The use of a patient classification system in a medical/surgical intensive care unit : a pilot study
by Sue Anne Warren

A thesis submitted in partial fulfillment of the requirements for the degree of Master of Nursing
Montana State University

Abstract:
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A descriptive exploratory design was used to answer the research questions. Patients admitted to the Intensive Care Unit during a selected time interval between March 14 and April 5, 1988, were classified according to critical indicators on the Patient Acuity Worksheet, the classification tool of the WMSN. One hundred thirty-seven patient classifications were completed on forty different patients.

The data analyzed indicated that patients in the MSICU during the selected sampling period were classified into Category III (Acute Care), Category IV (Intensive Care) and Category V (Continuous Care); the greatest number of patients were classified into Category IV. There was found to be no statistically significant difference between the WMSN method for identifying allocation of human resources and the actual staffing allocated by the shift charge nurse.

There is a need for use of a patient classification in a multidisciplinary intensive care unit because of the varying levels of care that exist within the patient population.

This study established a foundation for implementation of patient classification in the intensive care environment.

THE USE OF A PATIENT CLASSIFICATION SYSTEM IN A MEDICAL/SURGICAL INTENSIVE CARE UNIT: A PILOT STUDY

by

Sue Anne Warren

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Date July 8, 1988

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ABSTRACT

The purpose of this investigation was to pilot test a patient classification tool to determine what levels of care exist in the Medical/Surgical Intensive Care Unit (MSICU) at Montana Deaconess Medical Center. The actual direct care staffing was compared to the nurse/patient recommended staffing ratios indicated by the Workload Management System for Nursing (WMSN), the patient classification system studied.

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CHAPTER 1

INTRODUCTION

Rising patient acuity and declining length of stay are symptomatic of vast changes in the health care and delivery system. For nurse managers, these changes mean making increasingly difficult decisions in the determination and allocation of nursing resources. The primary management goal is to maintain the quality of nursing care in a period when hospital costs and the number of vacancies in hospital nursing positions continue to mount. Therefore, efficient use of available nursing personnel becomes imperative.

The need to provide quality nursing care in the most cost efficient manner and to monitor staffing patterns has been the primary focus behind the development of patient classification systems within nursing services (Curtin, 1983). Patient classification refers to the identification and classification of patients into care groups or categories, and the quantification of these categories as a measure of the nursing effort required (Jackson & Resnick, 1982). Patient classification systems (PCS) categorize

patients according to an assessment of individual nursing care requirements over a specified period of time (Dijkers & Paradise, 1986). Most systems consider only the quantity of care, although some also include the level of care (Registered Nurse (RN) versus Non-RN (NRN)) and thus consider one aspect of quality. An acceptable patient classification system must be simple, specific, sensitive, auditable, individualized, time-based, and revisable. These qualities in patient classification constitute a system which lends itself well to manual or computer documentation. Patient classification systems were originally used by nurse managers as staffing tools; they were used daily to assign float personnel to those units most in need or to admit new patients to those units with the greatest staff to patient ratio. Thus, a PCS helped prepare nursing department budgets as an aid in long-term planning. Based upon the expected census and patient mix, nurse managers projected the number of staff members needed for the coming fiscal year. Ultimately, patient classification systems were also used for special management reports, quality assurance, utilization review, and recently for charging for patient care (Dijkers & Paradise, 1986).

Only in recent years have research studies begun to explore patient acuity systematically. As more and more

intensive care units began to be formed in the mid 1960s, patients were grouped to concentrate both medical and nursing care on the needs presented by the special groups. Critically ill patients are cared for in a complex, labor intensive environment. They constitute a potentially vulnerable population as a result of physiological, psychological, pharmacological, and environmental influences. Therefore, it is important that the needs of the patients be quantified so that systematic methods of response to those needs can be employed (AACN, 1986). The use of patient classification systems in the critical care milieu is not widespread nationally. Although many general patient classification tools exist, most patient classification systems do not address the unique needs of the Intensive Care Unit (ICU) patients; most systems tend to quantify all critical care patients as maximal care. These systems fail to recognize that there are varying levels of care within the maximal care category (Ambutas, 1987).

Without a viable patient classification tool, control of staffing and budgeting could be removed from the hands of the nurse manager, and budget and/or staffing cuts would continue to be based on assumptions, or at best, imprecise data (Hamilton, 1983). Patient classification is a valuable tool that categorizes patients based on an

assessment of their nursing care needs over a period of time, and data collected from the use of a PCS tool can be applied by critical care nurse managers to maximize the use of available resources (AACN, 1986).

Patient classification systems hold the promise of providing nurse managers of critical care units with objective and scientific means to identify acuity levels and project staffing requirements. Nurse managers have an obligation to base nurse staffing on objective documentation produced from the tool (Ambutas, 1987).

Purpose and Research Questions

The purpose of this investigation is to pilot test a patient classification tool to determine what levels of care exist in the Medical/Surgical Intensive Care Unit at Montana Deaconess Medical Center. Questions to be addressed in this study include the following:

1. What are the levels of acuity of patients in the Medical/Surgical Intensive Care Unit (MSICU) according to the selected classification instrument?
2. How do the existing MSICU's direct care assignments compare with the nurse/patient recommended staffing ratios indicated by the personnel requirements produced by the selected tool?

Conceptual/Theoretical Framework

General Systems Theory is a study of wholes. The theory provides a theoretical framework to talk about structure and process. A system is any set of interrelated components that interact with each other within a boundary that filters inputs and outputs (Hamilton, 1983). The mechanism that systems use to correct discrepancies between actual and intended output is termed feedback, which allows systems to be self-directing. In systems, the whole is greater than the sum of its parts; change in one component leads to change in all other components.

Hamilton (1983) described health care in America as a system; however, subsystems of this whole would be innumerable. A hospital may be viewed as a system and the nursing department as one of its subsystems. The hospital provides a mission of service delivery through the interaction of three kinds of resources (inputs) into the system: human resources such as staff, technological resources such as methods and equipment, and financial resources such as the operating budget. Each subsystem within the hospital is allocated portions of these resources so that alterations in the amount and type of resources/input will lead to changes within the system as well as the subsystems.

The department of nursing, a subsystem of the hospital, is an open system influenced by a great number of internal and external environmental factors. The distal goal for this system is to provide nursing care to all health care demanders, and the proximal goal is to provide high quality nursing care to all patients admitted to the hospital (Torrez, 1983).

The objective for the nursing subsystem is to identify patient care needs for specific hospital units and to provide the qualified full time staff equivalents in their proper staff mix (RN versus Non-RN) to deliver this care. The objective must be quantitatively and qualitatively precise (Torrez, 1983).

Various nursing service departments have established standards of care according to a patient classification system which categorizes patients. The maintenance mechanism existing as the foundation for patient classification systems is diagrammed in Figure 1. The model pictured represents the four subsystems upon which a patient classification system is developed. This model was developed from the original model developed by Torrez (1983). The existing standards of care encompass the Belief System and consist of two parts. The Belief System for Health Care Standards is defined by the American Nurses

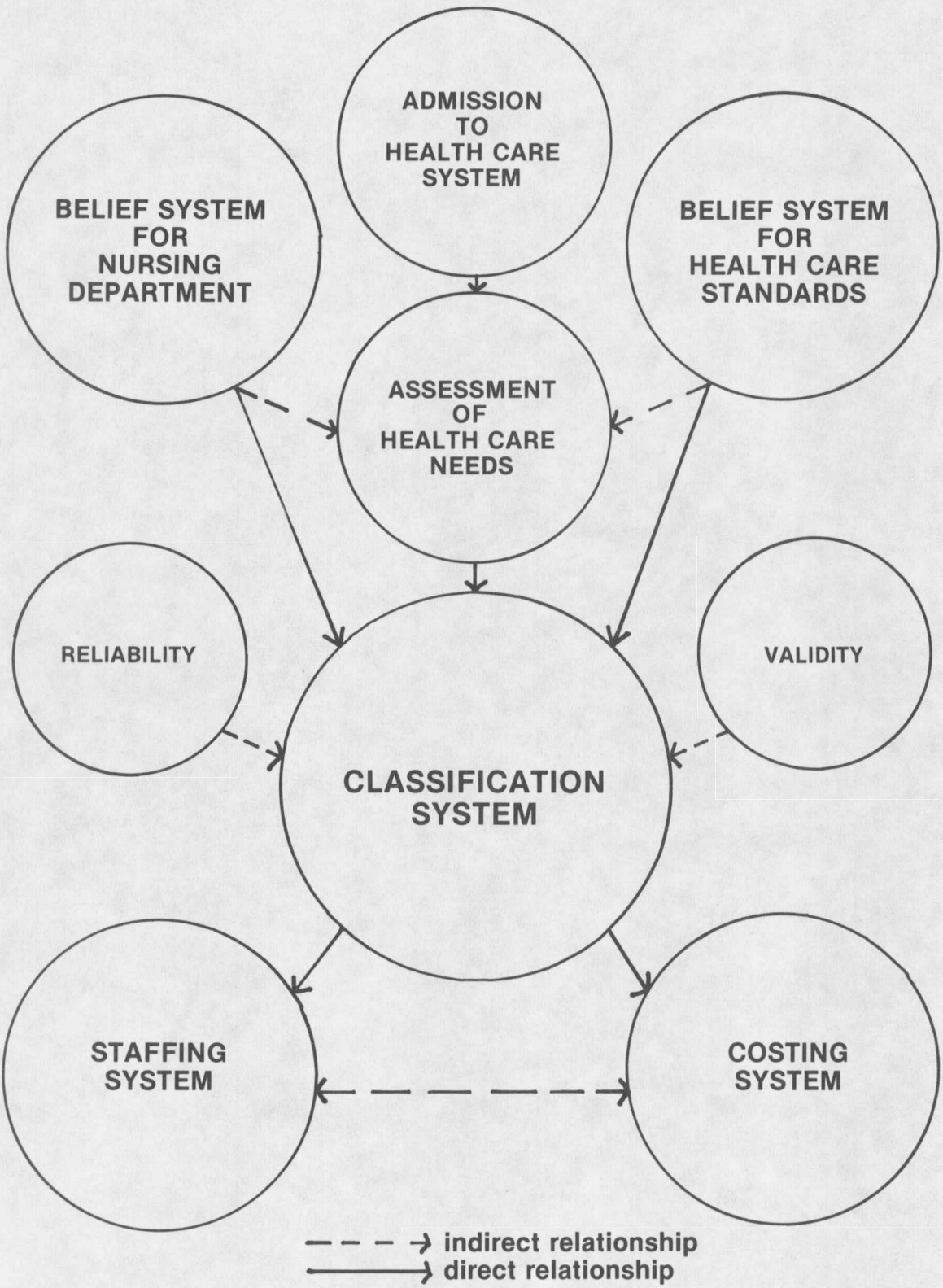

Figure 1: Warren Model for Patient Classification.

Association (ANA, 1985), the American Association of Critical Care Nurses (AACN, 1986), and the Joint Commission for the Accreditation of Health Care Organizations (JCAHCO, 1981). This part of the Belief System is illustrated in the upper right side of the model. The second portion of the system includes the specific Department of Nursing philosophy as well as policies and procedures for staffing and scheduling. This part of the Belief System is illustrated in the upper left side of the model. The second subsystem, the Classification System, defines the variable needs of patients for nursing services considering both the number of staff and skill level required. The Classification System is illustrated in the center of the model in Figure 1. The Staffing System (lower left side in Figure 1) is the allocation of nursing resources based on patient acuities, and the Costing System (lower right side in Figure 1) is that subsystem which identifies the costs to deliver nursing services per patient per day. This subsystem is referenced when reviewing the departmental budget to provide a basis for nursing care charges.

As Figure 1 illustrates, a patient enters the health care system as a consumer of health care. Upon admission to an identified acute care delivery system, the patient is assessed by a health care professional and classified into a

level of care category based on acute care requirements. The Belief System sets the standards for nursing care based on principles inherent in patient acuity and nurse staffing systems. Policies and procedures for staffing and scheduling are also included in this system; however, they are a separate entity specific to the selected health care system. In the same manner that the nursing department of a hospital is required to provide a written plan of care for all patients, it is also required to provide and follow an established nurse staffing system and patient classification system in accordance with the JCAHCO requirements for hospital accreditation and with the state requirements for hospital licensure (Lewis & Carini, 1984). These agencies outline what the Classification System should reflect and how it should function. Nursing administrators develop staffing systems as a step toward providing for the quality of nursing practice within the health care organization. A tool for patient classification is generally used to categorize patients based on the care needs identified through physical assessment by the Registered Nurse. Patient care needs are quantified and compared to a guideline for allocation of human resources within the Staffing System. The Staffing System must be compatible with the goals and philosophy of the nursing department in

meeting its expectations for the quality of patient care rendered according to the standards of nursing practice. This component defines the intersection of the Belief System and the Staffing System with the Classification System.

Nursing care is difficult to define or classify because of its broad scope and variability with regard to patient mix and nurse interdependence with other health care professionals and services; therefore, the Classification System becomes a viable concept for defining nursing care requirements and classifying patients according to the level of care required. Each classification level and subsequent required staffing serves as the cost basis for the charges for health care received. The Classification, Staffing, and Costing Systems that result reflect the actual costs of different levels of care.

The issues of reliability and validity of patient classification systems are extremely important. Patient classification systems should be considered as tools to aid in the effective allocation and utilization of nursing personnel resources; however, the tools utilized within the classification system should have been tested for reliability and validity before full implementation in a health care system. Every patient classification system utilizes a comprehensive patient classification tool that

identifies the level of care required to meet the needs of the specific patient population which is assessed or classified. This process helps to determine nursing care requirements (Torrez, 1983). The department of nursing defines the objective for patient classification and monitors the system components for quality assurance. Torrez states that this nursing subsystem is challenged with the responsibility for selecting the strategies and techniques to be used in evaluating the system's objective, and the nurse manager is responsible for maintaining the standard of care on a respective nursing unit. According to Torrez a model for patient classification does not answer all staffing problems. The systems approach is an objective problem-solving technique which nurse managers can use to control their immediate situations and justify resource allocation accordingly.

Definition of Terms

The following definitions are the foundation for concepts and information produced through the Workload Management System for Nurses (Vail, Norton, & Rimm, 1984), the PCS selected for use in this pilot study.

Workload Management System for Nurses (WMSN): A patient classification instrument of factor evaluative design which requires a registered nurse to assess nine groups of factors

related to direct patient care and to assign an overall score to each factor. The assessment of care during the day shift is used to predict care requirements for the next 24 hours. The weighted scores are summated, and the patients are classified into one of six discrete categories. A staffing methodology is used for determining the actual nursing care hour requirements and the numbers and mix (RN and Non-RN) of personnel recommended for quality care. This system incorporates both direct and indirect care time (Vail et al., 1984).

Category: A representative grouping of patients according to their nursing care requirements defined by critical indicators. The Workload Management System (WMS) consists of six categories of care. A category I patient requires minimal care whereas a category VI patient requires intensive care (>1 staff to 1 patient).

Critical Indicators: Those activities on the patient classification instrument that have the greatest impact on direct care time. A list of Critical Indicators for the WMS is contained in Appendix A.

Direct Care: Includes all hands-on activity such as the measurement of vital signs and performance of special procedures such as suctioning, necessary in the delivery of

care to patients. These activities are observable, behavioral, and are usually completed at the patient's bedside.

Factors: A group of critical indicators that covers one specific domain of activities inclusive of nine areas. They include vital signs, monitoring, activities of daily living, feeding, treatments, respiratory therapy, intravenous therapy, teaching, emotional support, and continuous care. (See Critical Indicators in Appendix A).

Indirect Care: The assessment, planning, documentation and education (orientation and inservice) necessary to deliver care to patients. Indirect care includes charting, transcribing orders, phone calls, and clean-up after procedures are completed. Indirect care time encompasses activities that necessitate time over and above the direct care critical indicators. To address these factors, indirect care time and unpredicted needs have been factored into the WMSN.

Multidisciplinary Intensive Care Unit: A critical care nursing unit in which diseases of multiple body systems such as cardiovascular, respiratory, and neurological, both medical and surgical, predominate as contrasted with a critical care unit in which single system failure predominates.

Non-RN (NRN): Nursing service personnel other than RNs who have satisfactorily completed an orientation program to the hospital and are direct care providers. They include Licensed Practical Nurses and Nursing Assistants. Clerical support such as Ward Secretaries are not classified as direct care providers.

Nursing Care: A process of nurse-patient interaction that stems from assessment of patient's needs and levels of functioning designed to optimize the patients' adaptability through modification and/or reinforcement of behavior and biological care maintenance.

Nursing Care Hour Requirements: The number of hours of nursing care time required for each category of patient based upon an assessment of his/her direct and indirect nursing care requirements. The concept is operationalized via six precalculated patient care hour requirement charts. The Critical Care Patient Care Hour Requirement Chart is contained in Appendix B.

Patient Acuity Worksheet: The instrument used to determine direct care time. This is a front and back printed legal sized form that was used in the manual system for classifying patients. (See Appendix C).

Patient Classification: An appropriately weighted and time based system for determining the amount of nursing care patients need. Patient classification defines the grouping of patients according to an assessment of their nursing care requirements.

Personnel Requirements: The number of direct care providers, Registered Nurses (RNs) and non-RNs (NRNs), required to care for the patient workload on a unit. This is operationalized through the use of the Critical Care Patient Care Hour Requirement Chart in Appendix B.

Points: The numbers assigned to each specific critical indicator based upon documented time and motion studies. Each point is equal to 7.5 minutes of direct nursing care time. (See Appendix A).

Registered Nurse (RN): Nursing service personnel who have passed the State Board Test Pool Examination for Registered Nurses and satisfactorily completed an orientation program to the hospital.

Unpredicted Needs: Refers to unanticipated needs due to changes in the patient's condition, admissions, care conferences, personal time and staff education.

Assumptions

Developing a patient classification system for managing nursing resources in a nursing service depends upon a number of assumptions about patients and nurses.

1. Nursing intervention is temporal; it goes on 24 hours a day, every day the patient is in the hospital.
2. Patient conditions may change drastically and change frequently during hospital stays.
3. The services which nurses allocate for patients are integrated, not perceived as separate unto themselves, and are conveyed to the patient by their presence. An example is performance of a physical assessment while giving a bed bath to the patient.
4. Nurses consider each patient unique; therefore, the likelihood that any given patient will be classified the same as any other patient is remote.

Significance for the Discipline of Nursing

Patient information must be obtained, interpreted by a professional, integrated, accurately communicated, and used by the health team. The information must be systematically collected and turned into a dynamic plan of action based on a patient's particular problems. This care planning system facilitates the process for patient classification. Highly valid and reliable patient classification systems are basic

to effective staffing and fiscally responsible charging for nursing service (Atwood, 1983).

The patient classification system based on General Systems Theory will monitor patient care requirements as well as establish a framework for nursing practice in the intensive care setting.

CHAPTER 2

REVIEW OF LITERATURE

Throughout the history of health care planning, hospital patients have been classified primarily according to their medical diagnosis, age, and sex. More recently, categories have reflected the acuity of illness and type of care needed. Placement within today's health care system is often assigned according to these generic classifications.

There are four major patient classification systems: those based on disease, procedure, acuity (or severity), or a combination of the three (Bermas & Van Slyck, 1984). Disease-based classification systems were the first to appear. As early as the 1700s medical diagnoses, which are a form of classification, were being used in England to identify causes of infant mortality. One system that came to be widely used in hospitals from the 1930s through the 1950s was the Standard Nomenclature of Diseases and Operations (SNDO). Today's 467 Diagnosis Related Groupings (DRGs) in the Medicare Prospective Pricing System (PPS) are disease-based classifications (Bermas & Van Slyck, 1984).

Procedure-based systems classify patients by the types of procedures they require. An example of this type of system is the California Relative Value Status (CRVS) (Bermas & Van Slyck, 1984).

Acuity-based or severity-based systems are the systems most often used in hospital nursing departments to determine staffing. Bermas and Van Slyck (1984) define acuity-based systems as those that measure patient's psychosocial dependency levels and need for services.

During the last thirty years, patient classification has acquired greater meaning to the nurse manager. In 1984, the JCAHCO specifically began to require guidelines for provision of adequate staffing in nursing care by establishing Nursing Standard III, in which it mandated that departments of nursing define, implement, and maintain a system by which they base staffing on patients' care requirements (JCAH, 1984). Standard II for Special Care Units addresses this issue for the critical care environment: "Each special care unit shall be properly directed and staffed according to the nature of the special patient care needs anticipated and the scope of services offered" (JCAH, 1981).

To make sound decisions about staffing requirements and to manage the quality, quantity, and use of personnel

productively and cost-effectively, nurse managers must use well-established tools to produce the data they need to justify their decisions (Vail, Morton, & Rieder, 1987). Today, patient classification includes categorizing patients according to an assessment of the acuity of illness, severity of symptoms, nursing dependency, and required nursing interventions (Atwood, 1983). There are wide swings in the demand for nursing care from day to day and shift to shift, and these fluctuations are often independent of the number of patients in the unit at any given time.

Development of Patient Classification in Nursing

The development of patient classification systems in nursing has been in response to the variable nature of nursing care demands (Giovannetti, 1979). In situations where there is imposed a homogeneity of patient care needs, or where the mix is highly consistent, the use of patient classification may not be indicated. Postpartum, well newborn nurseries, and coronary care units are areas where this has often been found to be true.

There are two common methods for quantifying or estimating the nursing care resources. One of these entails classifying patients of similar requirements for nursing care into categories or levels of care. Because the number of patients in a unit may not be an adequate indicator of

the demand for care, grouping patients into categories that reflect the magnitude of nursing care time provides a more rational and sensitive approach for determining the need for nursing care resources (Giovannetti, 1979). Using this approach, general characteristics of nursing care are described and the patient is assigned to one of four or five categories such as routine, moderate, special and intensive. The average amount of nursing care required for each category is then determined (Gallagher, 1987).

The second approach involves determining standard time requirements for each major nursing care activity. The standards for each activity are multiplied by the number of times that activity occurs. These are then totaled to determine the nursing service requirements for a patient (Gallagher, 1987).

Patient classification systems can be extremely effective in matching workload generated by patients to numbers of nursing personnel (Giovannetti, 1979). However, there was no evidence in the review of literature that the effective utilization of nursing personnel is only one input of the total patient care system, and the quality of care as measured by patient outcomes is one output (Hanson, 1983). Giovannetti indicated that nurse managers are hopeful that the structure and process of care have some bearing on the

outcome of care; however, there is little evidence to define the nature of this relationship. Attempts to draw a direct relationship between the two ignore the existence of other important factors and mask the impact of the interaction effects between parts of the complex model.

Patient Classification Systems

A patient classification system (PCS) is a method of predicting nursing care needs of patients according to established indicators of care. All systems have three basic components: a tool to identify indicators of acuity, a measurement of time to deliver nursing care, and an understanding of the staffing mix necessary to provide nursing care according to nursing standards (Billings, 1983).

Acuity-based systems are either prototype systems or factor systems. Prototype systems assign patients to groups by means of common characteristics and broad descriptions As the need to identify nursing costs by DRGs has become more critical, factor systems have grown in popularity. Factor systems set forth specific elements of care known as indicators, and each patient is rated by the number of indicators he presents. These indicators are then combined to determine the patient's acuity level (Bermas & Van Slyck, 1984). Activities which, if they occur, will have the greatest impact on nursing care time are called "critical

indicators of care" (Gallagher, 1987). Typically, these involve activities associated with feeding, bathing, ambulation, preoperative preparation, observations, special treatments and medication therapy.

The time necessary to provide nursing care according to weighted points to identify critical indicators was established by frequency studies that determined direct and indirect nursing care (Billings, 1983). Determining the amount of time spent in nursing activities involves the translation of nursing activities into hours of care per patient per day. Although this division is somewhat arbitrary, direct care alludes to those nursing activities performed in direct contact with the patient. Indirect care consists of those activities done away from the patient's bedside which usually do not require direct patient contact. Variations in acuity of illness result in fluctuation in the requirements for direct hours of care per patient per day, or even fluctuations in direct hours of care from one shift to the next. Once indirect hours of care per patient have been determined, they remain relatively constant.

Indirect time also accounts for time spent monitoring patients, transferring and transporting patients, attending unit meetings, and shift report. Classification is done to predict nursing care so that nursing activities that are time-consuming but do not occur on a regular basis (such as

response to cardiac arrest) are calculated in reviewed frequency studies as indirect time.

In a weighted-point system for identifying critical indicators, all nursing activities performed in a given nursing unit are listed and then grouped for convenience into major categories such as vital signs, medications and hygiene. The numbers of categories should be sufficient to describe all nursing care, but not so many that the tool would be cumbersome and time consuming to use. Points within each identified category are established to reflect the amount of time needed to provide similar kinds of nursing care. Although time-consuming to tally, a weighted point tool reflects information about patient acuity that is precise even as the patient's condition changes (Billings, 1983).

Although patient classification requires patient assessment, it does not include a comprehensive assessment and will never be a substitute for the more detailed assessment necessary for patient care planning. The inclusion of critical indicators specific to emotional support and teaching may be redundant factors to include; however, the patients' psychological, social, and teaching requirements are generally met by nurses while providing care related to feeding, bathing, ambulation, and other physical or technical functions.

An acuity level staffing system can help to alleviate the problem of inadequate staffing. Tensions among the nursing staff do decline as staffing demands are more equitably met (Billings, 1983). An acuity level staffing system would seem to be an ideal means for meeting the challenges of staffing and budget accountability. Through more efficient management of personnel, nurse managers can continue to provide optimum care in a fiscally responsible manner.

Patient Classification Systems for General Hospital Units

The Workload Management Design, implemented by nurse researchers at Walter Reed Army Hospital in November, 1984, evaluates the categories of tasks that nurses perform in providing patient care and compares those to the factoring design described by Bermas and Van Slyck (1984). By totaling the time required for all tasks, the nursing care units required by all patients were quantified. This system not only enables managers to categorize patients according to the nursing care they need, but also provides a way for them to allocate and to use nursing resources effectively (Vail et al., 1987). This classification system allows the nurse manager to determine staffing needs according to the number of nursing care hour requirements for any group of patients. The staffing method consists of nursing care hour

requirement (NCHR) charts and personnel requirement charts that represent each of six clinical areas of practice: medical-surgical, pediatrics, psychiatry, obstetrics-gynecology, nursery, and critical care. Since this system can be used in critical care units, it will be covered in more detail in the next section.

The Grace-Reynolds Application and Study of PETO (GRASP) system, currently in use at many hospitals throughout the United States has a task oriented design. Specific patient care needs for each patient are listed and given point values as to the time taken for each task. The task points are totaled and converted into Patient Care Units (PCUs) (Scroeder, Rhodes, & Shields, 1984). Through pilot testing this method of classification, Scroeder et al. compared the above two systems and found that both systems reflected similar staffing requirements. The authors concluded that category systems are easier to establish, less time-consuming to operate and can result in essentially the same nurse staff requirements as the cumbersome, detailed task-oriented systems.

Patient Classification in Intensive Care Units

Nurse staffing has traditionally been based on historical data related to the number of beds occupied in a clinical area (Vail et al., 1984). Over the years the

nature and volume of the workload of the critical care nurse has changed drastically, altered by increasingly complex technology, specialization and personalization of service to patients. The American Association of Critical Care Nurses (1986) supports the use of patient classification systems as a valuable mechanism for linking patients' nursing care needs to the utilization of human resources.

Priorities for care can be determined and changes in individual patients can be monitored through use of a PCS. In addition, analysis of patient classification data can be helpful in identifying trends in patient care needs so proactive, rather than reactive, steps can be taken to meet those challenges (AACN, 1986).

More sophisticated and precise quality review tools are needed to evaluate the quality and appropriateness of care provided in Intensive Care Units (ICUs) and to accurately plan for future ICU investment (Knaus, Draper, & Wagner, 1983). Until recently such tools have not been available, primarily because of the reported difficulty in developing objective and accurate measures of ICU case mix. One measure which holds substantial promise for use in evaluation of the appropriateness of intensive care is the Acute Physiology and Chronic Health Evaluation (APACHE).

Before examining the APACHE classification system the reasons most patients are admitted to ICUs have to be identified. Regardless of the type of unit, a patient is admitted to an ICU for one of three reasons: an immediate need for one or more of approximately 35 active life-support therapies routinely available and best performed within ICUs; the perceived risk of a patient quickly needing one of these therapies; or the need for more nursing care than is otherwise available in the hospital (Knaus, 1981).

The broad range of diagnoses seen in an ICU also hinders precise evaluation of ICU care (Knaus et al., 1983). More importantly, diagnosis often is not the reason the patient is admitted to the ICU, but rather, he is admitted because of the need for monitoring of respiratory or cardiovascular systems following surgery or for treatment of infections, etc. Therefore, a patient's severity of illness most directly determines the need for and the potential benefit from Intensive Care Unit services.

The APACHE Patient Classification System

The APACHE system for patient classification has been under development since 1978 at the ICU Research Unit of George Washington University. It is designed to be applicable to the broad range of diagnoses with which

patients commonly are admitted to mixed (multidisciplinary) medical/surgical ICUs (Knaus, 1981).

The underlying philosophy of APACHE is that the unifying characteristic of ICU patients is their severity of illness, both acute and chronic. The Acute Physiology Score (APS) is designed to determine the severity of acute illness. It currently consists of a weighted sum of 33 possible physiologic measurements obtained within 24 hours of a patient's admission to the ICU (Knaus et al., 1983). The Chronic Health measure is a four-category scale ranging from A, "healthy prior to hospitalization" to D, "severely disabling chronic health status." The final APACHE classification is a combination of both measures.

In most hospitals that have used the APACHE system, data has been collected by an experienced ICU nurse, medical record personnel and physicians. The collected data have been collected with a high degree of reliability, principally because of the objectivity of the recorded information (Knaus et al., 1983). Intraobserver reliability testing at one institution found a 96% item agreement (Knaus, 1982).

Knaus stated that the approach used in designing the APACHE system holds promise in improving the precision of clinical research on severely ill patients. To investigate

APACHE's role in patient classification and its relationship to therapeutic requirements, a national sample of 6000 acutely ill patients from 14 hospitals was being evaluated (Knaus, 1982). No followup report of this evaluation was located in the review of literature. The existence of a relationship between the magnitude of physiologic derangements and the severity of illness, regardless of the disease initiating the physiologic disturbance, could increase understanding of the relationship between aggressive medical therapy and outcome from an acute disease.

Cullen (1974) proposed the Therapeutic Intervention Scoring System (TISS) as an aid to define appropriate utilization of intensive care at the Massachusetts General Hospital in Boston. Points were assigned to primarily indicate the intensity of nursing intervention and to reflect the severity of the patient's illness (Nelson, 1985).

Workload Management System for Nurses

In response to the increasingly urgent need for a measurement tool to help managers determine staffing needs, the United States Army and the United States Navy recently developed and tested a WMSN. The WMSN is now in place in 86

military hospitals (Vail et al., 1987). This system not only enables managers to categorize patients according to the nursing care they need, but also provides a way to allocate and to use nursing resources effectively.

The WMSN is a two-part system: (1) It is a factor-evaluation classification system that places patients into one of six discrete categories; and, (2) it is a system linked to a staffing method that determines the number of personnel recommended to provide nursing care. The system measures both direct and indirect nursing care requirements (Vail et al., 1987). Implementation of the WMSN begins with the classification of patients into categories of care. The hours of nursing care required and the recommended number of personnel needed to meet these requirements are then calculated based on the number of patients in each category (Vail et al., 1984). The actual number of personnel assigned is then compared with the recommended staffing to determine if staffing levels are above, below, or within the recommended levels. The number of nursing personnel available to provide patient care will significantly impact the quality of care actually delivered.

System users classify patients according to which direct nursing care activities occur or are projected to occur over a 24 hour period. The system is based on

critical indicators of care in these areas: vital signs; monitoring; activities of daily living; feeding; treatments, procedures and medications; respiratory therapy; intravenous therapy; teaching; emotional support; and continuous care (Vail et al., 1987). The developers of the WMSN weighted factors within each group of critical indicators; each point is equal to 7.5 minutes of direct nursing care time. The WMSN encompasses the nursing process in the following manner: (1) assessment and classification of patients; (2) allocation (planning) and assignment of nursing personnel; (3) scheduling of nursing personnel (intervention); and (4) evaluation or monitoring of the care given.

Influence of Official and Non-official Organizations on Patient Classification

As previously discussed, Departments of Nursing were mandated by the JCAHCO to define, implement, and maintain a system by which the quantity and quality of available nurse staffing is based on identified requirements for nursing care (Vail et al., 1984). Understanding of patient classification involves awareness and knowledge of the capabilities of those systems with recognition that (1) they are based on a unidimensional and partial assessment of patient requirements for care; (2) quantification is primarily based on the existing practice of nursing; and (3)

their value is enhanced by adequate measures of reliability and validity (Giovannetti, 1979). The lack of attention and effort directed toward acceptance of the selected patient classification system by the hospital administration has been a major reason for the failures experienced by some in the implementation and application of the system.

The AACN (1986) defined critically ill patients as constituting a potentially vulnerable population due to physiological, psychological, pharmacological, and environmental influences. It is, therefore, important that the needs of this patient population be quantified so that systematic methods of response to those needs can be employed. The AACN supports patient classification systems as a valuable mechanism for linking patients' nursing care needs to the utilization of human resources and promotes utilization of patient classification in critical care areas to determine and respond to the variable care requirements of the critically ill patient in an effective and efficient manner. The AACN further advocates that professional nurses quantify nursing care needs of critically ill patients using an objective classification tool that is valid and reliable. Patient classification systems should be considered as tools to aid in the effective allocation and utilization of nursing personnel resources. A well structured patient classification system facilitates the process of defining needs and monitoring workload and staffing performance.

Selection of Classification Systems

As a result of the review of literature, the WMSN was chosen for use in this pilot study. Selected for its factor evaluative design, The WMSN not only enables nurse managers to categorize patients according to the nursing care they need based on summation of critical indicators, but also provides a way for them to allocate and to use nursing resources. This system is applicable and adaptable to all subsystems of the department of nursing. The WMSN appeared to be a management tool which would provide objective workload data for both short-term and long-range planning.

CHAPTER 3

METHODOLOGY

The purpose of this investigation was to pilot test the WMSN to determine what levels of care exist in the Medical/Surgical Intensive Care Unit at Montana Deaconess Medical Center. The following sections describe the design, the sample selection, the instrument used for data collection, and protection of human rights.

Design

A descriptive exploratory design was used to explore the research questions proposed for this study. Descriptive design is not concerned with relationships among variables; instead, the purpose is to observe, describe, and document aspects of a given situation. Exploratory research is an extension of descriptive research (Polit & Hungler, 1983). Once the existing levels of care were described, comparisons between the existing MSICU's nursing staff assignments and the nurse/patient recommended staffing ratios indicated by the WMSN were planned.

Sample

The target population from which the prospective sample was drawn consisted of patients admitted to the MSICU at Montana Deaconess Medical Center. The patient care unit examined in this study is a 12 bed unit with an average daily census of five patients with varied medical/surgical diagnoses. Although the unit serves a varied patient population, the greater percentage of those admitted involve neurosurgical trauma or respiratory failure.

Nonprobability sampling was the technique employed in this research investigation. Patients who were in the ICU during the defined data collection period were classified by the researcher using the selected classification instrument; hence, a convenience sample. The phenomena (critical indicators) investigated in rating patients were homogenous within the population, reducing the risk of bias inherent to convenience sampling.

Human Rights Protection

In health care practice, the need for protection of human rights is of singular importance in any activity that goes beyond the established and accepted practices of the professional group involved or in which the focus is not directed specifically toward meeting the needs of the individual patient or subject (ANA, 1985).

The requirements for the protection of human rights were met prior to the implementation of the study. This study was approved by the Human Subjects Review Committee, College of Nursing, Great Falls Extended Campus, Montana State University. No consent was required by the individual patient for classification as the variables of interest were those treatments and procedures (critical indicators) which were scored (rated) to yield the patient classification category. Treatments and procedures were ordered by a physician and not provided nor withheld at the nurse's discretion based on the resultant classification.

Access to this target population of patients in the ICU was gained through approval of the Director of Critical Care and Vice-President for Nursing at Montana Deaconess Medical Center. The patients who were acuity classified were identified by their assigned medical record number only.

Procedure

The principal investigator, who is also the Administrative Nurse II of the MSICU, introduced the pilot study and the concept of patient classification to the professional nursing staff at a unit staff meeting prior to the start of data collection. Data were collected on patients admitted to the Intensive Care Unit between March 14 and April 5, 1988. Patients who were admitted to the

ICU during that time period were classified according to Critical Indicators listed on the classification instrument. Forty different patients comprised the population of study.

The Patient Acuity Worksheet (Appendix C) was used to classify patients at specific times (0600, 1400, and 2200) for each shift. A separate patient acuity worksheet was used on each shift, and the medical record numbers of each patient were noted on the lines at the top of the worksheet.

Critical indicators were identified for each patient and the appropriate point score for each item was recorded. The total acuity points were summed at the bottom of each column, and the patient's care category was determined by matching the total points with the appropriate point ranges.

After the patient acuity worksheets were completed for each 24 hour period, the Nursing Care Hour Requirement Chart (Appendix B) was used to determine nursing hours required to meet the direct care needs of all patients classified. The Personnel Requirements Chart (Appendix D) was then used to determine the total number of direct care providers required for the next 24 hours.

Instrument Description

The WMSN is a patient classification system of factor evaluative design requiring a registered nurse to assess nine groups of factors related to direct patient care and

assign an overall score to each factor (Vail et al., 1984). Each factor is considered a critical indicator. The Critical Indicator Sheet (Appendix A) lists the direct nursing care activities determined to be critical indicators of direct nursing care time. Under each of the nine critical indicator groups is the list of activities that pertain to that group. The numbers in parentheses to the left of each specific critical indicator represent the point score assigned to that activity (Vail et al., 1984).

To collect data the Patient Acuity Worksheet (Appendix C) is used to determine direct care time. The worksheet is a two page form used for classifying patients manually. Data may be collected on up to twelve patients per form. On the Patient Acuity Worksheet, the "point values" in the left column correspond to the "acuity code" in the right column; alterations in any of these point values will void the system. Each "critical indicator" is assigned a "point value." Figure 2 illustrates examples of three critical indicators and their "point values" and "acuity codes."

POINT VALUES	CRITICAL INDICATORS	ACUITY CODE
	TREATMENTS/PROCEDURES/MEDICATIONS	
	Simple > 15 and < 30 Minutes Total	
(2)	Start IV or NG or Foley or EKG	70
(4)	Chest Tube Insertion or Lumbar Puncture	90
(12)	New Admission (assessment & orientation)	101

Figure 2. Key Terms for Patient Acuity Worksheet.

The Patient Acuity Worksheet has spaces across the top for patient case numbers to be identified. Under each patient case number are columnar boxes which correspond to a vertical list of critical indicators on the left side of the page. The critical indicators in each section are rated as appropriate for each patient. Two or more activities in a single line may apply. The sum is recorded in the box to the right of the activity on the worksheet. At the bottom left of the worksheet is a series of blocks for noting the total scores and categories for each patient listed and assessed.

The researcher proceeded through each group of critical indicators and recorded the points in the appropriate boxes; the total points for each patient were recorded in the space at the bottom of the column. The patient's category was determined by matching the total points with the appropriate point ranges (Appendix B).

The total numbers of patients in each category is summed. This sum is used to determine the nursing care hour requirements (Appendix B) for the numbers of patients in all categories of care in the unit at any given time.

The assessment of care during the day shift was used to predict care requirements for the next 24 hours; however, the instrument could be used to assess patient care needs each shift. A staffing model was used for determining the

actual nursing care hour requirements and the numbers and mix of personnel recommended for quality care.

Reliability and Validity

Interrater reliability of total scores yielded a Pearson Product Coefficient of .93 between the staff nurses and the investigators when first implemented at Walter Reed Army Hospital in 1984. The total score Pearson Product Coefficient between the two principal investigators in design of the Patient Classification System was .98. Interrater reliability between categories was also high. Using the Goodman-Kruskal Gamma, the rating between the staff nurse and the investigators was .96 and .96. The Gamma score between investigators was .99 (Vail et al., 1984).

The validity of the patient categories and the times for direct care have been studied by nurse researchers at Walter Reed Army Hospital in Washington, D.C. for four months in five Army Medical Treatment Facilities using objective data. The system has been used and studied extensively in a large number of Navy hospitals (Vail et al., 1984). The Pearson Product Moment Correlation between the Workload Management System and Nursing Care Hour Standards was .81. When adjusted for emotional support the correlation was raised to .89.

Procedure for Data Analysis

The data were first analyzed through the use of descriptive statistics. The calculation of means, standard deviations, ranges, and frequency distributions was used to describe the acuity of patients in the MSICU during the period of data collection. Measures of central tendency and percentage distributions were calculated to determine differences in levels of care. The actual number of personnel assigned by the MSICU charge nurses was compared with the recommended staffing according to the WMSN, using the t-Test for Difference of Means, to determine if staffing levels were above, below, or within the recommendations.

CHAPTER 4

DATA ANALYSIS

The patient classification tools of the WMSN were used to pilot test patient classification in the MSICU at Montana Deaconess Medical Center in Great Falls, Montana.

Description of the Sample

Forty patients in the MSICU were classified using the Patient Acuity Worksheet. The classified patients represented a convenience sample obtained for 14 days during a time period between March 14 and April 5, 1988. Patients were classified at 0600, 1400, and 2200 on the days selected. For the 40 different patients, a total of 137 acuity classifications were obtained (See Appendix E). Thirty-six percent (n=49) of the patient classifications was done at 0600; 34% (n=46) was done at 1400; and, 30% (n=42) was done at 2200.

The forty patients classified in this study represented the variation in age and diagnosis normally seen in the MSICU (See Appendix F). Ages of the included patients ranged from 1 to 88; diagnoses included overdose (drug, alcohol, accidental) to postoperative respiratory complications to multi-system trauma.

Variability of the MSICU census caused the sampling to be selected by convenience. For two and one half years prior to data collection the MSICU had remained open and had maintained a relatively stable census of 5 patients. At three points during the data collection period the MSICU closed three times: the first time for 12 hours; the second time for 36 hours; and the third for 10 hours.

Research Questions

Research Question 1

The first research question sought to determine the levels of acuity of patients in the MSICU according to the WMSN. The Guidelines for Using Critical Indicators available in appendix format in the WMSN Manual (Vail et al., 1984) were used as an interpretive text for the definition of each critical indicator and its application during the assessment of patients. These guidelines also contain answers to questions about special situations that could arise when classifying patients; however, the latter portion of the guide was not needed during the data collection period.

The patients were classified not less than one hour prior to the next scheduled shift; therefore, the classifications completed at 0600, 1400, and 2200 reflected the projected acuity of patients for the next scheduled shift. The range of acuity point scores for the 137

classifications completed on 40 different patients was 33 to 139; these point scores resulted in levels which varied from Category III, described by the WMSN as Acute Care, to Category V, described as Continuous Care. A complete listing of the raw data can be found in Appendix E.

The summary of the dates, shifts, the number of patients in each category, and the required nursing care hours for those dates of data collection is illustrated in Table 1. The required nursing care hours based on the categories of patients present in the MSICU ranged from 0 to 122. For the WMSN, Category III patients (32-63 acuity points) are defined as Acute Care or requiring 1 staff per 3 patients; Category IV patients (64-95 acuity points) are defined as Intensive Care or requiring 1 staff per 2 patients; and, Category V patients (96-145 acuity points) or requiring 1 staff per 1 patient. The times when 0 was indicated (3/17, 3/20, and 4/05) represented the times when the MSICU was closed.

Table 2 summarizes the number of classifications, the percent of the total, mean acuity score and category for each shift classified on selected days. The mean acuity for the 7-3 shift was 64; the 3-11 shift, 76; and the 11-7 shift, 72. All three shift mean acuity scores fell into Category IV, described by the WMSN as Intensive Care.

Table 1. Background Data of Sample for Shift Staffing Comparisons. (N=137)

Date	Shift	Total Count Category III	Total Count Category IV	Total Count Category V	Required Nursing Care Hours
3/14	1 (0700)	1	2	2	95
	2 (1500)	1	2	2	95
	3 (2300)	2	4	2	112
3/15	1	3	4	1	122
	2	2	1	2	88
	3	0	3	0	50
3/16	1	0	3	0	50
	2	1	2	0	44
	3	1	2	0	44
3/17	1	2	1	0	37
	2	0	0	0	0
	3	0	0	0	0
3/20	1	0	1	0	17
	2	0	0	0	0
	3	0	0	0	0
3/22	1	0	0	0	0
	2	1	2	0	44
	3	3	0	0	30
3/23	1	3	0	0	30
	2	0	1	2	68
	3	1	1	0	27
3/24	1	3	0	0	30
	2	1	1	1	52
	3	1	2	1	69
3/25	1	2	1	5	62
	2	2	1	5	62
	3	1	2	0	44
3/28	1	1	3	0	60
	2	1	3	0	60
	3	1	3	1	85
3/29	1	3	2	0	64
	2	1	2	0	44
	3	1	1	1	52
3/30	1	1	2	0	44
	2	1	2	1	69
	3	1	2	1	69
3/31	1	1	3	1	85
	2	2	4	1	112
	3	3	2	0	64
4/05	1	2	0	0	20
	2	1	1	0	27
	3	0	0	0	0

Table 2. Summary of Mean Acuity Scores. (N=137)

Shift	Number of Classifications	% of Total	Mean Acuity Score	Mean Category
1 (7-3)	49	36%	64	IV
2 (3-11)	46	34%	76	IV
3 (11-7)	42	30%	72	IV

Table 3 illustrates the frequency of each acuity (level of care) classification for each of the three shifts on which patients were classified. The number of patients classified as Category III across the shifts varied from 14 to 22 and represented 30% to 45% of the total count. The number of patients classified as Category IV was 22 across all three shifts and represented 45% to 53% of the total count. Patients classified as Category V ranged from 5 to 10 and represented 10% to 22% of the total.

Table 3. Frequency Table for Level of Care Classification per Shift. (N=137)

Variable	Total Count (%) Level III	Total Count (%) Level IV	Total Count (%) Level V
Shift 1	22 (44.9)	22 (44.9)	5 (10.2)
Shift 2	14 (30.4)	22 (47.8)	10 (21.7)
Shift 3	15 (35.7)	22 (52.3)	5 (11.9)

The mean, median, and standard deviation for category classification (level of care) for each shift was also calculated (see Table 4). The results indicated a mean of

Category IV (Intensive Care) classification; the standard deviation indicated that the sample was evenly distributed closely around the mean on each shift.

Table 4. Mean, Median and Standard Deviation for Category Classification.

Variable	$\bar{X}$	Median	S.D.
Shift 1	3.65	4	.663
Shift 2	3.91	4	.724
Shift 3	3.76	4	.655

During this data collection period there were no patients classified into Category I, II, or VI. Analysis of data indicated that patients in the MSICU during the selected sampling period were classified into Categories III, IV, and V; the greatest number of patients were classified into Category IV.

Research Question 2

The second research question sought to compare the direct care recommendations for each 24 hour period during which patients were classified with the actual 24 hour direct care personnel allocated by the shift charge nurse. As patients were classified, the actual number of direct care providers allocated by the charge nurse each shift were recorded and compared to the recommended number of direct care providers based on the acuity scores for each patient.

Descriptive statistics were used to compare the recommended personnel requirements (staffing) for summated acuity scores with the actual staffing provided based on the subjective judgment of the shift charge nurse. Since the WMSN recommends that acuity classifications be completed daily at 1400 with staffing projections for the next 24 hours calculated and based on nursing care requirements for the 0700-1530 shift, comparisons were made with the patient acuity classifications calculated at 1400. Table 5 illustrates data extracted from Table 1 and identifies the required nursing care hours, the WMSN recommended 24 hour staff, the actual MSICU 24 hour staff and the percent variance. The percent variance ranged from -22% to 0 to +50%.

Table 5. Comparison of Recommended and Actual 24 Hour Staffing. (N=137)

Date	Required Nursing Care Hours	Recommended 24 Hour Staff (WMSN)	Actual 24 Hour Staff (MSICU)	Percent Variance
3/14	95	12	14	16%
3/15	88	11	12	9%
3/16	44	6	9	50%
3/17	0	6	6	0%
3/20	0	6	7	17%
3/22	44	6	6	0%
3/23	68	9	7	-22%
3/24	52	7	8	14%
3/25	62	8	8	0%
3/28	60	8	9	13%
3/29	44	6	7	17%
3/30	69	9	8	-11%
3/31	112	14	12	-14%
4/05	27	6	6	0%

Table 6 contains the sample mean, standard deviation, range, and median for the comparison of the allocation of human resources. The data demonstrated that the mean number of direct care providers recommended by acuity ratings of the WMSN was 8.0 compared to 8.5 direct care providers actually allocated for a 24 hour period. The raw data produced a normal curve; all values were within $\pm$ 3 standard deviations from the mean. There was no 24 hour period with fewer than 6 staff nor greater than 14 recommended or allocated staff.

Table 6. Comparison of Allocation of Human Resources. (N=28)

Variable	$\bar{X}$	S.D.	Range	Median
WMSN (recommended)	8.1	2.59	6-14	7.5
MSICU (actual)	8.5	2.50	6-14	8

The t-Test for Difference of Means was used to compare the actual direct care staff assignments with the nurse-patient recommended staffing ratios indicated by the WMSN. To calculate the t-statistic the difference of the sample means of the two groups was divided by the difference of the standard deviations of the sample. The resulting t-statistic value was .36; it did not exceed the critical value of t (2.77) for statistical significance. Therefore, there was no statistically significant difference between

the WMSN method for identifying allocation of human resources and the actual staffing allocated by the shift charge nurse.

CHAPTER 5

DISCUSSION AND RECOMMENDATIONS

The purpose of this research was to conduct a pilot study to determine the levels of care (levels of acuity) in the Medical/Surgical Intensive Care Unit at Montana Deaconess Medical Center in Great Falls, Montana. The systems theory provided the conceptual framework for the study. The Patient Acuity Worksheet of the Workload Management System for Nursing was the tool selected for acuity classification. A total weighted-point acuity score was obtained for each patient which determined the level of care category. One hundred thirty-seven classifications were completed on 40 different patients for three shift periods on 14 different days. Descriptive statistics were used to determine the range and means of the categories resulting from the accumulated acuity scores. The difference between the actual number of direct care providers allocated by the shift charge nurse versus the WMSN recommended number of providers was analyzed using the t-test.

Discussion

The study findings demonstrated that patient acuity scores collapsed into three categories (III, IV, V) of the WMSN during the time that data was collected in the MSICU. Although the time frame from which the sample was drawn presented no acuity classifications in Category VI (the most acute classification), patients in Category V are known to deteriorate, thereby accumulating additional acuity points. This information is known to the researcher through experience in caring for and managing patients in the critical care environment. The direct care description for Category VI is Critical Care (>1 staff to 1 patient). Likewise, there were no patients who were classified in Category I (Self/Minimal Care) nor Category II (Moderate Care) which is appropriate for a critical care unit as defined by the unit's admission and discharge criteria.

The study findings demonstrated that patients who were classified as Category III were transferred to a medical-surgical unit or were maintained in the MSICU for 24-48 hours until a bed was available on a general medical or surgical unit (overflow status). This finding may be important in identifying patients who are candidates for transfer from the Intensive Care Unit, and could be a recommendation for inclusion in the discharge criteria should a patient classification system be implemented.

No statistically significant difference was found between staffing recommended by the shift charge nurse based on his/her intuitive knowledge and assessment of the patient care needs and the staffing recommended by the WMSN based on patient acuity classification scores. The percent variance appears greater than the actual numerical difference; however, the difference is realized between numbers of staff allocated in projecting acuity at 1400 daily and the summated total of actual staffing allocated on 3 shifts. The actual numbers of staff allocated were not based on an absolute number required for a certain acuity point range, but rather an intuitive determination of level of care required based on care provided on the previous shift.

The WMSN was developed and implemented in a military hospital; therefore, the allocation of personnel may vary within the military facility without affecting the actual overstaffing which may present if the census is decreased after the daily allocation of personnel has been mandated. This could be explained by the greater utilization of Non-RNs in a military facility with different job descriptions from Non-RNs in a nonprofit institution such as Montana Deaconess Medical Center. The current staffing policies within the Department of Nursing at Montana Deaconess Medical Center require that staff allocation be monitored

by the shift charge nurse to meet the current acuity needs of the patients in the unit one hour prior to the start of the next shift.

The results of this study indicated that the WMSN provides a patient classification tool which may be valid for a multidisciplinary intensive care unit; however, greater accuracy in allocation of staff may be provided with an 8 hour versus a 24 hour assessment of patient acuity. Although the WMSN provides for a daily acuity classification for purposes of staff allocation, daily classification may not be a cost effective staffing methodology for a public community hospital such as Montana Deaconess Medical Center.

There is a need for patient classification by acuity of care in a multidisciplinary intensive care unit, such as the MSICU at Montana Deaconess. To make quantitatively sound decisions about staffing requirements and to manage the quality, quantity, and use of personnel productively and cost-effectively, nurse managers must use well-established tools (Vail et al., 1987). Use of the patient classification tool can be balanced with the intuitive judgment of the nurse manager to provide and justify appropriate allocation of human resources in the critical care environment. By using valid and reliable instruments such as the WMSN, nurse managers can produce the data they need to justify their decisions.

The health care industry is among the most labor intensive industries in society. The most important and valuable resource in the health care system are the human resources. All other inputs to the system and all of the outcomes depend on having properly qualified staff available in appropriate quantities at the right time (Hanson, 1983). A systems approach provides the conceptual framework for a patient classification system. The patient classification system can be viewed as the element that provides the transformation between the primary system input (the consumer of health care) and its output (acuity classification with a resultant staffing and costing system).

Limitations

A limitation of the "patient category" approach of factor evaluation is that understaffing could occur if all or some borderline patients lacked one point qualifying for the next highest category. Another limitation related to the above is that patients in the respective/assigned categories continue to get the amount of service indicated by the classification instrument even though the actual acuity rating may change. Likewise, the difference in classification of personnel (RN versus Non-RN) differs

between a military facility and a public community hospital limiting the use of the WMSN (recommended staffing levels) to a 24 hour rather than a shift to shift classification system.

The costs and reliability of proposed patient classification systems have frequently been questioned. The costs of errors arising from inappropriately matching staff with fluctuating patient population are often overlooked (Diggs, 1986).

Nursing Implications

The data from this study have implications for nurse managers as well as nursing administrators at the corporate level. Traditionally, critical care nurse managers determined staffing needs based on daily census coupled with predetermined numbers of care hours per patient day (Vail et al., 1987). Because all patients do not have the same nursing care requirements, it has become necessary to develop a more accurate procedure for determining staffing needs in private hospital settings.

Nurse managers may use the data acquired from the WMSN at the unit level (MSICU), at the department level (Division of Critical Care), or at the corporate level (MDMC). Data collected at the unit level can provide input to the departmental level for recommendations for numbers and mix of care providers for each fiscal year. The nursing administrator at the corporate level can use

aggregate data from the nursing department to establish a foundation for the allocation of human resources, to justify nursing budgets, and to provide a rational guide for correcting staffing deficiencies.

Recommendations

It is recommended that further research utilize the shift charge nurse to classify patients in order that interrater reliability for classification can be determined. The shift charge nurse is that RN who coordinates admissions, discharges, communicates patient care needs to team members, and therefore would be the one most knowledgeable to rate patients on a shift to shift basis using a reliable and valid classification instrument. Interrater reliability could be established in a replication of this study by asking the shift charge nurse to simultaneously, yet independently, rate the patients each shift with the researcher or Administrative Nurse II. Content validity could also be determined in a future study by having clinical nurses, assigned as shift charge nurses, review the critical indicators in the instrument to assure they are congruent with or adequately reflect the patient population and care activities employed. Time and motion studies for each acuity criterion also need replication in private non-profit hospitals such as Montana Deaconess Medical Center to ascertain the validity of acuity point assignment.

This pilot study can be viewed as a stepping stone to future nursing studies to systematically measure patient classification. Randomization of days throughout the year is suggested for future sampling in order to determine the usability of patient classification systems with seasonal variation in patient admissions and acuity levels, and variation in numbers of staff available during favored vacation periods.

This study's findings suggest that a daily acuity classification at 1400 can project staffing requirements for the next 24 hour period. However, further testing of 8 hour versus the 24 hour acuity classification is needed to determine which would provide greater accuracy in staff allocation and a more cost effective and efficient allocation of staff.

This pilot study provided information about the benefits and limitations inherent to the utilization of a Patient Classification System and established a foundation for implementation of patient classification in the intensive care environment.

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APPENDICES

APPENDIX A

PATIENT CLASSIFICATION CRITICAL INDICATORS

PATIENT CLASSIFICATION CRITICAL INDICATORS

VITAL SIGNS (MANUAL TPR, BP)

(1) Vital Signs qid or less
(2) Vital Signs q4h or x 6
(3) Vital Signs q3h or x 8
(4) Vital Signs q2h or x 12
(8) Vital Signs q1h or x 24
(2) Rectal or Axillary Temp or Apical Pulse qid or more
(2) Femoral or Pedal Pulses or Fetal Heart Tones q4h or more
(2) Tilt Tests q4h or more
(6) Post-op, Post-Partum, or Post-Newborn Vital Signs

MONITORING

(2) Intake and Output q8h or x 3
(8) Intake and Output q2h or x 12
(2) Circulation or Fundus checks q2h or x 12
(3) Neuro Checks q4h or x 6
(6) Neuro Checks q2h or x 12
(2) CVP or ICP q2h or x 12
(6) Cardiac/Apnea/Temp/Pressure Monitor (not cummulative)
(6) Transcutaneous monitor
(4) A-line or ICP monitor or Swan-Ganz set-up
(2) A-line or ICP monitor reading q2h or x 12
(2) PAP/PA Wedge Reading q4h or x 6
(4) PAP/PA Wedge Reading q2h or x 12
(2) Cardiac Output tid or x 3

ACTIVITIES OF DAILY LIVING

(6) Infant/Toddler Care ($\leq$ 5 years)
(2) Self/Minimal Care (Adult or Child > 5)
(6) Assisted Care (> 5 years) - positions self
(14) Complete Care (> 5 years) - assists with positioning
(32) Total Care (> 5 years) - position and skin care q2h
(4) Extra linen change and partial bath x 2 per shift
(14) Turning Frame (2 staff to turn q2h)
(8) Peds Recreation/Observation (0-12 years)

FEEDING
(5) Tube Feed (bolus) q4h or x 6
(8) Tube Feed (bolus) q3h or x 8
(10) Tube Feed (bolus) q2h or x 12
(2) Tube Feed (continuous) per bottle change
(6) Adult Meals > 5 years (spoon feed x 3)
(10) Child Meals < 5 years (spoon feed x 3)
(2) Infant/Neonate Bottle x 1 feeding
(12) Infant/Neonate Bottle q4h or x 6
(24) Infant/Neonate Bottle q2h or x 12

IV THERAPY
(4) KVO (change bottle bid or less)
(4) Heparin Lock or Broviac
(6) Simple (change bottle tid or qid)
(8) Complex (2 or more sites or change bottle q4h or multilumen line)
(2) Medication q8h or x 3
(3) Medication q6h or x 4
(4) Medication q4h or x 6
(2) Blood Products (each administration)

TREATMENTS/PROCEDURES/MEDICATIONS
Simple > 15 and < 30 Minutes Total
(2) Start IV or NG or Foley or EKG
(2) OR Prep or Enemas or Ace Wraps/Teds
(2) Simple Dressing x 2 or Tube care x 2 (exclude trach) or Foley care x 2
(2) S&A or Sp Gr or Guiac or Spin Hct x 6
(2) Lab Studies x 6; ABG stick or Blood Cultures x 3
(2) Medications q3h - q8h (up to 12 trips) *exclude IV medications
(2) Irrigations or Instillations x 4 or less
(2) Restraints (2 or 4 point or posey)
(2) Assist OOB to chair/stretcher x 3
(2) Assist OOB, walk, & return x 1
(2) Infant Circumcision or Phototherapy
(2) Accompany patient off ward > 15 minutes but < 30 minutes
(2) Other activities requiring > 15 minutes but < 30 minutes
(2) Isolation (gown & glove x 6)

Complex > 30 Minutes and < 1 Hour Total
(4) Chest Tube Insertion or Lumbar Puncture
(4) Thoracentesis or Paracentesis
(4) Complex Dressing Change (> 30 minutes)
(4) Straight Catheterization x 4 or more
(4) Medication q2h or more (> 12 trips)
* exclude IV medications)
(4) Range of Motion Exercises x 3
(4) Accompany patient off ward > 30 minutes
(4) Other activities requiring > 30 minutes and less than 1 hour

Special Procedures > 1 Hour and < 4 Hours
(8) Each hour requiring continuous staff attendance/assistance
(12) New Admission (assessment & orientation)
(4) Transfer (in-house)

RESPIRATORY THERAPY
(2) Oxygen Therapy or Oxyhood
(2) Incentive Spirometer or C & DB q4h
(2) IPPB or Maximist bid or x 2
(4) IPPB or Maximist q4h or x 6
(8) Croup Tent or Mist Tent
(2) Chest Pulmonary Therapy bid or x 2
(4) Chest Pulmonary Therapy q6h or x 4
(6) Chest Pulmonary Therapy q4h or x 6
(2) Suctioning q4h or x 6
(4) Suctioning q2h or x 12
(10) Ventilator
(4) Tracheostomy Care x 3

TEACHING AND EMOTIONAL SUPPORT
Teaching
(2) Group Teaching
(4) Preoperative Teaching
(4) Special Structured Teaching (diabetic, cardiac, etc.)
Emotional Support (> 30 minutes q 24 hours)
(4) Patient/Family Support (anxiety, denial, loneliness)
(4) Lifestyle Modification (prothesis, behavior, image, coping, etc.)
(6) Sensory Deprivation (retarded, blind, deaf, mute, etc.)
(10) Maximum points for emotional support

CONTINUOUS
(96) Patient requiring 1:1 coverage
(146) Patient requiring > 1:1 coverage

APPENDIX B

CRITICAL CARE
NURSING CARE HOUR REQUIREMENTS

CRITICAL CARE
NURSING CARE HOUR REQUIREMENTS

PATIENTS	CATEGORY					
	I	II	III	IV	V	VI
1	1	5	10	17	25	43
2	3	9	20	34	51	85
3	4	14	30	50	76	128
4	6	18	40	67	101	171
5	7	23	51	84	127	214
6	8	28	61	101	152	256
7	10	32	71	118	177	299
8	11	37	81	134	202	342
9	13	41	91	151	228	384
10	14	46	101	168	253	427
11	15	51	111	185	278	470
12	17	55	121	202	304	512
13	18	60	131	218	329	555
14	20	64	141	235	354	598
15	21	69	152	252	380	641
16	22	74	162	269	405	683
17	24	78	172	286	420	726
18	25	83	182	302	455	769
19	27	87	192	319	481	811
20	28	92	202	336	506	854
21	29	97	212	353	531	897
22	31	101	222	370	557	939
23	32	106	232	386	582	982
24	34	110	242	403	607	1025
25	35	115	253	420	633	1068
26	36	120	263	437	658	1110
27	38	124	273	454	683	1153
28	39	129	283	470	708	1196
29	41	133	293	487	734	1238
30	42	138	303	504	759	1281

Classification Categories

Category	Acuity Point Range	Direct Care Description
I	0 - 12	Self Care/Minimal Care
II	13 - 31	Moderate Care
III	32 - 63	Acute Care (1:3)
IV	64 - 95	Intensive Care (1:2)
V	96 - 145	Continuous Care (1:1)
VI	146 - 999	Critical Care (>1:1)

APPENDIX C

PATIENT ACUITY WORKSHEET

PATIENT ACUITY WORKSHEET

WARD: FACILITY:

	CRITICAL INDICATORS														
	VITAL SIGNS (MANUAL TPR, BP)	**A1-A3**													
(1)	Vital signs qid or less	1													1
(2)	Vital signs q4h or x 6	2													2
(4)	Vital signs q2h or x 12	3													3
(8)	Vital signs q1h or x 24	4													4
(2)	Rectal or axillary temp or apical pulse qid or more	5													5
(2)	Femoral or pedal pulses of FHT q4h or more	6													6
(2)	Tilt tests q4h or more	7													7
(6)	Post-op, post-partum, post-delivery (Infants)	8													8
(3)	Vital signs q3h or x 8	9													9
	MONITORING	**A3-A7**													
(2)	Intake and output q8h	20													20
(8)	Intake and output q2h	21													21
(2)	Circulation or fundus checks q2h or x 12	22													22
(3)	Neuro checks q4h or x 6	23													23
(6)	Neuro checks q2h or x 12	24													24
(2)	CVP or ICP (manual) q2h or x 12	25													25
(6)	Cardiac/apnea/temp/pressure monitors (not cumulative)	26													26
(6)	Transcutaneous monitor	27													27
(4)	A-line or ICP (monitor) or Swan Ganz set-up	28													28
(2)	A-line or ICP (monitor) reading q2h or x 12	29													29
(2)	PAP/PA wedge reading q4h or x 6	30													30
(4)	PAP/PA wedge reading q2h or x 12	31													31
(2)	Cardiac output tid	32													32
	ACTIVITIES OF DAILY LIVING	**A7-A15**													
(6)	Infant/toddler care (<5 years)	40													40
(2)	Self/minimal care (adult or child >5 years)	41													41
(6)	Assisted care (>5 years) - positions self	42													42
(14)	Complete care (>5 years) - assist with positioning	43													43
(32)	Total care (>5 years) - position and skin care q2h	44													44
(4)	Extra linen change and partial bath 2x per shift	45													45
(14)	Turning frame (2 staff to turn q2h)	46													46
(8)	Pads recreation/observation (0-12 years) (include NBN)	47													47
	FEEDING	**A16-A17**													
(5)	Tube feed adult/child/neonate q4h or x 6 (Bolus)	50													50
(10)	Tube feed adult/child/neonate q2h or x 12 (Bolus)	51													51
(6)	Adult meals >5 years (spoon feed x 3)	52													52
(10)	Child meals >5 years (spoon feed x 3)	53													53
(2)	Infant/neonate bottle x 1 feeding	54													54
(12)	Infant/neonate bottle q4h x 6	55													55
(24)	Infant/neonate bottle q2h or x 12	56													56
(8)	Tube feed adult/child/neonate q3h or x 8 (Bolus)	57													57
(2)	Tube feed (continuous) per bottle change	58													58
	IV THERAPY	**A30-A33**													
(4)	KVO (change bottle bid or less)	60													60
(4)	Heparin lock or Broviac	61													61
(6)	Simple (change bottle tid or qid)	62													62
(8)	Complex (2 or more sites or change bottle q4h)	63													63
(2)	Medication q8h or x 3	64													64
(3)	Medication q6h or x 4	65													65
(4)	Medication q4h or x 6	66													66
(2)	Blood products (each administration)	67													67
	SUBTOTAL POINT VALUES														

POINT VALUES	CRITICAL INDICATORS	ACUITY CODE														
	TREATMENTS/PROCEDURES/MEDICATIONS	**A17-A23**														
(2)	Start IV or NG or Foley or EKG	70														70
(2)	OR prep or enemas or ace wraps/teds	71														71
(2)	Simple dressing or tube care, Foley care (exclude trach)	72														72
(2)	S&A or SpGr or Gulac or spin HCT x 6	73														73
(2)	Lab studies x 6: ABG or blood culture x 3	74														74
(2)	Medications q3h - q8h (up to 12 trips) (exclude IV)	75														75
(2)	Irrigations or Installations x 4 or less	76														76
(2)	Restraints (2 or 4 point or posey)	77														77
(2)	Assist OOB to chair/stretcher x 3	78														78
(2)	Assist OOB, walk & return x 1	79														79
(2)	Infant circumcision or phototherapy	80														80
(2)	Accompany patient off ward >15 minutes and <30 minutes	81														81
(2)	Other activities requiring >15 minutes and <30 minutes	82														82
(2)	Isolation (gown and glove x 8)	83														83
	Complex >30 minutes and <1 Hour Total	**A24-A26**														
(4)	Chest tube insertion or lumbar puncture	90														90
(4)	Thoracentesis or paracentesis	91														91
(4)	Complex dressing change (30 minutes to complete)	92														92
(4)	Straight catheterization x 4 or more	93														93
(4)	Medication q2h or more (greater than 12 trips) (exclude IV)	94														94
(4)	Range of motion exercises x 3	95														95
(4)	Accompany patient off ward >30 minutes	96														96
(4)	Other activities requiring >30 minutes and <1 hour	97														97
	Special Procedures >1 Hour and <4 Hours															
(8)	Each hour requiring continuous staff attendance/assistance	100														100
(12)	New Admission (assessment and orientation)	101														101
(4)	Transfer (in-house)	102														102
	RESPIRATORY THERAPY	**A27-A30**														
(2)	Oxygen therapy or oxyhood	110														110
(2)	Incentive spirometer of C&DB q4h	111														111
(2)	IPPB or maximist bid or x 2	112														112
(4)	IPPB or maximist q6h or x 4	113														113
(6)	IPPB or maximist q4h or x 6	114														114
(8)	Croup tent or mist tent	115														115
(2)	Chest pulmonary therapy bid or x 2	116														116
(4)	Chest pulmonary therapy q6h or x 4	117														117
(6)	Chest pulmonary therapy q4h or x 6	118														118
(2)	Suctioning q4h or x 6	119														119
(4)	Suctioning q2h or x 12	120														120
(10)	Ventilator	121														121
(4)	Tracheostomy care x 3	122														122
	TEACHING & EMOTIONAL SUPPORT(Must be documented)	**A33-A35**														
(2)	Group teaching	130														130
(4)	Preoperative teaching	131														131
(4)	Special Structured teaching (diabetic, cardiac, etc.)	132														132
	EMOTIONAL SUPPORT (in excess of 30 min. q 24 hours)															
(4)	Patient/family support (anxiety, denial, loneliness, etc.)	135														135
(4)	Lifestyle modification (prosthesis, behavior, image, etc.)	136														136
(6)	Sensory deprivation (retarded, deaf, blind, etc.)	137														137
(10)	Maximum points for emotional support	138														138
	CONTINUOUS	**A34-A35**														
(96)	Patient requiring 1:1 coverage all shifts	140														140
(146)	Patient requiring greater than 1:1 coverage all shifts	141														141
	0-12 I 64-95 IV	**Subtotal**														
	13-31 II 96-145 V	**Total**														
	32-63 III 146-999 VI	**Category**														

APPENDIX D

CRITICAL CARE
PERSONNEL REQUIREMENTS CHART

CRITICAL CARE
PERSONNEL REQUIREMENTS CHART

TOTAL HOURS	TOTAL 24 HOUR STAFF
0- 48	6
49- 56	7
57- 64	8
65- 72	9
73- 80	10
81- 88	11
89- 96	12
97-104	13
105-112	14
113-120	15
121-128	16
129-136	17
137-144	18
145-152	19
153-160	20
161-168	21
169-176	22
177-184	23
185-192	24
193-200	25
201-208	26
209-216	27
217-224	28
225-232	29
233-240	30

TOTAL HOURS	TOTAL 24 HOUR STAFF
241-248	31
249-256	32
257-264	33
265-272	34
273-280	35
281-288	36
289-296	37
297-304	38
305-312	39
313-320	40
321-328	41
329-336	42
337-344	43
345-352	44
353-360	45
361-368	46
369-376	47
377-384	48
385-392	49
393-400	50
401-408	51
409-416	52
417-424	53
425-432	54
433-440	55

APPENDIX E

LIST OF RAW DATA

LIST OF RAW DATA

DATE	SHIFT	PATIENT	ACUITY	CATEGORY
3/14	0600	001	103	5
		002	95	4
		003	122	5
		004	76	4
		005	56	3
	1400	001	99	5
		002	94	4
		003	133	5
		004	78	4
		005	60	3
	2200	001	82	4
		002	88	4
		003	139	5
		004	74	4
		005	56	3
		006	61	3
		007	85	4
3/15	0600	001	65	4
		002	60	3
		006	59	3
		003	123	5
		007	65	4
		008	65	4
		004	64	4
		005	58	3
	1400	001	59	3
		002	80	4
		003	99	5
		004	60	3
		009	129	5
	2200	001	81	4
		002	84	4
		009	66	4
3/16	0600	001	73	4
		002	88	4
		009	64	4

DATE	SHIFT	PATIENT	ACUITY	CATEGORY
	1400	002	88	4
		009	61	3
		010	71	4
	2200	002	74	4
		010	41	3
		011	73	4
3/17	0600	002	74	4
		010	43	3
		011	45	3
3/20	0600	012	72	4
3/22	1400	013	68	4
		014	68	4
		015	62	3
	2200	013	54	3
		014	56	3
		015	46	3
3/23	0600	013	50	3
		014	47	3
		015	40	3
	1400	016	96	5
		017	81	4
		018	116	5
	2200	016	72	4
		017	51	3
3/24	0600	016	62	3
		017	51	3
		019	60	3
	1400	016	55	3
		020	92	4
		021	113	5
	2200	016	49	3
		020	70	4
		021	101	5
		022	85	4

DATE	SHIFT	PATIENT	ACUITY	CATEGORY
3/25	0600	016	33	3
		020	68	4
		021	101	5
		022	55	3
	1400	016	40	3
		020	59	3
		021	97	5
		022	73	4
	2200	020	59	3
		021	72	4
		022	69	4
3/28	0600	023	67	4
		024	70	4
		025	81	4
		026	58	3
	1400	023	79	4
		026	42	3
		027	72	4
		028	84	4
	2200	023	73	4
		027	55	3
		028	66	4
		029	129	5
		030	84	4
3/29	0600	027	56	3
		023	79	4
		028	55	3
		029	81	4
		030	46	3
	1400	023	83	4
		029	87	4
		031	62	3
	2200	023	69	4
		029	121	5
		031	40	3
3/30	0600	031	38	3
		023	85	4
		029	85	4

DATE	SHIFT	PATIENT	ACUITY	CATEGORY
3/30	1400	023	83	4
		029	75	4
		032	58	3
		033	106	5
	2200	023	81	4
		029	61	3
		033	94	4
		034	120	5
3/31	0600	035	60	3
		023	83	4
		033	90	4
		029	65	4
		034	106	5
	1400	035	46	3
		023	77	4
		033	90	4
		029	57	3
		034	114	5
		036	91	4
		037	78	4
	2200	023	79	4
		033	86	4
		029	57	3
		036	63	3
		037	50	3
4/05	0600	038	52	3
		039	48	3
	1400	038	50	3
		040	78	4

APPENDIX F

DEMOGRAPHIC DATA

DEMOGRAPHIC DATA

PATIENT	AGE	DIAGNOSIS
001	35	Laminectomy with Fusion
002	73	CHF; Respiratory Failure
003	76	Excision of lesions of colon Postop Respiratory Failure
004	74	Carotid Endarterectomy
005	4	Congenital Heart Defect Respiratory Failure
006	59	Preinfarct Angina
007	35	Fracture of Femur Facial Fractures
008	56	Asthma; Acute Bronchitis
009	72	Postop Left Total Hip
010	16	Sagittal Split Osteotomy
011	33	Maxillary Fracture
012	63	CHF; Respiratory Failure
013	1	Croup; Febrile Seizures
014	3	Accidental Overdose
015	1	Accidental Overdose
016	68	Carotid Endarterectomy
017	30	Sagittal Split Osteotomy
018	88	AK Amputation
019	25	LaForte Osteotomy
020	68	Right Thoracotomy
021	26	Alcohol Overdose
022	64	Craniotomy
023	4	Bronchitis
024	56	COPD; Acute Bronchitis
025	74	Gastrointestinal Bleed
026	75	Chest Pain
027	35	Drug Overdose
028	9	Diabetic Ketoacidosis
029	70	Celiac/Mesentery Bypass
030	85	Gastrointestinal Bleed
031	73	Chest Pain
032	70	Chest Pain
033	87	Intraventricular Bleed
034	77	Respiratory Failure
035	78	Chest Pain
036	67	Femoral/Popliteal Bypass
037	62	Pneumonia
038	72	Transurethral Resection of Prostate
039	74	Liver Biopsy
040	79	Respiratory Failure

APPENDIX G

PERMISSION TO USE PATIENT ACUITY WORKSHEET

DEPARTMENT OF THE ARMY
OFFICE OF THE SURGEON GENERAL
5109 LEESBURG PIKE
FALLS CHURCH, VA 22041-3258

REPLY TO
ATTENTION OF

Ms. Sue Warren
205 15th Avenue South
Great Falls, Montana 59405

12 NOV 1987

Dear Ms. Warren:

Thank you for your letter expressing interest in the Army Nurse Corps' Workload Management System for Nursing (WMSN). I am pleased to share the requested information. The two studies which explicate the research methodologies are:

1. Nursing Care Hour Standards Study
   HCSD Report #81-009
   and
2. Time Spent in Indirect Nursing Care
   FINAL REPORT #83-004

If you are a regular user of the services of the Defense Documentation Center (Per DOD Instruction 5200.21) you may order these documents directly from the following:

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ATTN: DDC-TSR
Cameron Station
Alexandria, VA 22314

Telephones: IDS 107-47633,34,or 35
Commercial (202) 274-7633,34,or 35

All other request for these reports must be directed to the following:

US Department of Commerce
National Technical Information Services (NTIS)
5285 Port Royal Road
Springfield, VA 22161

Telephone: Commercial (703) 557-4650

Attached is the General Patient Acuity Worksheet used for patient classification in intensive care units. Permission is granted to use this tool for your thesis data collection. Futher questions about the acuity worksheet or the Workload Management System for Nursing may be directed to Major Betty Jones, Project Officer for the WMSN, 202-756-0294.

Sincerely,

Clara L. Adams-Ender

Attachment

Clara L. Adams-Ender
Brigadier General, AN
Chief, Army Nurse Corps