis, intervention, and evaluation categories of the nursing process capture nursing practice workflow and are required documentation according to most state nurse practice acts and the ANA's "Scope

and Standard of Nursing Practice."[3] Again, it is critical for practicing nurses to participate in screen design to ensure that the screens are compatible with and support nurse workflow.

## Promoting usability, clarity, and consistency

The American Nurses Association accepted standardized terminologies labels and defined terms to maximize clarity so that they can be applied consistently.[23] However, there are several additional ways health systems can maximize reliability. First, terms need to be universally understood. Nurses have a long history of documenting physical head-to-toe assessment data (eg, lung sounds, bowel sounds, and pulses). However, nurses have not historically documented psychosocial and spiritual issues in as much detail as physical data. One reason for the inconsistency in documenting these "softer" areas of nursing is that universal definitions or conceptual understandings are not consistently applied. Spirituality provides a clear example of how ambiguous terminology may make documentation difficult.

The literature is inconsistent in the definition of spirituality and spiritual care. Much of the literature has converged on describing spirituality as a dimension of self that searches for meaning and purpose in life; transcends beyond the physical body; and/or experiences connectedness with self, others, nature, and/or a power greater than oneself.[41-44] This is in contrast to religiosity, which is the expression of rites and rituals associated with a faith tradition.[34,42] Many nurses confuse spirituality with religiosity and thereby confuse spiritual care with religious care. Research has identified spiritual care to include interventions that promote searching for meaning and purpose in life, meaningful relationships with others, promoting a positive perspective and hope, integrating beliefs and prayer, and practicing faith traditions.[45,46] The Joint Commission requires the provision of spiritual care, but it is not clear how consistently nurses document that care.

The NOC system, which provides a method to measure nursing-sensitive patient outcomes on a 5-point Likert measurement scale, has published reliability and validity data. In a research study funded by National Institute of Nursing Research, the University of Iowa College of Nursing tested the reliability and validity of these measurement systems. Different NOC labels have different reliability and validity support, as described in the 2004 edition of the NOC book.[36] The spiritual health NOC was tested in this study, and findings suggested that it is possible to measure spiritual health consistently. For example, when studying the spiritual health NOC ($n = 27$), the interrater reliability between 2 nurses (ie, a research assistant and a parish nurse) was 60% for an exact match and 92.2% within 1 point.[36,46] In these situations, the research assistant met the client for the first time, while the parish nurses cared for this client for years. This suggested that it is possible to consistently measure spiritual health as part of assessment documentation within a short assessment time frame.

Health systems can maximize reliability of documentation through training programs and by making term definitions available on the documentation screens. Training programs can also incorporate case studies to test interrater reliability by using percent agreement.[48]

## DATA ANALYSIS: MEASUREMENT ISSUES

If the EHR will be used to research practice patterns that affect patient outcomes, documentation system designers should consider not only nursing workflow patterns, but also whether the documentation is presented and measured in a format that can answer research questions. Documentation systems collect nursing data and information based on the nursing process; that is, assessment areas, diagnoses, interventions, and outcomes. The level of measurement used to capture these elements will affect what research questions can be answered and what statistical analysis techniques can be used. The following

sections describe these issues and analysis opportunities based on the nursing process.

## Measuring diagnoses and interventions

Diagnoses and interventions tend to be measured at the nominal level; that is, the patient has or does not have this condition, and the provider performed or did not perform the listed intervention. This level of measurement allows researchers to identify subsets of patients based on the nominal variable and compare samples. For example, all oncology patients in spiritual distress can be extracted from the large data set, and researchers can measure if there is a difference in symptom severity (eg, nausea) between those patients who have received spiritual support or prayer and those who did not receive a spiritual intervention. To answer these types of research questions, computer screens must include diagnosis and intervention data and the resulting database must be able to extract data based on these nominal variables.

## Measuring assessments and patient outcomes

Patient outcomes are typically measured in terms of change in assessments or change in outcome/goals. Assessment and outcome measurements are conceptually similar in that an assessment at time 1 is an outcome measure at time 2; or stated conversely, outcomes are a summative statement about trends in assessments. For example, if blood pressure assessment readings for a day are 120/80, 110/78, and 118/76 mm Hg, the goal/outcome is that vital signs are stable. Therefore, patient outcomes can be measured in terms of trends in assessments or a change in summative goal statements. How this information is documented will affect what research questions can be answered.

Assessment data vary in the level of measurement, particularly for physical data: nominal (lung sound present/not present), ordinal (eg, severity of wound or decubiti), interval (eg, temperature), or ratio (eg, height, weight, 0–10 pain scale). Some standardized terminologies offer methods to measure psychoso-

cial and spiritual data by using ordinal or interval levels of measurement. For example, the NOC system[35] lists nursing-sensitive patient outcomes with a 5-point Likert measurement scale, with "1" representing the least desirable outcome and "5" representing the most desirable outcome. Measuring assessment items by using 5-point Likert scales, interval, or ratio levels offer the opportunity to study trends in patient outcomes and model patient outcomes for specific conditions by using structural equation modeling (SEM).[49] SEM is a set of statistical techniques (eg, confirmatory factor analysis, path analysis, causal modeling, and multiple regression) to identify components and variances of a theory and the explanatory strength of those components and can compare the structure of theories between groups (eg, patient populations, units, hospitals).[49] These statistical techniques require at least a 5-point Likert scale as the lowest level of measurement and require large data sets.[49] Documentation systems are inherently large, but to maximize the use of SEM, the documented variables need to be at a 5-point Likert scale or higher.[49]

Outcomes can also be measured with documented outcome/goal statements. These summative statements tend to be measured with nominal variables (ie, met or unmet goals). Subsequent research with nominal data is limited to questions that group patients who met or did not meet the goal or the percentage of patients who met or did not meet the goal. Standardized terminologies have offered additional methods to measure outcomes. For example, the Saba HHCC system[37] captures change in outcomes on an ordinal 3-point scale in that the nurse determines whether the patient has improved (measured as "1"), stabilized (measured as "2"), or deteriorated (measured as "3") in relation to the diagnosis chosen. This measurement system allows the researcher to determine the percentage of patients who have improved, remained stable, or deteriorated.

The NOC system[36] can also be used in goal measurement by identifying a NOC label and a target measurement for that label by

using the 5-point Likert scale. One advantage of the NOC system, over the Saba HHCC system, is that measurement is independent of the patient's previous condition. For example, a patient in spiritual distress, because he or she feels the need to pray prior to surgery (eg, spiritual health level "3"), has a different level of need than a patient with a recent diagnosis of inoperable pancreatic cancer who also requests prayer (eg, spiritual health level "1"). The NOC allows comparisons between patient populations, as well as measuring change over time. For example, in the former case, the patient may be initially at a spiritual health level "3" and after prayer may be a level "4," while in the latter case, the patient may be initially at a spiritual health level "1" and after prayer may be at a level "2." This example compared 2 patients at each point in time and compared change in outcome over time. The Saba HHCC system is limited in that it does not allow for outcome comparison between patient groups, as both patients in the example "improved" (measured as "1") even though they represent different levels of spiritual health.

Nursing informatics provides the opportunity to generate and test practice theories by using the EHR. A database infrastructure is currently available to accomplish this goal. With the integration of nursing standardized terminologies into one database infrastructure (ie, SNOMED CT), nurse researchers have the capability to determine what nursing interventions account for improved patient outcomes for specific patient populations. However, to accomplish this goal, there needs to be a coordinated effort within and among health systems to incorporate wholistic standardized terminology in nursing documentation and data entry screens to maximize reliability and validity. Researchers can also be consulted to design the databases to maximize research opportunities. The chosen terms need to not only be SNOMED-CT based, but also integrate physical, psychological, social, and spiritual dimensions of care so that the wholistic nature of nursing practice can be studied. It is also critical to use the appropriate level of measurement to maximize the data analysis opportunities. The nursing terms and measurement systems already exist in nursing standardized terminologies. It is up to nurse leaders and informaticists within health systems, in collaboration with nurse researchers and clinicians, to identify and choose what terms best capture nursing practice in their organizations while carefully considering how these data sets will be analyzed. The opportunity is to identify practice patterns that lead to improved outcomes and prevent never events. The evidence-based practice can be derived from their own documentation.

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