The Nursing Minimum Data Set: Abstraction Tool for Standardized, Comparable, Essential Data

ABSTRACT

The Nursing Minimum Data Set (NMDS) represents the first attempt to standardize the collection of essential nursing data. These minimum core data, used on a regular basis by the majority of nurses in the delivery of care across settings, can provide an accurate description of nursing diagnoses, nursing care, and nursing resources used. Collected on an ongoing basis, a standardized nursing data base will enable nurses to compare data across populations, settings, geographic areas, and time. Public health nurses will be able to evaluate and compare services.

The purpose of this article is to discuss briefly the following aspects of the NMDS: background including definition, purposes, and elements; availability and reliability of the data; benefits; implications of the NMDS with emphasis on nursing research; and health policy decision making. (Am J Public Health 1991;81:421–426)

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Introduction

With the rapid explosion of nursing knowledge worldwide, the amount of data nurses use and process in the delivery of care is extensive and often unmanageable. Advances in information management and computer technology have broad implications for this knowledge explosion and can facilitate the collection, manipulation, and retrieval of essential nursing data for practice and research. A uniform standardized data base that will allow for the grouping and comparison of nursing data collected across various populations, settings, geographic locations, and time would be a boon to both assessing and comparing nursing care provided and resources used, as well as to research. Eli Ginzberg,[1] in reviewing nursing's past and present, noted that nurses still are writing patient records for two to three hours out of every eight-hour shift; he predicted the necessity for reviewing essential record-keeping and of greater use of computerization in nursing.

Public health nurses identified the need to explore minimum data set requirements for their practice and planned to prepare a miniproject proposal to accomplish this.[2] However, as this project was described, the data acquired in a public health setting apparently could not be linked with those from other areas of nursing practice. This would continue the fragmentation of documentation on nursing care of patients. As nurses in public health, and in other practice areas, continue to discuss the necessity and value of a minimum data set, it is essential that they recognize that the Nursing Minimum Data Set (NMDS), along with its elements and definitions, constitutes a minimum set of nursing's essential core data.[3] The NMDS is a system that can be used by public health nurses in their practice and for comparison of nursing care and resource consumption across other settings, thus providing linkage to all other nursing care settings.
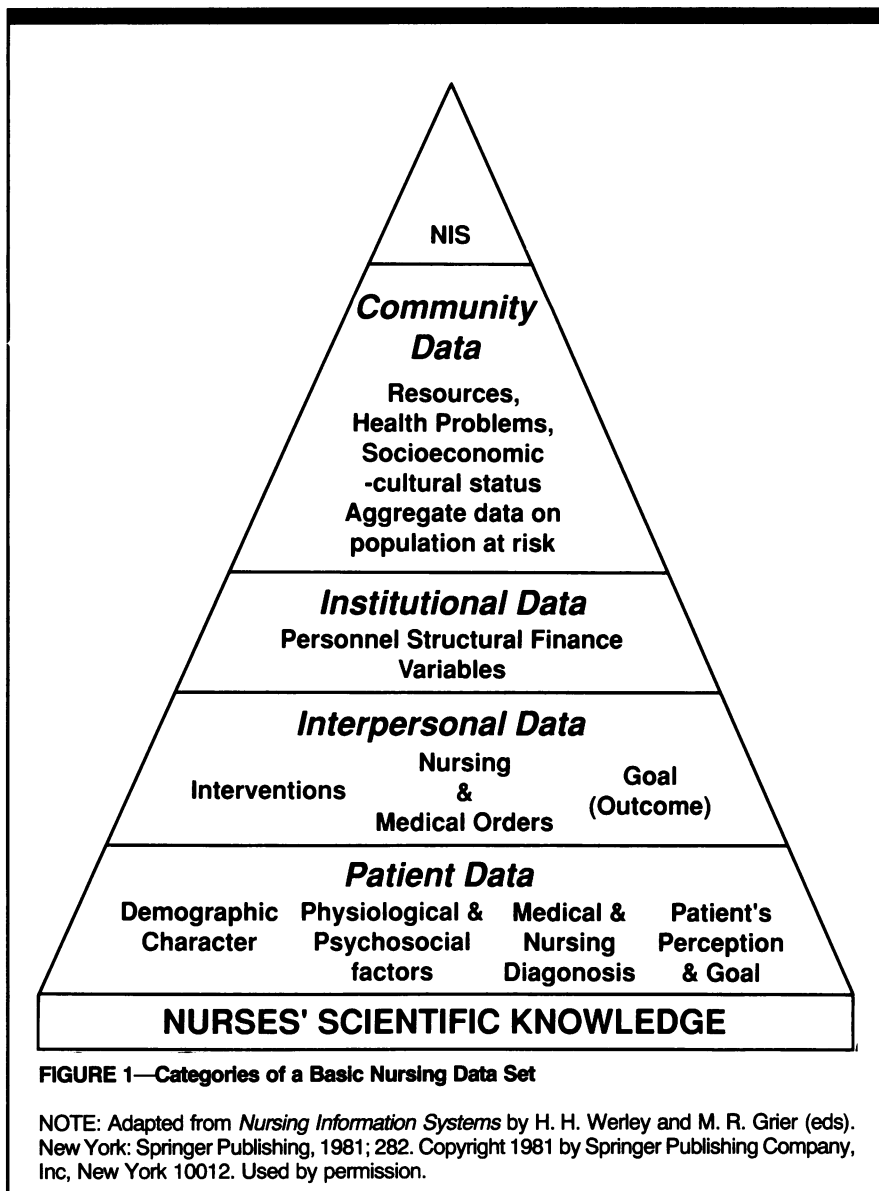
In addition to providing a mechanism for the comparison of nursing care data across settings, the Nursing Minimum Data Set can be combined with the more detailed data accumulated in nursing information systems and other health care information systems. In the future, it is anticipated that these nursing information systems will be both computerized and in existence at the institutional level, where, through data-base management systems, the nursing data can be linked to other health data. In this way, the use of the NMDS in detecting trends in nursing care practices and resource allocation is expanded further.

The Nursing Minimum Data Set is nursing's first attempt to standardize the collection of essential, comparable core nursing data. In this paper we discuss briefly: background, including definition, purposes, and elements of the NMDS; availability and reliability of the data; benefits; implications with emphasis on nursing research; and health policy decision making.

FIGURE 1—Categories of a Basic Nursing Data Set

NOTE: Adapted from *Nursing Information Systems* by H. H. Werley and M. R. Grier (eds). New York: Springer Publishing, 1981; 282. Copyright 1981 by Springer Publishing Company, Inc, New York 10012. Used by permission.

Background

The NMDS was derived from the general concept of a Uniform Minimum Health Data Set, defined as "a minimum set of items [or elements] of information with uniform definitions and categories, concerning a specific aspect or dimension of the health care system, which meets the essential needs of multiple data users."[4] Note the emphasis on multiple users and not only a specific group of users; a minimum set of items of information in nursing must meet the needs of other data users as well as nurses.

Existing patient-focused health data sets built on this concept include: the Uniform Hospital Discharge Data Set, the Long-Term Health Care Minimum Data Set, and the Uniform Ambulatory Medical Care Minimum Data Set.[5-7] The Hospital Discharge Data Set is the only minimum health data set in widespread use currently, since these data must be collected on all hospitalized patients receiving Medicare benefits; it does not include nursing data, however. The NMDS is consistent with but expands the Hospital Discharge Data Set by including core nursing data. The Long-Term Health Care Minimum Data Set and the Ambulatory Care Minimum Data Set currently are being revised and tested.

The NMDS effort is a follow-through on earlier work that was done at the University of Illinois. In a Nursing Information Systems Conference held in 1977 at the University of Illinois College of Nursing in Chicago,[8] an effort was made to stimulate nurses to move toward computerization of nursing services data and toward submission of proposals to develop nursing information systems. In addition, one of the small work groups was given the challenge of identifying a basic nursing data set. Their effort[9] is shown in Figure 1. However, the timing for movement in this direction apparently was not right for nursing at that time.

One of the authors (HHW) opened the subject again a few years later. In 1985, a NMDS Conference was developed at the University of Wisconsin-Milwaukee School of Nursing. The NMDS was developed consensually through the efforts of a national group of 64 experts, who participated in this three-day invitational conference. The participants included: nurse experts in a variety of areas; health policy spokespersons; information systems, health data, and health records specialists; governmental and proprietary agency personnel; and persons knowledgeable about the development of the previous minimum health data sets.[3,10,11]

NMDS Definition

Built on the concept of Uniform Minimum Health Data Sets, the NMDS is defined as a minimum set of items of information with uniform definitions and categories concerning the specific dimension of nursing which meets the information needs of multiple data users in the health care system. It includes those specific items of information that are used on a regular basis by the majority of nurses in any care delivery setting. It is an abstraction system, or tool, designed for the collection of uniform, standard, comparable, minimum nursing data for use across various types of settings and patient groups. These data also are useful to other health professionals and researchers.

Purposes of the NMDS

The purposes of the NMDS are to:
• establish comparability of nursing data across clinical populations, settings, geographic areas, and time;
• describe the nursing care of clients and their families in a variety of settings;
• demonstrate or project trends regarding nursing care provided and allocation of nursing resources to individuals or populations according to their health problems, or nursing diagnoses;
• stimulate nursing research using the NMDS elements alone, as well as through links to the more detailed data existing in nursing and other health care information systems;[11] and

TABLE 1—Elements of the Nursing Minimum Data Set

Nursing Care Elements
1. Nursing Diagnosis
2. Nursing Intervention
3. Nursing Outcome
4. Intensity of Nursing Care

Patient or Client Demographic Elements
5. Personal Identification*
6. Date of Birth*
7. Sex*
8. Race and Ethnicity*
9. Residence*

Service Elements
10. Unique Facility or Service Agency Number*
11. Unique Health Record Number of Patient or Client
12. Unique Number of Principal Registered Nurse Provider
13. Episode Admission or Encounter Date*
14. Discharge or Termination Date*
15. Disposition of Patient or Client*
16. Expected Payer for Most of This Bill* (Anticipated Financial Guarantor for Services)

*Elements comparable to those in the Uniform Hospital Discharge Data Set.

● provide data about nursing care to influence and facilitate health policy decision making.

NMDS Elements

The NMDS includes 16 items, or elements, that have been categorized in three general groups: nursing care, client demographics, and service elements as shown in Table 1. Ten elements of the NMDS are components of the Uniform Hospital Discharge Data Set that already is being collected for all hospitalized patients receiving Medicare benefits. Six items are new to the set. When health information systems are computerized and linked across different types of settings, only the new items would need to be re-collected for hospitalized Medicare recipients. This system linkage with the Uniform Hospital Discharge Data Set "is valuable not only because of the information this data set contains but more importantly as the key to enter other data sets," such as access "to obtain an almost complete picture of the total period of hospitalization for a variety of uses."[12] Use of the NMDS can enhance the management of data—not only within hospitals, but also across settings in various long-term care and public health geographical locations.

The nursing care elements consist of Nursing Diagnosis, Nursing Intervention, Nursing Outcome, and Intensity of Nursing Care (with its two subelements of Hours of Care and Staff Mix).[3] Unfortunately no single classification system for nursing diagnoses is widely and universally accepted. Currently, two well-recognized classification systems are available: the North American Nursing Diagnosis Association Taxonomy I Revised[13] and the Classification Scheme for Client Problems in Community Health Nursing from Omaha[14] (hereafter referred to as the Omaha Classification System). Both have been examined in community health settings. For example, in a retrospective chart review study, Mundt[15] noted the compatibility of information documented in narrative charting by nurses in a midwestern urban public health department with the Omaha Classification System. Likewise, Hemphill, Lutes, Taylor, Carroll, and Cragg[16] integrated the North American Nursing Diagnosis Association classification system of nursing diagnoses into the documentation system of a large western county public health department, showing that their documentation became more clear and concise. To accommodate the diversity in classification systems for nursing diagnoses, the authors of the *Nursing Minimum Data Set (NMDS) Data Collection Manual*[17] suggested coding *both* the classification systems used and the actual diagnoses. While this does not assure exact comparability of data, it does allow data to be collected from more settings. Until a single classification system for nursing diagnoses is accepted more widely, nursing diagnosis data can be aggregated across settings only when using the same nursing diagnosis classification system.

Availability and Reliability of Data

In a test of the NMDS, data were collected pertaining to the availability and reliability of the NMDS elements from a review of 116 client health care records from four types of clinical sites in the midwest: a hospital, a nursing home, a home health care agency, and two clinics affiliated with a teaching hospital.[18] Most of the NMDS elements were available for greater than 90 percent of the cases. Overall intercoder agreement on the data set elements, excluding the Unique Number of Principal Registered Nurse Provider (which was never available) and Nursing

Interventions (which were included for pilot testing only), was a satisfactory 91 percent, with an item-specific range of 57 percent to 100 percent. For categorical-type data with fewer than 10 possible coding categories, coefficient Kappa was calculated,[19] with similar results. The implication of these results is that the definitions and protocol for coding were generally acceptable, although a few elements needed refinement, which has been done.[17]

Benefits of the NMDS

The benefits for nursing, if the NMDS were adopted nationwide in ongoing data collection systems, include:

● Access to comparable, minimum nursing care and resources data on local, regional, national, and international levels;

● Enhanced documentation of nursing care provided;

● Identification of trends related to client problems or nursing diagnoses and nursing care provided;

● Impetus to improved costing of nursing services;

● Improved data for quality assurance evaluations;

● Impetus to further development and refinement of nursing information systems;

● Comparative research on nursing care, including research on nursing diagnoses, nursing interventions, resolution status of client diagnoses or problems, and referral for further nursing services;

● Contributions toward advancing nursing as a research-based discipline; and,

● Easily retrievable data that would make nursing's data available for nursing, as well as for other health care providers and policy makers.

It is important to recognize and value these benefits, since nurses have been slow to work toward developing and computerizing nursing information systems with *ongoing* collection of nursing's essential core data.

Implications of the NMDS

Implementation of the NMDS has far reaching implications for health policy decision making and for nurses in the respective functional areas of nursing in the health care delivery system.

Clinical Practice and Administration

Relatively recently, the Committee for the Study of The Future of Public

Health[20] stressed greatly the need for professionals to maximize the influence of accurate data and professional judgment on decision making. The Committee recommended "that every public health agency regularly and systematically collect, assemble, and make available information on the health of the community, including statistics on health status, community health needs, and epidemiologic and other studies of health problems." As the Study Group on Nursing Information Systems[21] stated, at the 1982 Cleveland, Ohio Conference, "Management and practice data are interrelated or complementary and should be so perceived; ultimately, both kinds of information could be obtained from the same data." Both public health nurses and nurse administrators have responsibility for the implementation of the NMDS elements. Public health nurses and nurse clinicians should stress complete, accurate documentation of nursing care according to the nursing process. Continuity of care provided to clients transferred among health care settings can be facilitated through proper and accurate documentation of care. Nurse administrators should highlight both the need to abstract core, minimum nursing data in public health agencies and the need for these data to be comparable across the various types of care delivery settings, so that they can be incorporated into further development of computerized nursing information systems. Furthermore, nurse administrators should recognize the trends these core data can reflect about both public health nursing practice and the resources used in providing services, as well as the research possibilities of these data.

Education

Nurse educators must create an awareness in students of the necessity to document care appropriately, reflecting use of the nursing process. Faculty should be held accountable for ensuring the integration of information management and computerization in the undergraduate and graduate curricula for use in decision making in all areas of nursing. Furthermore, nurse educators in undergraduate and graduate programs should stress the relevance of the NMDS as an integral component of nursing information systems. Continuing education for public health nurses and clinicians should include basic information regarding the NMDS elements, their definitions, benefits, and implications. The importance of careful documentation of care provided and resources used should be stressed, be-

cause of the need for implementation of the NMDS as an abstraction tool for collection of standardized, comparable data.

Research

Use of the NMDS results in a compilation of nursing information *across* populations, settings, geographical locations, and time, using the same elements and definitions, nursing process labels, and categorizations. If nurses are to describe, compare, and assess their practice, they must be able to communicate with each other using comparable data. Recently, Treviño noted that "all too often the utility of potential information resources is [diminished significantly] because of a lack of comparability in the definitions, codes, classifications, terminology, and sampling frames used by different agencies at the federal, state, and local levels."[22] He identified several consequences of this lack of comparability, which included: difficulty in making meaningful comparisons, increased cost in collecting new data in an attempt to make up for inconsistencies, and major gaps in data where much information still is lacking.

Westermeyer also discussed concerns about the lack of comparable data when he was developing a strategy for an alcoholism social indicator system, using information already collected by various institutions. After reviewing data collected from five state agencies, two national private agencies, and two federal agencies, he concluded that age and gender were the only two variables that were collected routinely and therefore were available for comparison of data across agencies. Westermeyer further stated, "Failure to develop social indicators will impede the evolution of enlightened social policy and research into the factors associated with health problems."[23] The NMDS includes not only social indicators that must be comparable with other data bases, as suggested by Westermeyer, but also nursing's essential core elements that must be comparable and of use in other data bases, in order for nursing to conduct certain types of research across populations, settings, and geographical locations.

Equally as important as consistent documentation in its implications for the development of computerized nursing information systems is the need for a unified language in nursing. As pointed out by McCormick, "A major impediment to more wide spread use of computers in nursing has been the absence of a standard vocabulary for describing health care phe-

nomena pertaining to patient care, nursing research, nursing education, and nursing administration."[24] Consideration of these two components—consistent documentation and a unified language—will assist nurses in moving more rapidly toward computerization of nursing services' data.

In an effort to avoid the problem of inconsistency in the matter of coding, a *NMDS Data Collection Manual* has been developed.[17] The *Manual* includes: the NMDS data elements and definitions; a description of how to organize and conduct a survey of agency health care records for the purpose of extracting and coding information; four setting-specific versions of the instrument, as well as, instructions for data collection, analysis, and interpretation.

Types of Research Possible with the NMDS Elements

Examples of research that could be done using the NMDS elements to enhance nursing practice, include:

● the description of nursing care of clients in various settings;

● evaluation of the resolution status of nursing diagnoses and referrals for further nursing care;

● assessment of patterns of outcomes for various nursing diagnoses with different populations; and

● comparison of nursing intervention effectiveness for specific nursing diagnoses across settings—locally, regionally, nationally, and internationally.

Research for nursing administration might include:

● evaluation of the procedure for costing nursing care for selected nursing diagnoses in a variety of population groups;

● appraisal of the cost-effectiveness of nurse staffing patterns and their impact on the resolution status of nursing diagnoses;

● evaluation of the patterns of nursing care and resource requirements in the different types of care delivery settings—hospitals, nursing homes, home health care agencies, and ambulatory clinics; as well as

● analysis of existing and emerging resource allocation methodologies for nursing services.

Health Policy Decision Making

Public health nurses, like nurses generally, must have data that reflect their practice, in order to influence health policy development. Two issues illustrating this need for nursing data are prospective

payment for home health care and the effectiveness initiative.[25,26] It has not yet been determined if there will be a prospective payment system for home health care. However, if one is developed, the kind of data used to determine payment must be readily available and retrievable, and this means computerization. Medical diagnoses are the most frequent method of categorizing client problems, but these do not reflect the variance in the cost of caring for clients in the home. Rather, home care clients have nursing problems and require nursing care; a major service provided for home care clients is nursing care. If nursing data were collected routinely using the NMDS elements (in particular, nursing diagnoses, interventions, and outcomes, and intensity of nursing care), nursing information would be available for development of a prospective payment system that is likely to account for more variance in the cost of providing care to clients in the home setting.

The second health policy issue for which the NMDS is essential is the Medical Treatment Effectiveness Program.[26] This is a federally funded program designed to demonstrate which procedures or interventions are the most effective in producing quality client outcomes. Without access to a standardized nursing language, effectiveness of nursing care cannot be demonstrated. One component of the effectiveness initiative program is the development of data bases that can be linked to Medicare files and other population data bases that may lead to improved quality of client outcomes. Today, nursing's data are absent from current data bases. Implementation of the NMDS would demonstrate the effectiveness of care provided by nurses, including those in public health nursing.

Public Health Nursing may be at a crossroads. If public health nursing is to survive, it must be able to demonstrate the effectiveness of its services. Economic pressure has resulted in shrunken departments and a diminution of services in some settings. A new federal department, the Agency for Health Care Policy and Research,[26-28] has been created in the offices of the Assistant Secretary for Health to study and enhance the effectiveness, appropriateness, and quality of care. If nursing information is not included in this data base, the need for nursing will not be demonstrated. Long-term planning and the use of resources will be determined by what has been demonstrated from these data. Therefore, if public health nursing (and nursing generally) is to play a major

role in health care, it must have standardized data and must demonstrate its essential nature and effectiveness. A national health care data base is being developed which will provide a basis for making many decisions. Nurses must become aware of the urgency of having nursing's information systems developed and computerized, so nursing data can be included in the broader data base development for studies of effectiveness and dissemination of findings. Nursing data also must be readily retrievable and available for health policy making as health policy issues are raised.

Aside from uses already mentioned, implementation of the NMDS in public health nursing would provide nurses with a large data base to describe the population, nursing practice, and allocation of resources. The frequency of nursing problems or diagnoses, the outcomes for groups of individuals, and the amount and intensity of nursing care provided for those groups of clients could be articulated. Additionally, the association between and among diagnoses, interventions, outcomes, and intensity of nursing care (as measured by the two subelements: Hours of Care and Staff Mix) could be identified. The data set would assist nurses to explain and predict trends in their practice, providing them with aggregate data rather than only anecdotal accounts of practice.

Use of the NMDS would enable public health nurses to plan and evaluate care. With reflected changes in data trends within this data base, nurses could plan for the health needs of the future. By reviewing the information available through the NMDS system, they would be able to detect how their client groups have changed over time with respect to demographics, diagnoses, interventions, and outcomes. This information would be useful in designing and delivering future services for improvement of public health nursing. The applicability of the NMDS to current public health nursing concerns, such as the immunization of children, care of the AIDS population, and nursing care of the homeless, is readily apparent.

Public health nurses would be able to evaluate their services, for they would have the data to demonstrate what impact a new program has had on diagnoses, interventions, and outcomes. And most importantly, they would have a minimum set of readily retrievable data that would enable them to measure outcomes in *nursing terms*, in addition to the traditional medical indicators of morbidity and mortality.

For too long, nurses have attempted to define nursing and evaluate the effectiveness of nursing interventions with the concepts essential to the epidemiology of medical practice. Nurses are interested in the responses of clients to actual and potential problems, involving health maintenance and the prevention of illness. Nursing's language, represented by the NMDS elements and definitions, incorporates the broad scope of information used by public health nurses.

Because of requests from nursing professionals and others, information about the NMDS and its relationship to the development of nursing information systems is disseminated at both national[29] and international[30] meetings. But a word of caution is necessary for individuals developing computerized nursing information systems. Through talking with nurses about their information systems, it is apparent that simply entering the nursing data into an integrated computerized information system may not be enough. The nursing data also must be retrievable in order to be put to any meaningful use. That is, the subset of nursing's data must be retrievable from the overall client or public health information system, so the data elements can be examined by nurses. If nurses cannot be shown what nursing data are retrievable, these data may have been integrated into larger information systems and then deleted without letting nurses know of this deletion. Nurses must, as autonomous professionals, be knowledgeable not only about entering data, but also about retrieving them, in order to assure the integrity of nursing's essential data. There are ways of keying nursing data so they can be retrieved. This was discussed recently in a monograph developed for the American Nurses' Association (ANA) Council on Computer Applications in Nursing.[31] Currently, a survey is being developed to collect information from those who have requested the *NMDS Data Collection Manual*.[17] Responses to the questionnaire will provide information about the NMDS use, implementation of the data set, and whether the respondents might be interested in planning cooperative or collaborative research on the NMDS.

Nurses in all functional areas can and should find a role for themselves in promoting, implementing, and testing the NMDS in the interest of improving client health care. The ANA Resolution[32] on computerization of nursing services data is still as applicable, and as much needed, today as it was when it was passed unan-

imously by the House of Delegates at the 1986 ANA Convention. Therefore, nurses are encouraged to facilitate its implementation as soon as possible. ☐

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