# Implementation of Standardized Nursing Languages (NIC, NOC) in On-line Care Planning and Documentation

C.M. Prophet, G.G. Dorr, T.D. Gibbs and A.A. Porcella Department of Nursing and Patient Care Services, The University of Iowa Hospitals and Clinics, 200 Hawkins Drive, Iowa City, Iowa, 52242, USA

At the University of Iowa Hospitals and Clinics (UIHC), the Standardized Nursing Languages (SNLs) of Nursing Interventions Classification (NIC) and Nursing-sensitive Outcomes Classification (NOC) are being implemented in on-line care planning and documentation. NIC and NOC are being integrated in the INFORMM NIS (Information Network For Retrieval & Medical Management Nursing Information System). The implementation process for SNLs includes six components: objectives, programming, database content, education, utilization, and evaluation. This process has been used successfully in NIC implementation and will be applied in NOC field testing.

#### Introduction

Standardized Nursing Languages are essential to the development of Nursing Information Systems and the Computer-based Patient Record (CPR). In order to define nursing knowledge and nursing's contribution to patient care as well as to share nursing data across sites, a common nursing language is fundamental.

For both new and legacy NISs, the Nursing Minimum Data Set (NMDS) containing Nursing Diagnoses per the North American Nursing Diagnosis Association (NANDA), NIC and NOC can be installed readily <sup>1,2,3,4,5</sup>. However, a careful implementation process must be developed to ensure full participation of all stakeholders and to facilitate maximal efficiency.

## **INFORMM NIS**

In order to envision the use of the SNL implementation process, an understanding of the existing NIS, its database structure and content is necessary. NIC and NOC are being implemented in the INFORMM NIS which was developed entirely at UIHC and includes multiple functions <sup>6,7,8,9</sup>.

In the INFORMM NIS, nursing content is contained in a mainframe, three-tier, hierarchical database structure: orders, groups and titles. The order layer contains patient care orders with order details and charting parameters. The group tier encompasses a group name, patient care orders and other data, such as outcomes, which are associated with the group. In the title section, an order group may be associated with one or more titles.

For example, the patient care order "self-care ability" is stored in the order section of the database. The order group "bathing" includes the order "self-care ability" with other orders, such as "bathing: assistance" and outcomes such as "patient demonstrates bathing ability". The order group "bathing" may be associated with a title named "cerebral vascular accident (CVA)".

At the inception of the INFORMM NIS, the only SNL available was NANDA Nursing Diagnosis. The lack of SNLs and the desire to gain maximal user ease in the transition to automated care planning led to the decision to develop INFORMM NIS database content customized for each patient care unit. In the design of patient care documentation, it became clear that the INFORMM NIS database needed refinement and streamlining in order to enhance its content with documentation data elements.

The initial database revision involved the identification of essential patient care orders. For each order, order details (specifics for performing the order) and charting parameters (documentation data elements) were added. With each order thereby augmented, the number of patient care orders in the database decreased from 3,122 to 302. With the order tier streamlined, the database re-organization then focused upon order groups. Fortunately, the UIHC Department of Nursing is actively involved in NIC and NOC research and was selected to be a field site for both.

## NIC and NOC on-line

NIC contains 433 nursing treatments. Each treatment includes an intervention label, a definition and a list of defining activities. In INFORMM NIS, the NIC intervention label becomes an order group name and the defining activities convert to patient care orders.

Still in development, NOC contains at least 173 outcomes. Each outcome includes an outcome label, outcome indicators and a measurement scale. In the INFORMM NIS, outcome labels will augment the current outcomes (patient goals). Outcome indicators will translate to charting parameters. The five-point measurement scale for each outcome label will convert to charting responses and will replace the current outcome measurement of "met" or "not met".

#### **Implementation process**

A process, addressing six components, was developed for the implementation of SNLs in the Department of Nursing as well as in the INFORMM NIS. Although some activities are sequential, the entire process should be defined and understood at the outset so that tasks may be simultaneously and independently completed for overall efficiency. The six components are: objectives, programming, database content, education, implementation and evaluation.

The determination of institution-specific objectives for the implementation of SNLs builds a strong foundation for the success of the endeavor. Unless the objectives suit the expectations of the users of the system, active participation and full commitment may be unachievable.

In the programming component, the technical requirements need specification for both SNL maintenance and functionality. Programming should allow SNL content storage and maintenance on the database. In addition, programming must support functionality for users to access the SNL content for care planning and documentation. Technical requirements should be examined early so that programming can occur concurrently with database content efforts and can be fully operational prior to SNL utilization.

Database content consists of three steps: prioritization, conversion, and integration. Given the extensive content of SNLs, database content steps may involve several iterations.

As the initial step of content review and customization, prioritization of content areas is critical. Initially, prioritization involves the selection of the SNL content germane to the

setting and patient populations. Subsequently, the sequence of the database conversion of the selected SNL content needs to be decided according to projected usage needs.

In the conversion step, the SNL content must be adapted to fit the NIS database and the standards of patient care in the particular setting. Throughout the integration step, the SNL content should be added to a new NIS database or should replace the existing content in a legacy NIS.

Although sequenced after database content efforts, the education component may be initiated at any time. However, an intensive focus should occur immediately prior to utilization.

The process used for the implementation of automated systems should be copied in the utilization component. With INFORMM NIS, a pilot in one or two units is expanded to other representative units before full implementation.

Unlike education, which must occur prior to utilization, evaluation usually occurs last. However, rather than a final review, formative evaluation should occur after each component of the process using the objectives as major evaluation criteria.

# **Implementation process: NIC**

This six-component SNL implementation process was tested and refined in the successful implementation of NIC in the INFORMM NIS.

At UIHC, the five objectives for NIC are to: attain consistency of order groups reflect and monitor standards of care for nursing interventions maintain the on-line archive for data contribution to internal and external databases provide data for research and quality improvement supply data for the NIC field site research questions

The NIC field site research questions are to: identify clusters of nursing interventions determine usage of nursing interventions identify linkages of nursing interventions with nursing diagnoses and patient outcomes

For NIC, programming changes were minor. The database functions were enhanced to allow sorting of NIC content into several categories; for example, the NIC domains and classes. In terms of functionality, additional programming supported the selection, updating and documentation of order groups.

Prioritization of NIC involved the determination of the NIC content needed for the INFORMM NIS and, in particular, for the pilot units and the shared NIC field site database. At UIHC, with the selection of the cardiovascular medical and cardiovascular surgical units for pilot, approximately 200 NICs were identified as first priority for conversion. Then, the priority NIC content was reviewed and converted . Since the NIS database content had been developed by many entities, a complex matrix was delineated to depict the involvement of these individuals and committees, e.g., standards of care, policy and procedure, and quality assurance/improvement.

Expert clinician working groups (a total of 80 experts in 14 groups) assembled to convert NIC content. To maintain NIC integrity, NIC labels cannot be revised, and were added to the database as order group names. However, the defining activities needed to be converted to patient care orders in the INFORMM NIS database.

During integration, the existing database content was replaced with NIC interventions. With few exceptions, such as specific post-operative protocols, NIC interventions replaced the order group content on-line. At the completion of NIC integration, it is anticipated that the number of order groups will be reduced from 1,451 to fewer than 500.

Additionally, in associating NIC interventions with nursing diagnoses, it was recognized that the nursing diagnosis content needed revision. Therefore, simultaneously, the nursing diagnosis content was standardized to reflect current NANDA content (128 approved diagnoses) and the initial work of the Nursing Diagnosis Extension Classification (NDEC)<sup>10</sup>. At the completion of the nursing diagnosis content revision, it is anticipated that the number of nursing diagnoses will be reduced from 567 to fewer than 200.

The education component of NIC involved multiple media. The users were provided selected journal articles and the NIC text, a scripted NIC slide presentation, the National League for Nursing videotape ("Meet NIC: The Nursing Interventions Classification"), a NIC poster ("Pick NIC" with a picnic theme), and NIC computer classes.

For the component of utilization, NIC was piloted on the two selected units. Although the original plan included an expansion to additional pilot units, the NIC pilot was so well received by the users that full utilization proceeded as soon as the NIC content was converted and available on-line.

In the final component of the process, evaluation encompassed an assessment of the achievement of the stated objectives and the NIC implementation process as well as a clinical critique of NIC content. At UIHC, the stated objectives were achieved and users deemed the implementation process successful. The clinical critique of NIC included proposed changes to the NIC labels, definitions, and defining activities and additional NIC interventions.

# Implementation process: NOC

As a result of the NIC implementation experience, the same process will be used for NOC field testing.

At UIHC, the five objectives for NOC are to: enrich the outcomes database and enhance the on-line pathways for the selection and monitoring of patient outcomes reflect and monitor standards of care for patient outcomes maintain the on-line archive for data contribution to internal and external databases provide data for research and quality improvement supply data for the NOC field site research questions

Of these five objectives, the first two are specific aims of NOC whereas the last three match NIC objectives.

The NOC field site research questions are to: - ascertain use of outcomes and indicators to evaluate nursing interventions

- determine usage of outcomes and indicators
- identify additional outcomes and indicators
- evaluate the clinical usefulness of outcomes and indicators

In contrast to NIC, the programming requirements for NOC are major. The INFORMM NIS outcome database and on-line pathways are extremely limited; outcomes contain only patient goal statements and can be selected and monitored by users only when the outcome is associated with an identified nursing diagnosis. Additional programming will expand the outcome database, and functionality will be enhanced to allow selection and monitoring of outcomes in multiple pathways.

When database programming has been completed, the outcome database will expand to include outcome labels, outcome indicators, and measurement scales. In step one of database content, NOC will be reviewed to determine the NOC content needed for the INFORMM NIS and, in particular, for the pilot units and the shared NOC field site database. It is anticipated that the NIC pilot units will be selected to pilot NOC.

The conversion of NOC will entail associating NOC outcome labels with patient goals. Additionally, NOC outcome indicators will be converted to charting parameters and the outcome measurement scales will be matched to charting responses.

For example, the patient goal of "patient demonstrates bathing ability" will be associated with the NOC outcome label "Self-Care Ability: Bathing". The related outcome indicator will be converted to the charting parameter of "bathing ability". The responses for the charting parameter "bathing ability" are "dependent", "assistance & device needed", "assistance needed", "device needed" and "independent" which represent the five points of the measurement scale for the outcome label "Self-Care Ability: Bathing".

Unlike NIC integration, NOC will not replace on-line content. Integration will focus on the mapping of outcomes to many data elements, e.g., patient populations, clinical guidelines. During NOC education, a program will be conducted using materials similar to those used for NIC.

For NOC utilization, the plan may differ from that of NIC. Since the INFORMM NIS resides on a single mainframe computer, programming changes will affect all users simultaneously. The decision will be how to pilot the outcome pathways and content.

In the last component of the process, NOC evaluation will encompass an assessment of the achievement of the stated objectives and the NOC implementation process as well as a clinical critique of NOC content.

#### Summary

After approximately one year of effort, NIC has been successfully implemented in the INFORMM NIS as indicated by the extremely positive user response. Rather than enter, update, and document against individual patient care orders, users now work with the order groups of NIC interventions. The implementation of NOC, although it will follow a similar process to NIC, will pose different issues. Rather than refine content, NOC will add the critically important outcome assessment segment to the on-line system. The SNLs of NIC and NOC have refined nursing knowledge and offer an excellent database for new and legacy NISs. Careful consideration and execution of an SNL implementation plan facilitate an

effective and efficient method to provide nursing knowledge in NISs for the enhancement of quality patient care.

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