

Patients With Low Needs For Nursing Care Prior To
Hospital Discharge:
Implications For Nursing Efficiency

By

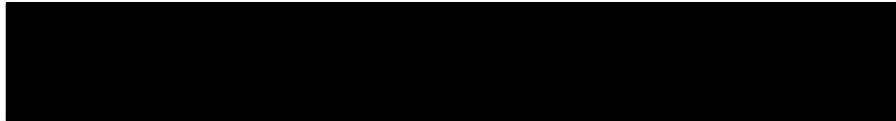
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A Masters Research Project

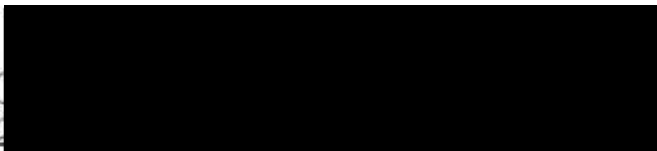
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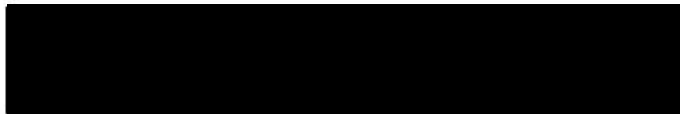
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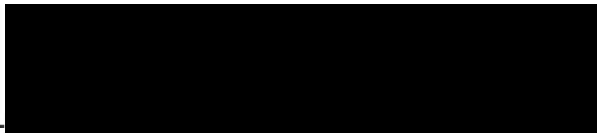
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Abstract

Patients With Low Needs For Nursing Care Prior To Hospital

Discharge: Implications For Nursing Efficiency

A descriptive study using secondary data was done to determine if within selected DRGs, there are patients in the hospital who have low needs for nursing care in the two days prior to discharge. Data were collected retrospectively from the Medicus Classification System completed daily by nurses on the acute care units of a local hospital. Two hundred sixty eight patients hospitalized between August and December 1987 were selected from four DRGs: 106 - Coronary Artery Bypass Graft with Catheterization (n=71); 107 - Coronary Artery Bypass Graft without Catheterization (n=101); 121 - Myocardial Infarction (n=35); and 127 - Heart Failure and Shock (n=67). Sixty percent of these patients had low nursing needs for the last two days of hospitalization. However, chi square analysis indicates that within each DRG, patients with low nursing needs prior to discharge were not significantly different than those with high nursing needs on the demographic variables of sex, age, marital status, proximity, admit source, admit type, and discharge disposition. This study is the first step in establishing a data base upon which future study can be done to enhance efficiencies for specific DRGs. Subsequent studies need to identify what the specific nursing and medical needs are for this group of patients in order to determine whether or not these needs could be met earlier in the stay, or in an alternative setting.

Introduction

In 1965, Congress passed two health care programs, Medicare and Medicaid. Because these programs were based on the idea of retrospective reimbursement, there was no limit on resources available and therefore no incentive for healthcare providers to increase the efficiency by which health care was provided. As a result of these programs, health care expenditure grew at an uncontrolled and unregulated rate. In 1967, Medicare paid \$3.7 billion for hospital services, a figure that escalated to more than \$37 billion in 1983 (Shaffer, 1984). The health care portion of the gross national product increased from 5.3% in 1960 to 10.8% in 1983 (Coleman, et al, 1984).

In response to the rapidly increasing health care costs the Federal Government implemented the Tax Equity and Fiscal Responsibility Act in 1982 (TEFRA) which changed the Medicare inpatient reimbursement system from retrospective to prospective. This system created a structure for distribution, or rationing (Hicks & Boles, 1984) of health care resources by providing incentives for cost-containment (Walker, 1983; Mowry & Korpman, 1986).

The prospective payment system (PPS) was based on the case mix system of Diagnostic Related Groups (DRGs) which attempts to categorize patients into clinically homogenous groups based on their resource consumption. There are currently 475 DRGs, each with an

assigned weight and rate of reimbursement. DRGs are based on specific diagnosis, the average length of stay, age, discharge disposition and status, and any complication or comorbidity factors (Hornbrook, 1985).

Many other third party carriers have also adopted the use of a prospective reimbursement system in establishing contractual agreements with health care providers. This move directly or indirectly affects all medical and health care practices (Kramer & Schmalenberg, 1987).

For hospitals to be cost effective under prospective reimbursement, medical and nursing resources, the major components of care delivery, must be looked at as a whole system. In order for a system to achieve maximum efficiency it must make the fullest use of all resources. This means that no change in the combination of resources can be made which results in increasing the cost effective measures of one component in order to decrease the cost effectiveness of another (Spencer, 1977). Cost effective measures have been achieved by individual departments in health care but this does not necessarily lead to efficiencies for the whole system. The problem is that in health care the medical and nursing resource components have not been looked at as a whole system to achieve efficiency of health care delivery. The study reported here was an initial step and examined the efficiency of the hospital care delivery system as it relates to nursing. There is a need to

determine whether there are patients within the hospital for whom nursing care could be provided outside of the acute care setting, thus potentially increasing the efficiency of the system.

Review of Literature

Hospitals have responded to the need to provide quality care with a limited amount of resources by relying heavily upon economic theory to guide their decisions (Hicks & Boles, 1984). Economics is a social science concerned chiefly with the way society chooses to employ its limited resources which have alternative uses, to produce goods and services for present and future consumption (Spencer, 1977). In the 1960s, health care charges were reimbursed retrospectively and there was little incentive to control costs. In the 1980s, the dollars available to reimburse health care have been limited by prospective reimbursement. People desire more goods and services than there are means to provide. Currently, health care providers must therefore determine how to utilize those limited resources. Economics is concerned with those choices and with the forces that determine those choices (Hicks & Boles, 1984).

Economic theory is used to make the decision-making process surrounding resource allocation more rational by examining the consequences of different choices. It provides a non-judgemental approach for predicting and explaining the behavior of consumers under different circumstances (Feldstein, 1983; Hicks & Boles, 1984).

Based on the DRG prospective payment system, hospitals are reimbursed a set amount: if the costs are greater than that amount, the hospital must absorb the loss; if the costs are less than that amount, the hospital will profit. Thus, prospective reimbursement has provided hospitals with an incentive to operate in a cost effective manner (Hamilton, 1984; Shaffer, 1984). Resources have become limited, and health care providers are forced to review utilization of these resources.

In order to maintain viability, hospitals have attempted to limit their costs to maximize allocated resources using a variety of strategies. These strategies have included: being more selective in the type of patients admitted, decreasing costs for labor, materials, and facilities, decreasing the number of services provided, increasing outpatient services, and developing utilization review activities (Marchette & Holloman, 1986; Kramer & Schmalenberg, 1987).

Another frequently used strategy to limit resource allocation employed by hospitals has been attempts to decrease patients' length of stay. The trend toward earlier discharge in Oregon began in 1980 and accelerated in 1983 following the implementation of DRGs. From 1982 to 1984 the average length of stay in Oregon fell from 7.7 days to 6.0 days (Bragg & Lovdale, 1987).

One of the major ways in which nursing, as a component of the hospital system, has attempted to address resource allocation

limitations is through staffing based on patient needs rather than the more traditional nurse/patient ratio. This has been made possible by patient classification systems (PCS) (Curtin, 1984). A reliable and valid PCS provides a means for quantifying nursing resource consumption based on patient needs (Djikers & Paradise, 1986; Brewer, 1984). Quantification of patient needs can then be used to identify nursing resource requirements for individual patients and for groups of patients (Buck, 1985; Curtin, 1983; Riley & Shaefer, 1983; Shaffer, 1984). Quantification of individual patient need is referred to by some patient classification systems as the patient type and quantification of groups of patients as the unit acuity. Knowing patient type allows staff to be assigned according to the needs of the individual patient. The unit acuity allows nursing units to be staffed at the level required for these needs. Thus, by quantifying patient needs, nursing has been able to allocate their resources according to this need (Sovie et al, 1985; Sovie & Smith, 1986; Hamilton, 1984).

Progress toward more efficient delivery of health care services is imperative under prospective reimbursement (Hornbrook, 1987). In order to attain efficiency, the system must be looked at as a whole (Hamilton, 1984; Hicks & Boles, 1984; Shaffer, 1984). Unfortunately, the strategies to increase efficiency employed by various hospital departments and the department of nursing have not always been looked at together. The hospital's efforts to discharge

patients earlier and to reduce the length of stay is one example of a separate strategy. This effort at earlier discharge was done with little consideration of the patient needs for nursing care (ANA, 1985; Mowry & Korpman, 1985). It may be that there are some patients who are being discharged with moderately high need for nursing care while others are staying with a pattern of low need for nursing care several days pre-discharge. On the one hand, discharging patients with a high need for nursing care may be a threat to providing patient needs in the most efficient yet quality manner. On the other hand, keeping patients with low nursing care needs in the hospital for two to three days prior to discharge may indicate inefficiency (Mowry & Korpman, 1985).

The possibility of either too early or too late discharge with regard to patients' nursing care needs has not been examined to determine if either or both of these patterns exist. All studies of nursing care needs have been done comparing groups of patients within DRGS. These studies have compared patient needs for nursing care across DRGs and between institutions (Mitchell, et al, 1984; Sovie & Smith, 1986). None have looked at levels of nursing care needed during the stay within a DRG.

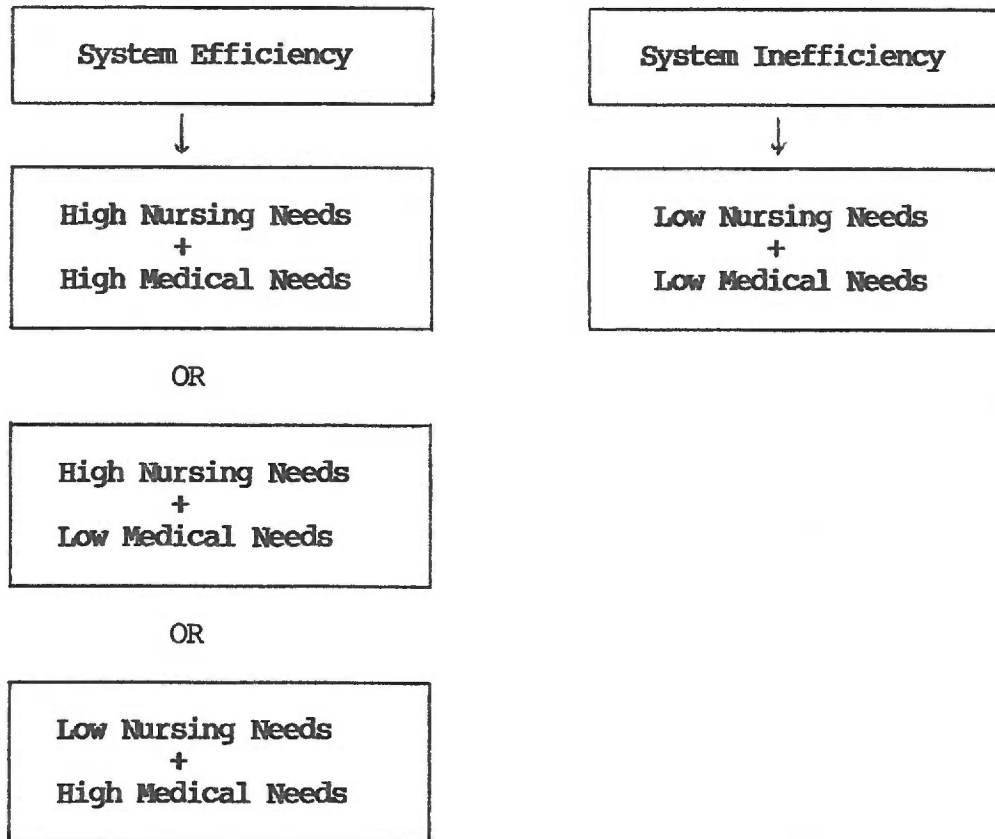
Conceptual Framework

Hospital services are traditionally divided into two major components: medical resources and nursing resources. Medical resources are those services based on physician ordered tests and

treatments used to diagnose and intervene in a patient's illness. These services are generally provided by laboratory, radiology, pharmacy, respiratory and biomedical departments. Room and care services include dietary, housekeeping and laundry services as well as the indirect services of operations and administration. Nursing resources are those services provided by professional and nursing staff. Hospitals often combine nursing services in with the room and care component for the purposes of billing. Nursing is considered separately in this study.

In order to achieve maximum efficiency a patient should not be kept in the hospital when both nursing and medical needs suggest that the care could be provided outside the hospital or that the care could have been provided earlier in the stay. As illustrated in Figure 1, there appear to be three combinations of nursing and medical needs which would justify hospitalization and therefore suggest hospital efficiency and one combination in which hospitalization is not justified and therefore suggests system inefficiency. The first combination is when a patient has both high nursing and high medical resource needs. The second combination is when a patient has high nursing resource needs even if medical resource needs are low. The third and last combination suggesting efficiency is when a patient has high medical resource needs and nursing resource needs are low. Conversely, when a patient's need for both medical and nursing resources is low there is little if any

Figure 1. Conceptual Model of Hospital Efficiency



justification for caring for the patient in the hospital setting.

To do so is not an efficient use of the system.

The question of efficiency could be addressed by starting with either the medical or nursing resource needs of patients. Only those patients with a low need for the selected group of resources would require evaluation of the remaining group of resources. The nursing component of patient need was selected to be studied first since nursing is the largest single group of health care providers

in the hospital and therefore has the greatest impact on the efficiency of the entire hospital system (Hamilton, 1984; Harrell, 1985; Shaffer, 1984). Nursing is pivotal in controlling resources as they are responsible for a wide range of decisions at all levels of care delivery: assessing, planning, giving, and managing care (Abdella & Levine, 1986).

In addressing efficiency of the hospital as a whole, patients identified as having a low need for nursing resources should next be evaluated for their level of medical resource need. The hospital stay of patients identified as having low needs for both types of resources should be examined more closely. Patterns of care should be evaluated and alternative methods or environment for delivery of service considered. One alternative method is to shift services to earlier in the length of stay. It is possible that medically ordered treatments such as physical or occupational therapy could be provided earlier in the stay. Starting discharge planning earlier is one way to enhance a patient's readiness for discharge when the acuity indicates. Providing patient teaching initially and throughout the stay may also increase the patient's readiness for discharge (Smeltzer and Flores, 1986).

Referring more patients to alternative settings when their care needs are low is another method to be considered in addressing hospital efficiency. Some treatments, such as respiratory and physical therapy can be provided outside the hospital. Nursing

homes and home care agencies provide an increasingly wide range of care, including homemaking, personal care and professional services. There is growing evidence that these facilities and agencies do accept patients whose need for nursing resources is similar to that of some patients in an acute setting. In a recent study using the Medicus PCS, Smith and Scott (1986) compared patients' nursing care requirements in a long term geriatric facility with those of patients in an acute nursing care setting. The results of the study indicated that long term care units have patient types that are similar to those in an acute setting.

The purpose of this study was to take the first step in examining the components of hospital care to determine the efficiency of the care delivery system as a whole. This study reviewed patient needs for nursing resources during the two days prior to discharge to determine if there were patients for whom nursing care need was low.

The following research questions were examined:

1. What proportion of patients in the total sample and within selected DRGs have low nursing care needs in both the last two days prior to discharge?
2. Within each DRG what are the demographic characteristics of patients with low nursing care needs in both the last two days prior to discharge?

3. Within each DRG to what extent is there a difference in selected demographic characteristics between patients with low nursing care needs and those with high nursing care needs in both the last two days prior to discharge?

Definition of Terms

Low Nursing Care Needs. Patients with low nursing care needs are patients with few needs or patients with several needs but all requiring a small amount of nursing care. The following are examples of patients with low nursing care needs: patients needing monitoring of intake and output, needing simple skin and wound care, needing assistance with mobility, feeding, and bathing, and needing admission into and discharge from the nursing unit. For the purpose of this study, a patient with low nursing needs is defined as a patient with a type I or II Medicus rating.

High Nursing Care Needs. Patients with high nursing care needs are those patients with many needs that each require small amounts of nursing care or patients with a few or many needs each requiring extensive nursing care. The following are examples of patients with high nursing care needs: patients needing care due to unconsciousness or confusion, patients needing oxygen therapy or invasive monitoring. For the purpose of this study, a patient with high nursing care needs is defined as a patient with a type III, IV, or V Medicus rating.

Low Medical Needs. Patients with low medical needs are patients with no abnormal physiological test results or conditions based on the medical intensity of illness criteria. Examples of patients with low medical needs might include a post operative patient without fever, abnormal labs, or sensory status change.

High Medical Needs. Patients with high medical needs are patients with one or a combination of abnormal physiological findings such as lab values, fever or neurological changes as defined by the medical intensity of illness criteria.

The Last Two Days Prior to Discharge. As defined by Medicus and consistent with national length of stay calculations, the day of discharge is not counted in the length of stay. Therefore, in this study the last two days prior to discharge are the two days preceding the actual day of discharge. A hospital day is from midnight to midnight. Thus, any patient admitted prior to midnight two days before discharge is included in this study.

Methodology

The design of this study is descriptive. The facility selected is a local metropolitan tertiary care teaching hospital, similar to other local hospitals in size, population served, and case mix of patients. Nursing staff is comprised primarily of Registered Nurses using comprehensive nursing, in which a nurse is responsible for total patient care of several patients for the duration of a shift.

Sample

Two hundred seventy four patients were selected from four DRG groupings. This number represents the total number of patients hospitalized between August 1 and December 15, 1987 for the four selected DRGs. This time frame was selected as representative of the patient acuity types for this institution. Two hundred sixty eight of the patients had at least a two day length of stay plus the day of discharge, meeting the criteria for inclusion in this study.

The four DRGs were: DRG 106, Coronary Artery Bypass Graft with Catheterization (CABG w/cath); DRG 107, Coronary Artery Bypass Graft without Catheterization (CABG w/o cath); DRG 121, Myocardial Infarction (MI); and DRG 127, Heart Failure and Shock (Shock). DRGs 106 and 107 represent surgical DRGs and are generally considered to be planned admissions, while 121 and 127 are unplanned. These DRGs were selected because of their high patient volume and a length of stay longer than the institution average across DRGs. The longer than average length of stay provides opportunity to redistribute services to an earlier time in the hospital stay, thus presenting the possibility that additional efficiencies may be able to be achieved if the total length of stay can be decreased. It should be noted that the average length of stay for each DRG in this study is shorter in this institution than the national average.

As illustrated in Table 1, almost two-thirds of the patients were surgical patients. The majority of patients were male,

Table 1

Selected Characteristics of Patients Across Four DRGs (N=268)

<u>Characteristic</u>	<u>Total</u>	<u>%</u>	<u>Characteristic</u>	<u>Total</u>	<u>%</u>
<u>DRG</u>			<u>Age</u>		
106 CABG w/Cath	71	(26)	<65	108	(40)
107 CABG w/o Cath	101	(37)	>65	160	(60)
121 MI	35	(13)			
127 Shock	67	(24)			
<u>Sex</u>			<u>Proximity</u>		
Male	163	(61)	Local	108	(40)
Female	105	(39)	Non Local	160	(60)
<u>Marital Status</u>			<u>Admit Source</u>		
S-W-D	66	(26)	Nursing Home	2	(<1)
Married	186	(74)	Home or MD Office	160	(60)
			Other Hospital	37	(14)
			Emergency Room	67	(25)
<u>Admit Type</u>			<u>Discharge Disposition</u>		
Emergent	99	(37)	Routine	231	(86)
Urgent	73	(27)	Another Hospital	1	(<1)
Planned	96	(36)	SNF	7	(3)
			ICF	2	(<1)
			Another Institution	4	(1)
			Home Health	17	(6)
			AMA	1	(<1)
			Expired	5	(2)

married, and were 65 years of age or older. Most of the patients came from outside the local area. Admission type was fairly equally distributed between emergent, urgent and planned. Admission source most frequently identified was the physician office and discharge disposition as routine. For a breakdown on the demographics by DRG see Table C-1 in Appendix C.

Instruments and Data Collection

Data collected were secondary data and were obtained from three instruments: The Medicus Patient Classification System, used to measure nursing care needs of the patient; the Interpretative Data System (IDX), used to store patient demographic information; and the Discharge/DRG report, used to record the patient's DRG assigned at discharge.

Medicus Patient Classification System. The Medicus Patient Classification Tool prospectively measures the nursing care needs of a patient based on the assessment of those needs by the nurse. The classification process includes use of a preprinted form listing 37 critical indicators which are marked as appropriate for each patient (See appendix A). The points associated with each indicator are then totaled so that each patient is grouped into one of five acuity rating categories or types. Patient types are arithmetically translated into a unit acuity to reflect nurse staffing requirements. Table 2 illustrates the relationship between acuity type point ranges and recommended hours of nursing care.

Table 2

Medicus Patient Classification Type By Range of Scores

<u>Range</u>	<u>Type</u>				
	1	2	3	4	5
Acuity Score	0-24	25-48	49-109	110-180	180+
Hours of Nursing Care/24hours	0-3	3-5	5-10	10-16	16+

Limited validity data are available on the Medicus System; however, it is widely used and accepted by hospitals nationwide. The tool is applicable on medical, surgical, pediatric, nursery, rehabilitative, post-partum, geriatric, and special care units in the acute care setting.

Development of the original system took over three years. Initially, more than 180 critical indicators were evaluated by a panel of experts for the development of the Type IV system. These were reduced to 37 for the Type V system. The indicators are objectively defined and point weighted based partly on time studies done by Medicus (See appendix B). Documentation as to the basis of this point value assignment is unavailable.

The Medicus Patient Classification Tool was utilized in a correlational study in which standard time values per nursing task

were multiplied by the frequency of the task and summed for each patient each day. This time continuum was then compared to Medicus scores resulting in a .93 correlation (Halloran, 1984).

In the study setting, the instrument is completed in the following manner: the patients are classified daily at 10:00 a.m. or upon the patient's arrival if during evening or night shifts. Nurses caring for each patient are responsible for completing the form. This process generally takes less than one minute per patient. Forms are scored by a scantron reader. Nurses are trained in accurately completing the tool with an inter-rater reliability of .95. Trained quality assurance monitors are used in a consistent manner to ensure inter-rater reliability.

The Interpretative Data System. The Interpretative Data Computer System (IDX) was used to collect demographic data during the registration of each patient. Interviews by patient registration personnel include questions about name, age, sex, marital status, address and phone number, occupation and employer, emergency contact persons and their relationship, insurance and financial status. Also included are questions about transportation means to the hospital, and from what place. Questions documenting the admission source refer to patients' location prior to admission. Many patients may have come from home after previously having seen the physician so the source appears as physician office. As a result home and physician office were combined for the purposes of

this study. The demographic data is obtained from the patient directly or from a significant other should the patient's condition warrant. All demographic data is entered into a computer. Printed data for each admission is available at any time on a medical record face-sheet. These face-sheets were used to obtain demographic data for this study.

Reservations personnel in the patient registration department receive diagnostic information from the physician's office. They, in turn, input this information into the IDX computer system. Information includes diagnosis, scheduled procedures and type of admission. Types of admission are identified as emergent, urgent or elective. Emergent admissions are of an emergency nature in that the patient requires immediate medical intervention as a result of severe, life threatening, or potentially disabling conditions. An urgent admission is when undue or prolonged delay in admission might threaten the patient's life or well-being. An elective admission is when the health of the patient is not endangered by delayed admission, and such admissions are usually scheduled several days to weeks in advance.

Discharge information is identified by nursing personnel and entered into the IDX computer system by patient registration personnel. Patients may be discharged to home or to a variety of alternative settings. The discharge disposition information identifies these settings including another hospital, a skilled care

nursing facility or an intermediate care nursing facility. Another institution refers to an institution that is neither a hospital or a nursing home - i.e. a rehabilitation setting or half-way house. Home health is the disposition when the patient returns home but has visiting nurse care. AMA refers to discharge against medical advice or when the patient leaves without physician permission. The final disposition is expiration. Each patient is assigned a disposition code by the nursing staff at the time of the discharge. Routine discharge is identified by the nurse when they have not been involved in special discharge arrangements for the patient even though the patient may receive home health services following discharge. Consequently the validity of this indicator is questionable.

The Discharge/DRG Report. The Discharge/DRG Report was used to identify patients assigned to the selected DRGs by the medical records personnel. The DRG assignment is done by specially trained coders in the medical records department. Length of stay is determined by the number of days of a patient's hospitalization. The day of admission is counted as day one. The day of discharge is not counted. A day begins at 12:00 a.m. and ends at 11:59 p.m.

Analysis and Discussion

Research question 1: What proportion of patients in the total sample and within selected DRGs have low nursing care needs in both of the last two days prior to discharge? As illustrated in Table 3,

Table 3

Patient Nursing Needs by DRG

DRG	Nursing Need				N
	Low (Type I, II)		High (Type III, IV, V)		
	Frequency	(%)	Frequency	(%)	
106 CABG w/Cath	39	(56)	32	(44)	71
107 CABG w/o Cath	61	(61)	39	(39)	101
121 MI	23	(66)	12	(34)	35
127 Shock	39	(62)	24	(38)	63
Total	162	(60)	106	(40)	268

the findings of this study indicate that over half of all patients, as a group and by DRG, have nursing needs in the last two days prior to discharge which suggest they might be candidates for earlier discharge if they do not have a high need for medically driven resources. However, prior to examining the level of need for medically driven resources it is first advisable to more specifically identify the low nursing care needs during those last two days prior to discharge.

The needs of most Medicus Type II patients (e.g. progressive ambulation, pain control, dressing changes and assessment) could likely be provided in an alternative setting, while others could be shifted to earlier in the hospital stay, (e.g. discharge planning and patient or family teaching); however, it is possible that some Medicus Type II patients need nursing care requiring an acute care setting. Examples of this latter type of care include: cardiac monitoring for arrhythmias while drug therapy is established and standby emergency interventions, defibrillation and intravenous drug therapy.

Once the patients with low nursing care needs, who require nursing care that can either be shifted to earlier in the hospital stay or can be provided in an alternative setting, have been identified, their medical needs during the last two days prior to discharge must be examined. Even though these patients' need for nursing care is low, the medically driven resource requirements of some of these patients may be high and therefore justify hospitalization. Such needs might include respiratory therapy treatments, physical therapy treatments, and diagnostic or follow-up testing. If the patient's need for medical resources is low it suggests that these needs could be met earlier in the hospitalization or in a non-acute setting; thus these patients also have the potential for earlier discharge thereby increasing the efficiency of the hospital care delivery system.

Research question 2: Within each DRG, what are the demographic characteristics of patients with low nursing care needs in both of the last two days prior to discharge? As illustrated in Table 4, patients with low nursing needs across DRGs were similar in the areas of marital status and discharge disposition. The majority of all patients were married and were discharged to home.

In relation to age, gender, proximity to the hospital and admission source, patients with low nursing needs within the two surgical DRGs tended to be similar to one another but different from those patients in the two medical DRGs. Two-thirds of the patients in the surgical DRGs (106, CABG w/Cath and 107, CABG w/o Cath) were male and evenly distributed as far as age, over and under 65. This is consistent with the fact that coronary artery disease is still predominant in males. Most surgical patients were not from the local area. This is due to the fact that these patients were referred from institutions where coronary artery bypass surgery and/or coronary angiography are not performed. The majority of patients in these two DRGs came from home or the physician's office. Conversely, the majority of patients for the medical DRGs (121, MI and 127, Shock) were female, over age 65 and from the local area. Since both of these diagnoses can be cared for in almost all acute care settings, these patients are less likely to be transferred to another institution. As imagined, patients in the two medical DRGs were, for the most part, from the emergency room.

In relation to admission type, patients with low nursing care needs within the medical DRGs tended to be similar to one another while patients within the surgical DRGs were dissimilar from one another. Patients' admission type, i.e. emergent, urgent and planned, was evenly distributed in DRG 106 (CABG w/Cath) while patients in DRG 107 (CABG w/o Cath) were planned admissions. This is probably due to the fact that DRG 106 also includes the diagnostic procedure of cardiac catheterization. In other words, patients admitted under this DRG are being evaluated to determine the existence of coronary artery disease. The symptoms precipitating an admission of this type are frequently of a less controlled and more urgent or emergent nature at least until the existence of coronary artery disease is determined or ruled out. For patients in DRG 107 this diagnosis has been established. Patients in DRGs 121 (MI) and 127 (Shock) were for the most part emergent or urgent admissions.

Research question 3: Within each DRG, to what extent is there a difference in selected demographic characteristics between patients with low nursing care needs and those with high nursing care needs in both the last two days prior to discharge? Using chi square analysis, no significant differences were found for the variables of age, sex, marital status, patient proximity to the hospital, urgency of admission, referral source, discharge disposition and mean length of stay (See Supplementary Table C-2).

Limitations

While the findings of this study indicate that there is a potential to discharge a large group of patients earlier and thus create greater overall hospital efficiency, it should be noted that the exact proportion may not be precise due to the measure used. The Medicus System was designed to categorize patients on the basis of the amount of resources needed to meet their nursing care needs, not the type of care needed as such. As previously noted, within the type I or II category, it is possible that some patients need a low volume of resources but the need is such that it is appropriate to provide it in the acute care setting, i.e. 24 hour monitoring. It is possible, therefore, that the sixty percent of type I and II patients could include some patients who should continue to be cared for in the hospital setting. However, it is also possible that the Medicus type I and II categories do not capture all patients whose needs suggest that they could be discharged earlier. For example, it was noted that many patients who were a type II two days prior to discharge were classified as a type III on the last day prior to discharge, thus excluding them from the study sample of patients with low needs for nursing care prior to discharge. It is very possible that these patients were identified as having higher needs for nursing care due to the fact that indicators were marked for teaching needs and discharge planning. This additional combination of needs could have been enough to have made the patient a type III.

Recommendations

This study has provided a conceptualization for efficiency of the hospital care delivery system. It has demonstrated the first phase in this process by identifying patients who might be discharged earlier from the nursing perspective. There is a substantial number of patients with low nursing needs in the last two days before discharge. The next step would be to include in the group of patients with low nursing needs those patients who went from a type II on two days prior to discharge to a type III the day prior to discharge. The third step for research is to examine the specific nursing needs of these patients. This will help determine if and which of those needs could be met in alternative settings or have the potential to be shifted to earlier in the patient's hospitalization.

Once this is done, the medical needs of those patients, for whom the possibility exists for a decreased length of stay from a nursing perspective, need to be examined. The low need group would then include only those patients for whom both the nursing and medical needs could be provided in alternative settings or earlier in their stay. The demographic characteristics of this smaller group can then be compared with those of the remaining sample as a possible means for early identification.

In addition to looking at demographic characteristics, another means of early identification of patients who have both low nursing

and medical needs at the end of their stay would be to look at level of nursing care needs throughout the entire length of stay, or at the beginning of the hospitalization. It may be patients' acuity at the beginning of their hospitalization is different for the groups with high and low nursing needs at the end of the stay, or the pattern of acuity throughout the stay may divide the groups differently.

Because hospitals have become very aware of length of stay due to reimbursement based on the prospective payment system, a secondary data analysis of length of stay was done. Seventy-eight percent of all patients had a length of stay within the reimburseable time frame. Furthermore, eighty-eight percent of all patients with low needs for nursing care in the last two days prior to discharge had a length of stay within the reimburseable time frame. This means that fifty-three percent of patients looked at in this study had low nursing needs for two days prior to discharge and were discharged within the reimburseable length of stay. Because there is an expectation that patients stay the entire reimburseable length of time based on their diagnosis, discharge planning is frequently initiated toward the end of that time period. The findings of this study suggest that the length of stay for over half of the patients could be further reduced if the targeted day for discharge was guided less by the reimburseable length of stay per DRG and more by the level of nursing and medical resources required by individual patients.

Summary

As a response to rapidly escalating health care costs, Medicare and other third party carriers have changed from retrospective to prospective reimbursement systems based on resource consumption. In order for hospitals to be cost effective under this system, care delivery must be looked at as a whole system to achieve maximum efficiency by making fullest utilization of all resources. The problem is that in health care the medical and nursing resource components have not been looked at as a whole system to achieve efficiency of health care delivery. This study was an initial step in examining the efficiency of the whole hospital delivery system as it relates to nursing. It was the purpose of this study to examine the level of nursing needs of patients during their last two days of hospitalization. Based on this examination, it was possible to identify the proportion of patients in the hospital whose need for nursing care suggested that nursing care might be provided earlier in the stay or outside the acute care setting, thus potentially increasing the efficiency of the whole system.

The literature supports an economic theory perspective for examining the limited available resources for health care delivery. Hospitals have used several economic strategies to limit costs to maximize allocated resources, including decreasing costs for labor, materials and facilities, increasing outpatient services, decreasing number of services provided and type of patients served, developing

utilization services, and decreasing length of stay. Patient classification systems are available to quantify patient needs, thus the hospital can more efficiently allocate nursing resources according to patient need.

The conceptual framework of this study divides hospital services into two major components: medical resources and nursing resources. A potentially inefficient allocation of resources may occur when both medical and nursing needs are low. Because nursing is the largest single group of health care providers in the hospital and therefore has great impact on efficiency of the entire system, nursing needs are addressed in this study.

A descriptive study using secondary data was done using 268 patients from four selected DRGs hospitalized during August 1987 to December 15, 1987. Three research questions were addressed as follows:

Research question 1: What proportion of patients in the total sample and within selected DRGs have low nursing care needs in both the last two days prior to discharge? Findings of this study indicate that over half of all patients have low needs for nursing care during this time period.

Research question 2: Within each DRG, what are the demographic characteristics of patients with low nursing care needs in both the last two days prior to discharge? Findings indicate characteristics were grouped according to whether or not the DRGs were medical or surgical services.

Research question 3: Within each DRG, to what extent is there a difference in selected demographic characteristics between patients with low nursing care needs and those with high nursing care needs in both the last two days prior to discharge? Chi square analysis resulted in no significant differences between the group with low nursing care needs and the group with high nursing care needs with regard to the demographic variables.

This study has provided a conceptualization for efficiency of the hospital care delivery system and has demonstrated that from a nursing perspective a substantial number of patients exist with low nursing needs in the last two days prior to discharge. It is suggested that further study be done to examine the specific nursing and medical needs of these patients to determine if the needs could be met at an earlier time within the hospital setting or in an alternative setting. Additional investigations could also include looking at acuity patterns at the beginning and/or throughout the hospitalization to see if the groups of patients with different kinds and/or levels of nursing needs can be identified.

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APPENDIX A
Medicus Indicators

FEED THIS DIRECTION

FORM NO. 2546-MMS

AGE _____ OF _____ UNIT _____
 SIGNATURE _____

MONTH	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
DAY	0	1	2	3	4	5	6	7	8	9	40	
UNIT CODE	0	1	2	3	4	5	6	7	8	9		

PATIENT CLASSIFICATION

* FOR ITEMS BRACKETED ONLY ONE MAY BE MARKED *

Admission or Transfer In	* 3	1	2	3	4	5	6	7	8	9	0	1
Discharge or Transfer Out	2	2	3	4	5	6	7	8	9	0	1	2
Less Than 2 Years	9	3	4	5	6	7	8	9	0	1	2	3
Age 2 - 6 Years	15	4	5	6	7	8	9	0	1	2	3	4
Unconscious	24	5	6	7	8	9	0	1	2	3	4	5
Confused/Disoriented	15	6	7	8	9	0	1	2	3	4	5	6
Sensory Deficits	12	7	8	9	0	1	2	3	4	5	6	7
Partial Immobility	9	8	9	0	1	2	3	4	5	6	7	8
Complete Immobility	24	9	0	1	2	3	4	5	6	7	8	9
UP AD LIB	0	10	1	2	3	4	5	6	7	8	9	0
Up with Assistance	5	11	2	3	4	5	6	7	8	9	0	1
Bed Rest	10	12	3	4	5	6	7	8	9	0	1	2
Bath with Assistance	3	13	4	5	6	7	8	9	0	1	2	3
Bath Total	4	14	5	6	7	8	9	0	1	2	3	4
Assistance \bar{c} Oral/Tube Feed	3	15	6	7	8	9	0	1	2	3	4	5
Total Oral/Tube Feed	10	16	7	8	9	0	1	2	3	4	5	6
I & O Simple	2	17	8	9	0	1	2	3	4	5	6	7
I & O Complex	8	18	9	0	1	2	3	4	5	6	7	8
IV's & Site Care	12	19	0	1	2	3	4	5	6	7	8	9
Specimen Collection - Simple	2	20	1	2	3	4	5	6	7	8	9	0
Specimen Collection - Complex	9	21	2	3	4	5	6	7	8	9	0	1
Isolation	9	22	3	4	5	6	7	8	9	0	1	2
Incontinent/Diaphoretic	18	23	4	5	6	7	8	9	0	1	2	3
Simple Wound and/or Skin Care	8	24	5	6	7	8	9	0	1	2	3	4
Extensive Wound and/or Skin Care	24	25	6	7	8	9	0	1	2	3	4	5
Tube Care	8	26	7	8	9	0	1	2	3	4	5	6
Oxygen Therapy	6	27	8	9	0	1	2	3	4	5	6	7
Respirator	10	28	9	0	1	2	3	4	5	6	7	8
Trach/ET Tube	6	29	0	1	2	3	4	5	6	7	8	9
Vital Signs, Q1½ - 2 Hr.	12	30	1	2	3	4	5	6	7	8	9	0
Vital Signs, Q1 Hr. or More Often	18	31	2	3	4	5	6	7	8	9	0	1
Monitoring - Non-Invasive	12	32	3	4	5	6	7	8	9	0	1	2
Invasive Monitoring	36	33	4	5	6	7	8	9	0	1	2	3
Prep. for Test/Procedure	3	34	5	6	7	8	9	0	1	2	3	4
Special Teaching Needs	12	35	6	7	8	9	0	1	2	3	4	5
Special Emotional Needs	12	36	7	8	9	0	1	2	3	4	5	6
Multi-System Instability	26	37	8	9	0	1	2	3	4	5	6	7
*point value for indicator	28	38	9	0	1	2	3	4	5	6	7	8

BED NO.	PATIENT NAME	PATIENT I.D. NO.
1		
2		
3		
4		
5		
6		
7		
8		
9		
10		
11		
12		

SCHEDULED STAFF
 DATE: ____/____/____

ACTUAL STAFF
 DATE: ____/____/____

D A Y	1	
	2	
	3	
	4	
	5	
E V E	1	
	2	
	3	
	4	
	5	
N I T E	1	
	2	
	3	
	4	
	5	

D A Y	1	
	2	
	3	
	4	
	5	
E V E	1	
	2	
	3	
	4	
	5	
N I T E	1	
	2	
	3	
	4	
	5	

APPENDIX B

Medicus Patient Classification Indicator Definitions

Appendix B

Medicus Patient Classification Indicator Definitions -Type 5

The intent of the classification tool is to capture a picture of the patient's needs at the moment of classification. For patients who have not left the unit for their test or procedure at the time of classification, mark only the indicators which apply now. For patients who have left the unit for their test or procedure at the time of classification, mark the indicators which reflect their needs the moment of their return. (if they are in surgery and will not return to the unit before 5:00pm, do not mark any indicators.)

1. ADMISSION OR TRANSFER IN: Mark if the patient has already arrived on the unit during the day shift, or if the patient is expected to arrive before 5:00pm. Mark any other indicators which are known as well.
2. DISCHARGE OR TRANSFER OUT: Mark if the patient is still on the unit, but certain to be discharged or transferred by 5:00 pm. Also, mark any other appropriate indicators.
3. LESS THAN TWO YEARS OLD: Refers to chronological age.
4. 2 - 6 YEARS OLD: Refers to chronological age.
5. UNCONSCIOUS: Applies to patients who are unconscious. Excludes the lethargic or stuporous patient. If this condition is checked, none of the following may be checked: Confused, Sensory Deficit, Up With Assistance, Special Teaching or Special Emotional Needs, unless

directed towards family, and the needs and interventions are documented.

6. CONFUSED/DISORIENTED: Applies to patients who are confused or have decreased sensorium (Example: patients who are unable to follow commands, care for self, are unaware of time and/or place) or are retarded (mental age significantly below chronological age). Includes pediatric patients who exhibit a definite lack of alertness for their age. This indicator does not apply to the unconscious patient. Special Teaching Needs would also be inappropriate for the patient who is unable to follow commands unless the teaching is directed toward the family and the need is documented.

7. SENSORY DEFICITS: Mark if patient currently relies on nursing measures to compensate for sensory deficits of vision, hearing, and speech only. Applies to patients with both eyes patched (exception: infants) and patients who have language barriers which increase nursing care needs (deaf, aphasic, foreign language, respirator). This indicator cannot be checked if Unconscious is marked. Special Emotional Needs would also be inappropriate if it applies only to the existence of sensory deficits as described here. Does not apply to neurologic deficits which impair tactile sensation or mobility only.

8. PARTIAL IMMOBILITY: Refers to the patient's ability to perform activities of daily living. Applies to two categories of patients requiring assistance because of obvious slowing in ability:

1. Restricted movement of 1-3 extremities or joints.
2. Restricted movement of chest wall to the extent of causing cardiopulmonary risk. (Patients requiring moderate to maximum assistance to turn.) "Restricted movement" may be due to physical or mental disability.

9. COMPLETE IMMOBILITY: Mark for the patient with 90-100% immobility. These are patients who due to their physical or mental condition are incapable of participation in most or all activities, such as turning or moving. Do not routinely mark for infants (age indicator accounts for dependency), or for post-op patients.

(Examples: Quadraplegic patient, unconscious patient, patient in 4-point restraints) ONE OF THE NEXT THREE INDICATORS MUST BE MARKED FOR EACH PATIENT CLASSIFIED AND SHOULD REFLECT THE PATIENT'S ACTUAL STATUS. (Not activity orders)

10. UP AD LIB: Patient gets up on his own without nursing assistance. Up With Assistance or Bedrest cannot be checked if Up Ad Lib is checked. Applies to non-ambulatory patients who transfer into or out-of-bed independently.

11. UP WITH ASSISTANCE: Mark for patient who is able to bear weight on arms or legs, but due to physical or mental condition requires nursing assistance to transfer into or out of bed. This indicator also includes patients on modified Bedrest orders. Bedrest or Up Ad Lib cannot be checked if Up With Assistance is checked.

12. BEDREST: Mark if patient is on strict bedrest without bathroom

privileges or is unable to bear weight. This includes all infants and patients needing bodily or hoier lift. Up Ad Lib or Up With Assistance cannot be checked if Bedrest is checked.

13. BATH WITH ASSISTANCE: Check for patients who currently need assistance with 1) setting up bath equipment and 2) washing small areas of body, e.g., back. Also includes patients needing supervision during bath, e.g., patient in tub or shower. (less than 50% assistance required)

14. BATH TOTAL: Includes patients who currently need an entire bath or patients who are only able to bathe small areas of body, e.g., face, hands, and genitals. (more than 50% assistance required)

15. ASSISTANCE WITH ORAL/TUBE FEED: Mark if the patient (because of physical or mental condition) requires tray or tube feeding to be set up by nursing personnel. Patient is then able to feed self or administer own tube feeding, with minimal supervision.

16. TOTAL ORAL/TUBE FEED: Mark if the patient is unable to feed self or requires constant supervision during the meal. (Example: aspiration precautions, severely confused patient)

17. I & O SIMPLE: Mark for patient currently on intake or output, including calorie counts, to be recorded less frequently than every two hours.

18. I & O COMPLEX: Mark for patient currently on intake or output to be recorded every two hours or more often.

19. IV'S AND SITE CARE: Mark if the patient currently has an IV or

A-V shunt in place, including heparin locks, arterial lines, access ports for chemotherapy. Does not include epidural lines.

20. SPECIMEN COLLECTION - SIMPLE: Mark for patient requiring specimen to be collected by nursing less frequently than every two hours. (e.g., blood, urine, sputum, Chemstrip, stool)

21. SPECIMEN COLLECTION - COMPLEX: Mark for patient requiring specimen to be collected by nursing every two hours or more often. (e.g., blood, urine, Chemstrip, stool)

22. ISOLATION: Mark if patient currently requires isolation beyond gloving and/or good handwashing when the nurse enters the room. Do not mark for isolette unless infant is in isolation.

23. INCONTINENT/DIAPHORETIC: Mark if patient currently has uncontrolled discharges, (bowel, bladder, wound, gastric), extreme diaphoresis, or is in a high humidity tent, and requires linen changes (at least two times per shift). Cannot be routinely marked for infants. Does not include patients with control measures in place, e.g., condom catheters, incontinence briefs, etc.

24. SIMPLE WOUND AND/OR SKIN CARE: Mark for patient currently requiring: 1) Observation/assessment of a wound or dressing 2) Intervention to prevent skin breakdown (beyond turning and inspection) 3) simple/uncomplicated wound care and dressing changes 4) perineal care, excluding catheter care (see #26) 5) isolation which requires only gloving and/or good handwashing 6) sitz baths, heat lamps, hot packs, ice bags, which are used for treatment of the

skin. Do not mark for routine AM and HS care.

25. EXTENSIVE WOUND AND/OR SKIN CARE: Mark for patients with complex, multiple dressing or packs, patients with extensive burns or other extreme dermatological problems requiring extensive care. (Example: draining fistulas, multiple decubiti, colostomies, etc.)

26. TUBE CARE: Mark if patient needs assistance with tubes, e.g., urinary catheter care, suctioning, cleaning trach tube, irrigation/aspiration of tubes, chest tube, intermittent catheterization program, peritoneal tube for dialysis. Includes: enemas, rectal tubes or one-time, post-void residual urines.

27. OXYGEN THERAPY: Mark if patient requires any oxygen therapy, heated mist, nasal oxygen, or suctioning, percussion or postural drainage. This applies if nurse is directly responsible for therapy and/or respiratory assessment follow-up. Includes incentive spirometers for a documented respiratory problem if nursing assistance required beyond verbal reminders and simple instruction.

28. RESPIRATOR: Mark for patients requiring mechanical ventilation for support of systems. If this is checked, Tube care, Oxygen Therapy, and Tracheostomy/ET tube should also be marked.

29. TRACH/ET TUBE: Mark for any patient who has a tracheostomy or an endotrach tube. Also mark Tube Care, if patient relies on nursing for care of tube.

30. VITAL SIGN Q 1 1/2 - 2 HOURS: Mark for vital signs, neuro checks, and CVP readings being currently taken at this frequency by

a nurse for more than 4 hours duration.

31. VITAL SIGNS Q 1 HOUR OR MORE OFTEN: Mark for vital signs, neuro checks, and CVP readings being currently taken at this frequency by a nurse for more than 4 hours duration.

32. MONITORING - NON-INVASIVE: Mark for patient currently requiring visual observation and assessment every 15 minutes for more than 4 hours duration, or, for patients requiring external cardiac monitoring, EEG telemetry, or monitoring of IV chemotherapy. This indicator does not include adults or children requiring periodic supervision of activities.

33. INVASIVE MONITORING: Mark for patients with invasive lines or equipment for purpose of monitoring. Includes Swan Ganz, intra-cranial pressure monitoring, arterial pressure line, intra-aortic balloon pump, membrane oxygenator, peritoneal dialysis, hemodialysis, etc. Do not mark for CVP lines (use IV and site Care for this) or if need is met by other personnel (Example: Hemodialysis department staff). If this indicator is marked, do not mark Non-Invasive Monitoring.

34. PREP FOR TEST/PROCEDURE: Mark if patient requires preparation by nursing before 5:00 pm for a test or procedure that has not yet occurred, e.g., bowel preps, special scrubs, use of checklists, pre-op meds, signing of permits, etc. Also applies to patients requiring nursing assistance or participation during a test/procedure, e.g., proctoscopy, lumbar puncture, or minor

surgical procedure done on the unit. This indicator includes assisting with a physical examination and pre-op teaching/orientation.

35. SPECIAL TEACHING NEEDS: Mark if patient and/or family has a specific need today for special instruction such as diabetic teaching, hygiene, medications, etc. There must be documentation in the care plan of the teaching plan and learning activities of the patient if this indicator is marked. This does not include routine admission instruction, environmental orientation, instruction for lab tests unless patient/family exhibit difficulties in understanding. Do not mark for reinforcement of previously taught information. This indicator cannot be marked for patients who cannot follow commands unless teaching is directed toward the family (see Confused). Do not routinely mark for patients who have not been admitted/assessed.

36. SPECIAL EMOTIONAL NEEDS: Mark if patient or family need additional support today because they are experiencing stress beyond the usual stress of hospitalization, are having difficulty coping, or are exhibiting inappropriate behavior. This indicator is to be used only for psychosocial disturbances which require specific nursing actions to meet the patient/family needs. There must be documentation in the care plan of the patient's or family's behavior and nursing interventions if this indicator is marked. This indicator does not include normal amounts of comfort and support by

unit standards given by nursing personnel. Do not routinely mark for patients who have not been admitted/assessed. (Examples: Withdrawn-clearly avoiding interaction, Aggressive - physically or verbally, Anxious/Demanding/Manipulative - requiring additional contact, Expressing Suicidal Ideations.)

37. MULTIPLE SYSTEM INSTABILITY: Mark for patients who require intense ongoing assessment of multiple body systems (e.g., respiratory, circulatory, and neurological) for purposes of adjusting aggressive therapeutic interventions to maintain physiological stability.

APPENDIX C
Supplementary Tables

Table C-1

Characteristics of Patients By DRG and Total Sample

<u>Characteristic</u>	<u>DRG</u>				<u>Total</u>	<u>(%) (N=268)</u>
	<u>106</u>	<u>107</u>	<u>121</u>	<u>127</u>		
<u>Sex</u>						
Male	43	74	16	30	163	(61)
Female	27	26	19	33	105	(39)
<u>Age</u>						
<65	32	52	8	16	108	(40)
>65	38	48	27	47	160	(60)
<u>Marital Status</u>						
S-W-D	14	19	9	24	66	(26)
Married	51	80	22	32	186	(74)
<u>Proximity</u>						
Local	17	17	23	51	108	(40)
Non Local	53	83	12	12	160	(60)
<u>Admit Type</u>						
Emergent	21	9	26	43	99	(37)
Urgent	29	17	8	19	73	(27)
Planned	20	74	1	1	96	(36)
<u>Admit Source</u>						
Nursing Home	-	-	-	2	2	(<1)
Home or MD office	42	87	9	23	160	(60)
Other Hospital	20	11	5	1	37	(14)
Emergency Room	7	2	21	37	67	(25)
<u>Discharge Disposition</u>						
Routine	59	92	28	52	231	(86)
Another Hospital	-	1	-	-	1	(<1)
SNF	1	1	1	4	7	(3)
ICF	-	1	1	-	2	(<1)
Another Institution	3	1	-	-	4	(1)
Home Health	6	2	4	5	17	(6)
AMA	-	-	1	-	1	(<1)
Expired	1	2	-	2	5	(2)

Table C-2

Chi Square of Difference of Demographic Characteristics Within Each
DRG For Patients With Low Versus High Nursing Needs

Variable	DRG											
	106			107			121			127		
	χ^2	(df)	p	χ^2	(df)	p	χ^2	(df)	p	χ^2	(df)	p
Sex	1.58	(1)	.21	1.22	(1)	.27	.53	(1)	.47	1.16	(1)	.28
Age	1.66	(1)	.20	2.41	(1)	.12	.41	(1)	.52	2.39	(1)	.12
Marital Status	.58	(1)	.45	.28	(1)	.60	1.96	(1)	.16	.02	(1)	.90
Proximity	.33	(1)	.56	.005	(1)	.94	.21	(1)	.64	.50	(1)	.48
Admit Type	4.14	(2)	.13	1.18	(2)	.56	2.95	(2)	.23	1.65	(2)	.44
Admit Source	4.20	(2)	.12	5.96	(3)	.11	.59	(2)	.74	3.57	(3)	.31
Discharge Disp.	3.50	(4)	.48	11.04	(6)	.09	4.57	(4)	.33	6.2	(3)	.10