

Promotion of interdisciplinary practice through an automated information system

Communication among and between health team members is in a state of confusion. This confusion could be eliminated by an interdisciplinary approach to care that includes communication via an automated nursing information system. The nursing data base model of Romano et al was analyzed to determine if it could serve as the basis for an effective information system for interdisciplinary practice/communication. This data base model has some empirical support, but it reflects a multidisciplinary approach to care, rather than the preferred interdisciplinary approach.

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PROFESSIONAL NURSES spend a large portion of time communicating information that describes patient status, documents the care planned or provided, and reports patient care outcomes. This information is transmitted along a series of frequently unrelated communication channels such as verbal report and documentation in the medical record. Although the information is intended for a multidisciplinary audience, whether it is received or interpreted by other disciplines is dependent on its value as perceived by those disciplines. Consequently, there may be multidisciplinary duplication of efforts, overlapping of services, and/or interruptions in continuity of patient care. In addition, increased volumes of patient data resulting from the expanding number of health care providers, the growing complexity of health care technology, and the increasing acuity level of patients continue to compound the difficulties.

An interdisciplinary approach that com-

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municates patient data to health team members via an automated nursing information system may be more effective than a multidisciplinary approach to this communication problem. The interdisciplinary approach to patient care would involve a variety of disciplines providing care in an interdependent and collaborative relationship, whereas multidisciplinary care is provided by various disciplines in parallel processes.¹ Interdisciplinary collaborative practice is preferred because "nurses and physicians work together in the delivery of quality care, jointly contributing in a balanced relationship characterized by mutual trust."^{2(p8)}

Information systems can augment or displace communication processes.³ A nursing information system consists of the data collected, transmitted, stored, and used by nurses, as well as the associated procedures of data entry, processing, and retrieval.⁴ Computerizing the data contributes to the efficient use and management of the information because of standardization, organization, and automation.⁴ To facilitate interdisciplinary communication, nursing must define the information requirements for an automated information system that supports the needs of nursing practice within an interdisciplinary approach to care.

NURSING DATA BASE MODEL

Romano et al⁵ present a nursing data base model (Fig 1) that may serve as the basis for an effective information system for interdisciplinary practice and communication. This nursing data base model

structures part of the computerized Medical Information system (MIS) in use at the Clinical Center, a 550-bed research hospital at the National Institutes of Health.⁵ The MIS is a hospital-wide information system in which patient care services are ordered, clinical findings and observations are recorded, and communication among hospital departments and professional disciplines are accommodated and streamlined.⁶ In describing their model, Romano et al state:

The components in the model are superimposed on the problem-solving processes of physicians and nurses in relation to a patient. The problem-solving process includes the following: A patient is assessed by a physician and a nurse, medical and nursing care is planned and executed, patient responses are observed and communicated from nursing to medicine, and the evaluation of patient responses by both disciplines is fed back to direct a continuation of the process.^{5(p46)}

Three nursing documentation (communication) components are identified in this model:

1. interdependent nursing interventions "that require a medical order for validity" and are collaborative "in that they are actions taken on the patients' behalf by the nurse, in response to physician orders"^{5(p46)};
2. "an independent nursing component which encompasses the health problems that nurses can independently identify, influence, or resolve, and nursing interventions that differ from, yet complement, the medical treatment but are carried out by the nurse"^{5(p48)}; and

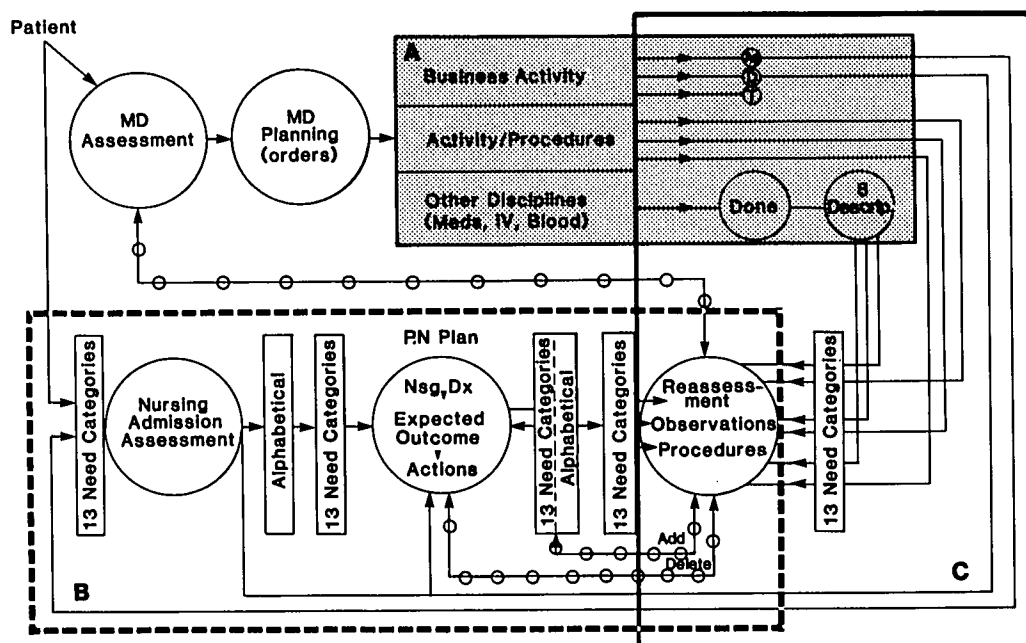


Fig 1. Three major components of nursing data base model: (A) interdependent nursing functions, (B) independent nursing functions, (C) interaction of interdependent and independent functions. Ad = admission note; D = discharge note; T = transfer note; Meds = medications; descrip = administrative description; $\circ\circ$ = feedback; NsgDx = nursing diagnosis. Reprinted from Romano CA, McCormick KA, McNeely LD, Nursing documentation: A model for a computerized data base, 1982.

3. communication of the interaction between the interdependent and independent functions of nursing.

The model identifies the patient as a source of data both at admission and as changes in status are observed during hospitalization. Assessment, planning, and evaluation of patient care are integral to the model, and some feedback systems to promote interdisciplinary communication are available.

The model of Romano et al is dependent on the ability of nursing to categorize nursing observations into 13 established need categories and to organize data by using the nursing process.⁵ These catego-

ries are air, circulation, food/fluid, elimination, sleep/rest, safety, mobility, comfort/pain, hygiene, sexuality, teaching/learning, and neurosensory and sociopsychological needs. Romano et al view such categorization of observations and use of the nursing process as possible deterrents to model implementation; they believe that nurses who have not been trained in these particular frameworks may have problems with data entry. This concern is supported by Sullivan's study of nursing notes.⁷ Sullivan found that "complete chains" (all components) of the nursing process were infrequently documented in both problem-oriented and source-oriented methods of

recording. She offered two interpretations of her findings: either nurses do not use the nursing process, or they use the nursing process in practice but fail to use it in record keeping.

ANALYSIS FOR APPLICABILITY

Prior to adopting a model for use in a specific situation, it is prudent to analyze the model to determine whether it is applicable in the new situation with its differing problems and needs.⁸ Nurse scientists have identified a variety of criteria for analyzing knowledge.⁸⁻¹⁰ In evaluating knowledge to be applied in a practice setting, Hardy⁸ espouses the use of empirical adequacy as the single most important criterion. She further states that "a theory cannot be empirically valid if it is logically inadequate."^{8(p15)} Thus, the data base model of Romano et al should be analyzed according to the criteria of logical and empirical adequacy.

Logical adequacy addresses the internal consistency or logic of a model. Internal consistency can be examined by identifying the components of the model and then the linkages or relationships among the components.⁸ Romano et al⁵ have identified the subcomponents of their nursing data base model, as well as the components (interdependent nursing functions, independent nursing functions, and the interaction of the two).

They have diagrammed detailed linkages, indicating the direction of influence and communication. This diagramming reveals two major "gaps" in the consideration of the model for use in nursing communication to foster interdisciplinary

practice/communication. First, the model suggests that, although physicians direct patient care, it is nursing that functions as the primary discipline receiving and processing information. Nevertheless, the nursing plan of care is only indirectly accessed by physicians and other disciplines. In addition, the model provides for communication or feedback of patient responses from nursing to medicine but not from medicine to nursing or other disciplines, except via medical orders. These gaps are consistent with the definition of collaboration given by Romano and associates, in which nurses act in response to physician orders.⁵

Empirical adequacy is the degree to which the model is supported or verified by observation or testing. The data base model has some empirical adequacy in that it serves as the structure for documentation of nursing activities at the Clinical Center.^{5,6} To further analyze the empirical adequacy of selected components of the model, findings from a nursing research study conducted in a large acute care teaching hospital¹¹ must be compared to aspects of the model. The researchers investigated various formats of nursing communication, including intradisciplinary communication (change-of-shift reports and written nursing care plans) and multidisciplinary communication (hospital policies and physician orders). The research question was, "Is the nursing process operationalized in nursing communication?"

To provide a means to evaluate content and continuity of nursing communication within the nursing process framework, researchers requested 75 nursing personnel assigned to eight surgical wards to identify and complete one patient care procedure

Table 1. Communication for initiation of procedures

Source of communication	No. of procedures	%
Nursing order	8	10.7
Physician order	39	52.0
Duplicate orders	12	16.0
Hospital policy	16	21.3
Total	75	100.0

under the observation of the investigators. The procedure selected was to be a part of their regular work assignment; procedures included dressing changes, suctioning, and administration of medications. The study found four categories or sources of communication for initiation of the procedures: nursing orders, physician orders, duplicate (nurse/physician) orders, and hospital policies (Table 1). The findings support the components of the model of Romano et al; nursing orders correspond with the independent nursing component; physician orders, with the interdependent nursing component; and hospital policies, with the activity/procedures segment of the interdependent nursing component. The finding that 16% of the procedures were duplicated by nursing and medical

personnel supports the belief that duplication of efforts exists in health care.

Change-of-shift reports were taped in the study hospital, so the investigators were able to carefully analyze two consecutive (night and day) reports for statements relating to the procedures selected by the participating subjects. Planning statements related to the procedures were tabulated from the night report, and corresponding implementation or evaluation statements were identified from the day report (Table 2). These nursing process statements were categorized according to sources of communication originating from many disciplines. The findings suggest that nurses focus their intradisciplinary communication on interdisciplinary patient care matters.

Nursing care plans were then examined for planning statements related to the observed procedure (Table 3). Nursing and duplicate orders were the only sources of communication evident on the nursing care plan. When duplicate orders were evident, statements on the nursing care plan reflected a nursing order. These findings indicate, as expected, that nursing care plans are not interdisciplinary in nature.

In answering the original research ques-

Table 2. Nursing process statements related to source of communication as identified in change-of-shift report

Source of communication	No. of procedures	Planning statement in night report	Implementation or evaluation statement in day report
Nursing order	8	6	2
Physician order	39	23	20
Duplicate orders	12	8	12
Hospital policy	16	3	9

Table 3. Documentation in nursing care plan by statements of observed procedures

Source of communication	No. of procedures	Statement
Nursing order	8	7
Physician order	39	0*
Duplicate orders	12	10
Hospital policy	16	0†

*Written on treatment and medication forms.

†Written in policy manuals.

tion, the investigators also analyzed the consecutive night and day change-of-shift reports on eight surgical wards for two different days. During that time, 109 nurses reported on 430 patients. Nursing statements were rated by trained nurse researchers according to both a process component (assessment, planning, implementation, and evaluation) and a category of patient care needs (Table 4). The 18 categories delineated in the study are similar to the 13 need categories of Romano et al.⁵ The major differences consist of additional study categories: medications, infection control, discharge/operating room, and "no needs perceived." According to the data base model, all of these categories except "no needs perceived" would be located in the interdependent nursing function component of the nursing data base model (Fig 1).

Components of nursing communication identified in Tables 2 and 3 demonstrate organization within a nursing process framework. As indicated in Table 4, nursing statements during report can be organized according to the nursing process and needs categories. These findings support the 13 needs categories and the intradisci-

plinary nursing care plan in the data base model, but they challenge the concerns of Romano et al regarding the ability of nurses to communicate the nursing process. However, since organization and classification of nursing statements during the study were accomplished by trained researchers, further investigation would be necessary to determine whether the staff nurses were conscious of using the nursing process as the organizational framework for communication of the care given.

IMPLICATIONS FOR PRACTICE

One of the major roles of nursing reflected in the data base model of Romano et al⁵ is to implement physician orders. This is done by arranging administrative activities and providing data to physicians, other disciplines, and/or nursing personnel for independent revision of the patient's plan of care. Such a role is consistent with an approach that is multidisciplinary, as it involves parallel care delivery. Multidisciplinary practice is inherent in the model and in the research findings, which support selected aspects of the model. Therefore, this nursing data base model supports the multidisciplinary provision of health care and not the preferred interdisciplinary care.

An ideal information system would provide interdisciplinary access; input from and availability to all disciplines; an integrated patient care plan; and a mechanism for nursing to communicate patient care information.

Table 4. Nursing statements from change-of-shift report tabulated according to nursing process steps and care needs categories

Categories of care needs	Nursing process steps				% of total categories
	Assessment	Planning	Implementation	Evaluation	
Diet	156	87	49	63	6.7
Medications	231	195	247	211	17.2
Mobility	263	40	56	52	7.8
Teaching	30	31	53	32	2.8
Safety	34	13	14	11	1.4
Discharge planning	205	91	78	17	7.4
Cardiovascular	353	37	34	69	9.3
Respiratory	111	51	40	47	4.7
Neurological	180	8	10	50	4.7
Integumentary	202	36	100	103	8.3
Genitourinary	224	28	43	94	7.4
Gastrointestinal	318	43	59	72	9.3
Psychological	126	16	15	30	3.5
No nursing need perceived	81				1.5
Infection	48	10	20	9	1.6
Comfort	95	10	23	39	3.2
Musculoskeletal	104	5	7	18	2.5
Sensory	32	2	1	3	0.7
% of total statements	52.8	13.2	16.6	17.4	100.0

What type of information system is necessary to facilitate interdisciplinary practice and, thus, interdisciplinary communication? An ideal information system would provide (1) interdisciplinary access for entering and retrieving data relative to assessing, planning, implementing, and evaluating patient care; (2) input from and availability to all disciplines at the ward level; (3) an integrated patient care plan developed by all participating disciplines; and (4) a clear, useful mechanism for

nursing to communicate patient care information in an interdisciplinary manner. Ownership of patient problems would be interdisciplinary, with efforts directed toward common patient goals established by the patient and the team.

A variety of issues must be considered in developing an information system to promote interdisciplinary care.

- Information systems that involve many professional disciplines or departments are more difficult to develop and

implement because of the variety of special interests, needs, and expectations.⁶

- A clinical record that accurately reflects the interdisciplinary care planned and delivered for each patient is dependent on a recording system that uses a commonly understood and accepted language.
- Previous attempts at interdisciplinary communication (ie, common problem lists and Problem Oriented Medical Record [POMR] charting) have demonstrated mixed success. Resistance to these formats is generally linked to a philosophy of isolationism in which each discipline views the others as encroaching on established territory and/or in which data from another discipline is viewed as superfluous.
- Information is power, and computerization redistributes information.⁶

Computerized information systems provide a large volume of quantitative data that must be synthesized and used to formulate plans. Professionally prepared nurses will be required to "decide what the data mean,

what their standards of practice are, and how to improve practice."^{12(p87)} These nurses are "third wave nurses"¹³ or "professionals who establish parameters of assessment and use information to make clinical decisions"^{13(p6)} by analyzing and differentiating within a clinical specialty and by harnessing technology.¹³

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The purpose of a computerized information system is to improve communication among people trying to accomplish a common goal. The common goal of the interdisciplinary health team is the achievement of therapeutic outcomes in patient care. An interdisciplinary approach to care requires that the various disciplines be committed to a balanced relationship characterized by mutual trust.² The nursing data base model of Romano et al⁵ has some empirical support but it reflects a multidisciplinary approach to care. Thus, the model does not provide the framework for an information system that enhances interdisciplinary communication and practice.

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