

Letters to the Editor

JAMIA

Toward Data Standards for Clinical Nursing Information

To the Editor:—In the article “Toward data standards for clinical nursing information,”¹ Ozbolt, Fruchtnicht, and Hayden discuss the need for a standard set of nursing care terms to facilitate research on the cost and effectiveness of nursing care. While we agree totally with the goal, we are concerned with the authors’ approach. As the authors indicate in the article, organized nursing is working to implement a Nursing Minimum Data Set (NMDS), which was developed at a 1985 National Consensus Conference organized by Werley and Lang. The major efforts to standardize nursing language to help achieve this goal are overviewed by Ozbolt et al. and then dismissed. As researchers and practitioners who have been involved in the construction and validation of the Nursing Interventions Classification (NIC)²⁻⁴ for the past seven years, we wish to take particular issue with the dismissal of the NIC.

Our current efforts in implementation with five field sites address the articulation issues between the standardized language needed for comparison across sites and for research and the documentation of specific activities needed for legal purposes and day-to-day communication. Ozbolt et al.’s singular focus on standardization of the detailed activities may not work and may lead us away from the real need to implement a standardized language for nursing treatments.

At the 1991 National Institutes of Health (NIH) conference on effectiveness research, mentioned in the article, a paper synthesizing the state of the science regarding the definition of nursing interventions was presented.⁵ According to this paper, the nursing literature contains a number of large conceptual schemes for nursing interventions, such as Henderson’s Components of Basic Nursing,⁶ Benner’s Seven Domains of Nursing,⁷ and the National Council of State Boards of Nursing’s Categories of Nursing Activities.⁸ These schemes are too broad to serve as elements of the

NMDS. At the other extreme are countless discrete nursing activity statements such as “turn, cough, and deep breathe” or “check vital signs TID,” which are too numerous and too locally influenced to fulfill the NMDS purposes. After a careful study of what exists, we concluded that nursing needs a standardized clinical language at a conceptual level midway between these two extremes. Such a language should be useful in all specialties and all settings. The NIC was developed to fulfill this purpose. The NIC has been developed by a diverse research team with evaluative feedback from numerous professional organizations and hundreds of nurse experts. The over 350 NIC interventions developed to date (examples include Acid-Base Management, Airway Management, Bed Rest Care, Cognitive Stimulation, Energy Management, Exercise Promotion, Grief Work Facilitation, and Wound Care) group more than 6,500 specific activities. We question the feasibility of Ozbolt et al.’s approach of establishing an exhaustive list of activities that will carry across specialties and settings. Indeed, they already have 544 statements from five pilot units in one site representing only acute care. They hope that they can code the statements from other agencies into this discrete language from one agency, but it is our experience that this is a daunting task. We have found that documentation is very specific to the agency and its type of patients, level of nurses, tradition, routines, and legal environment. If you could get nurses at ten hospitals to agree on a specific documentation list, what about other settings, such as long-term care and home health care? We need a standardized language for nursing treatments that crosses settings and specialties. We need one that we can use to teach students. We need one that can be used in a discharge note to indicate what was done for a patient, and the terms used need to be understood in other agencies. Perhaps we also need to standardize some of our documentation habits, but the two (the intervention and the parts of it that are documented to show daily progress) need to be related.

We also take issue with Ozbolt et al.’s idea that focusing on every detail gives one the whole picture.

First, no matter how comprehensive documentation is, it does *not* capture all that was done but rather only what the culture dictates should be documented in a legal source. No matter the number of trees and shrubs that are counted, the picture of the forest is not clear until one steps back. Nursing is both an action discipline and a thinking discipline. Yes, some interventions are more procedural than others, some more easily quantified than others. This is the nature of nursing work and we attempt to capture its complexity in the NIC.

We agree with Ozbolt et al. that work needs to continue on the relationship between using the NIC to build a research database and using the NIC to document care. Turley would call the former the nursing knowledge model and the latter the transaction record.⁹ In his article he challenged nursing to re-evaluate the current mode of record keeping: "any framework that maps and organizes professional knowledge cannot have an exact link to the transaction record." Future nursing information systems "must accommodate both the needs of the transactional model and the needs of the nursing knowledge." Reporting only detailed transactions "gives the appearance that nurses' responsibilities are solely task fulfillment and masks the elements of professional nursing." Conversely, "a model driven solely by nursing knowledge will create problems for legal or ethical monitoring and reimbursement." (p. 90)

In our opinion, Ozbolt et al. are developing more of what we already have—a single nursing information system built upon nursing orders. This will not articulate with the recognized and evolving national classification systems. They are building yet another discrete activity list and are organizing these activities into yet another large category scheme (26 categories adopted from Saba). We fear that people will invest time and other resources in the Virginia database project only to find that they cannot abstract data for the NMDS and cannot communicate with others.

While seven years is a short amount of time in classification research, the progress in developing a comprehensive standardized language for nursing interventions has been impressive. There are several indications that the NIC may become a national standard. For example, the NIC has been endorsed by the American Nurses Association for inclusion in a unified nursing language. In 1992 the NIC was one of the first two (the other being the North American Nursing Diagnosis Association's nursing diagnoses) nursing languages to be incorporated into the *Meta-thesaurus for a Unified Medical Language* by the National Library of Medicine. The NIC has also been

added to the indexing systems of the Cumulative Index to Nursing Literature (CINAHL) and Silver Platter so that nursing intervention literature will be organized using NIC terms. The Joint Commission on the Accreditation of Health Care Organizations includes the NIC in the scoring guidelines for the chapter about management of information as one nursing classification system that can be used to meet the standard on uniform data.¹⁰ The National League for Nursing has recently produced a video about the NIC and the NIC is prominent in the interventions included in a working paper of the International Council of Nurses.¹¹

While much work remains to be done, we have defined nursing treatments and have made a commitment to continue to refine and update the NIC as members of the profession give us feedback. Many health care agencies and educational institutions are beginning to implement the NIC as the standardized language for nursing treatments. We urge Ozbolt et al. to be a part of the total solution instead of creating yet one more individual attempt to do something local that does not travel well across institutional boundaries and practice settings.

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I am a member of the Iowa Intervention Program team that has developed the Nursing Interventions Classification (NIC) and I am in agreement with the attached letter to the editor expressing concerns about the Ozbolt, Fruchtnicht, and Hayden article.

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■ **In reply:** Members of the Iowa Intervention Project group take issue with our decision not to use their Nursing Interventions Classification (NIC) as the source of terms for patient care actions for our Patient Care Database Project.¹ We are keenly aware of the need for standard nursing vocabularies; our article tells why neither the NIC nor other standard vocabularies under development are adequate for our purposes.

Clinicians, researchers, and managers of patient care services need to identify the specific services that provide good outcomes at reasonable cost. To do so, they require standard terms and codes for patient problems, patient care actions, and patient outcomes, plus the ability to aggregate and analyze these data for comparisons within and across institutions. The

NIC intervention labels, although excellent for many other purposes, are frequently at too high a level of abstraction to serve this purpose well. For example, nurses in one unit may be achieving better patient outcomes than those in another unit for patients who have congestive heart failure, but if they have recorded only that they performed "Circulatory Care," we have no way of discovering the better practices.

The NIC activity lists, although more specific, pose a different kind of problem. The activity lists are limited exclusively to those actions considered to define the intervention label. Yet we find caregivers doing things that are not included in the NIC activity lists. Whether those actions represent better or worse practices than the set of activities in the NIC approved lists, we need to be able to record what is actually occurring, study its effectiveness, and provide feedback.

A further limitation of the NIC for our purposes is its particular focus on nursing interventions. The trend in the member organizations of the University Hospital Consortium (UHC) is toward integrated care planning and delivery. Although our set of terms started with nursing, as reflected in our JAMIA article, we anticipate including terms from other participants in patient care, as these are used in integrated care planning and documentation. Thus, we no longer refer to "nursing" terms, but to "patient care" terms.

The Iowa group questions the feasibility of developing a comprehensive set of terms that will apply across multiple hospitals. The answer to such a question is not ideological but empirical. We are now collecting terms across the full range of clinical services from eight member hospitals within the UHC. As we expected, we are finding a great deal of common language across institutions. Current funding from the UHC will allow us to test comprehensiveness (and compare effectiveness and efficiency of practice) in two services. We are seeking funds to test comprehensiveness across the full range of services. The research design, incidentally, includes comparing comprehensiveness in services that have contributed to the set of terms and in those that have not.

If we find support for our hypothesis that it is feasible to establish a comprehensive set of terms for patient care information at this level of detail, the Iowa group questions further whether the terms will be useful. They couch their questions in terms of the meaningfulness of specific actions, i.e., their contributions to the larger nursing intervention labels. Their concern with this question is emblematic of the differences

in our perspectives and purposes. To define what nurses do has been a central mission of the NIC project, and in that context naming specific nursing activities is useful to the degree that the set of activities gives meaning to the intervention label. We began with quite a different imperative: to capture what is actually occurring in the clinical area, and to abstract, aggregate, and analyze these data to discover how to give better care. Our criterion of usefulness, therefore, is not the contribution to meaning (although we agree that meaning is important and that the NIC provides a meaningful taxonomy), but rather the contribution to clinical discreteness. That is, do our terms enable us to distinguish one action from another so that we can use empirical methods to identify those actions associated with better outcomes for a particular problem or patient population?

This notion of utility is based upon the expectation that hospitals will adopt standard terms and codes, install them in automated information systems, and implement software for automatic, electronic abstracting of key data from the record to a variety of databases. We are using codes that conform to the UHC's standards for its Clinical Information Network, a patient-level database that already includes discharge abstract information. If the set of terms we are developing is found to be comprehensive, institutions will be able to choose from the set those terms they wish to use in their own patient care information systems. It will become possible to share data across institutions without requiring participants to subscribe to common documentation forms or information systems. Far from limiting hospitals' freedom to document care as they see fit, our approach, if successful, will maximize their options while permitting them to compare care practices and outcomes. As an enhancement to the Clinical Information Network, the Patient Care Database would allow institutions to examine care practices in relation to other databases, such as those for patient satisfaction, productivity, quality, and finance.

The Iowa group also expresses concern that the set of terms we are developing is limited, so far, to acute care settings. We make no claims to universality; these settings are the priority for the UHC member institutions. But in these institutions as elsewhere, care delivery is becoming more longitudinal and continuous. If our current efforts are successful, we would expect to begin collecting terms from ambulatory and other settings in the future.

Fundamentally, the Iowa group questions the appropriateness of our decision to develop a set of standard terms for clinical data when other efforts to

develop standard terms are ongoing. Although we think our work is necessary, we value the work of others. In our set of terms derived from hospital documents, we incorporate a number of terms (footnoted in our lists) from the North American Nursing Diagnosis Association and from Saba. If the Iowa group were interested in such collaboration, it might be possible to translate some patient care actions (especially those performed by nurses) into variant "activities" under intervention labels of the NIC. Such an approach would link patient care actions to more abstractly defined interventions and might help to bridge the gap between formal definitional language and the vernacular of clinical practice.

As our *JAMIA* article made clear, we hold in high esteem the various efforts to develop standard language for nursing and other components of health care. We recognize that no one approach is likely to meet all needs, and we believe that health care progresses best when we learn from one another. The terms we are collecting and coding for patient problems, patient care actions, and patient outcomes do not pretend to be all things for all purposes. Rather, they provide a set of common terms for recording and studying clinical data to identify more effective and efficient care. We welcome the thoughtful comments and critique of our colleagues in this endeavor.

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1. Ozbolt JG, Fruchtnicht JN, Hayden JR. Toward data standards for clinical nursing information. *J Am Med Informatics Assoc.* 1994;1:175-85.

■ **Comment:** In their article "Toward data standards for clinical nursing information,"¹ Ozbolt et al. summarize a number of contemporary efforts to develop standard nursing data elements, classifications, and vocabularies; indicate why none of the existing terminologies is suitable for recording detailed nursing care information in patient records; and then describe a project to develop standard terms for detailed nursing documentation of patient care problems, outcomes, and patient care actions. Their method is a "bottom up" approach, which began by examining and classifying terms actually used in a set of nursing

standards of care, protocols, and patient education plans. They detail the coding system developed for use in their project.

McCloskey et al.,² the developers of the Nursing Interventions Classification (NIC), raise doubts about the feasibility of building a standard terminology for detailed nursing activities that will be accepted across institutions. They indicate that the project undertaken by Ozbolt et al. may have a negative impact on current efforts to implement a standardized language for nursing treatments, since it has no express connection to the NIC and other emerging standards.

In response, Ozbolt et al. reiterate that none of the existing vocabularies is suitable for their purposes, which are different from the purposes for which the NIC was designed. They believe that their work is necessary (and that its feasibility is subject to empirical proof), but express their admiration for other efforts to standardize nursing language. Ozbolt's group at the University of Virginia has adopted (with attribution) some terms from the North American Nursing Diagnosis Association (NANDA) and from Saba's Home Health Care Classification of Nursing Diagnoses and Interventions. Ozbolt et al. open the possibility of collaboration with the Iowa group to relate some of the patient care actions they have identified to the NIC's intervention names.

This interesting interchange highlights some important clinical vocabulary issues that extend beyond the field of nursing and form a part of the rationale for the National Library of Medicine's (NLM) Unified Medical Language System (UMLS) project. The NLM and its UMLS collaborators have developed what may be a unique perspective on these issues. This perspective has been influenced by processing the many vocabularies and classifications that make up the UMLS Metathesaurus and by developing a Metathesaurus structure that links the concepts and terms from different terminologies without sacrificing their individual characteristics.

As the University of Virginia and Iowa groups point out, the UMLS project team has specific experience with nursing vocabularies. The 1994 Metathesaurus incorporates three of the four terminologies recommended by the American Nurses Association³ for inclusion in the Metathesaurus, that is, the NIC, the NANDA classification, and Saba's Home Health Care Classification. (The fourth, the Omaha Visiting Nurses Association Classification, will be included in future editions of the Metathesaurus.) In adding Saba's terminology to the 1994 edition, the NLM established explicit machine-readable connections between Saba's concepts and terms and those of the NIC and

of NANDA. The Metathesaurus also includes a growing number of explicit links between concepts and terms from these three nursing terminologies and those from other vocabularies such as Medical Subject Headings (MeSH) and Systematized Nomenclature of Human and Veterinary Medicine (SNOMED) International.

One lesson drawn from UMLS experience is that vocabularies that appear on the surface to be duplicative or competitive usually have different underlying goals that explain many of their differences. It is unlikely that a single biomedical vocabulary or classification will ever serve such disparate purposes as statistical reporting of mortality and morbidity, detailed documentation of individual patient conditions and treatments, and indexing of the scientific biomedical literature. Ozbolt et al.'s argument that existing nursing vocabularies are not sufficiently granular to represent clinically important distinctions is analogous to the generally held view that the *International Classification of Diseases, 9th edition, with Clinical Modifications* (ICD-9-CM) is too general to represent many important aspects of clinical reality.

A second UMLS lesson is that when vocabulary developers do take advantage of each other's work, they often don't leave a useful machine-readable audit trail. To use a nursing example again (others are readily available), there is considerable overlap among the NIC, NANDA's classification, and Saba's classification, but, in the data provided to the NLM, none of the three included built-in, unambiguous, machine-readable links to either of the other two. Ozbolt et al. report that terms obtained from NANDA and Saba's classification are being footnoted in the vocabulary they are developing. This sounds like an excellent practice, particularly if the footnoting scheme includes an unambiguous, machine-readable link to the specific concept as it appears in the other vocabulary. Since NANDA's classification and Saba's classification are now both in the UMLS Metathesaurus, one appropriate link would be the unique identifier for the concept in the Metathesaurus.

Although one benefit of built-in, machine-readable links is a reduction of work in constructing the Metathesaurus, a more important advantage is that a link created at the time a decision is made to include a concept from another vocabulary is likely to be more accurate. In nursing and in other fields, there are obvious potential benefits to merging and analyzing patient data coded by different vocabularies. A little extra effort during vocabulary creation can facilitate this kind of aggregation.

A third UMLS observation is that creators of new

vocabularies or classifications may adhere to practices that were necessary or desirable in the manual environment, but that can be counterproductive in computer-based systems. In discussing the coding system developed for the vocabulary they are creating, Ozbolt et al. indicate that they limited each concept to a single position in their classification scheme to avoid multiple codes for the same concept and that they structured the coding system to allow for projected growth. These same practices are used in many clinical vocabularies. An approach that takes better advantage of the flexibility of computer-based systems is to divorce the hierarchical arrangement of a concept from its unique identifier.

Assigning each concept a unique identifier that has no inherent meaning, e.g., an accession number, and regarding the hierarchical code(s) used to order the concept in displays as attributes that can be changed as needed insulates users of the vocabulary from maintenance problems. Users can store the unique identifier for the concept in their systems secure in the knowledge that it will never change, even when the advance of knowledge or a change in practice patterns dictates a modification in the hierarchical arrangement of the vocabulary. Vocabulary developers are free to include the same concept in multiple positions in the hierarchical arrangement wherever it might prove useful. They also avoid all possibility of "running out of room" for codes and all temptation to succumb to the cardinal sin of reusing the same code for a different concept.

This approach opens up the possibility that different groups can agree to use the same set of concepts and unique identifiers without having to agree on the hierarchical arrangement or the preferred names of those concepts. The structure developed for the Metathesaurus offers a reasonable model for representing different names and different hierarchical con-

texts for the same concepts in a single vocabulary database.

In the machine environment, where many different concept names and many different hierarchical views of concepts can be accommodated, the only significant issue is how many different concepts will be delineated for use for a particular purpose. Here varying purposes, such as those described by Ozbolt et al., may well dictate the need for varying degrees of granularity. There is still an opportunity, however, to link the narrower concepts needed for one purpose to the broader concepts established for another. Should the vocabulary being developed by Ozbolt's group be adopted by a range of clinical information systems, it may become another candidate for inclusion in the Metathesaurus. The fields of nursing and informatics would be well served if machine-readable links between the NIC and this newer vocabulary were established before that happens.

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