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1. AGENCY USE ONLY (Leave blank)	2. REPORT DATE	3. REPORT TYPE AND DATES COVERED THESIS / DISSERTATION	
4. TITLE AND SUBTITLE Relating Nursing Care Requirements to Diagnosis Related Groups (DRGs)		5. FUNDING NUMBERS	
6. AUTHOR(S) Holly A. Slater, Major			
7. PERFORMING ORGANIZATION NAME(S) AND ADDRESS(ES) AFIT Student Attending: Baylor University		8. PERFORMING ORGANIZATION REPORT NUMBER AFIT/CI/CIA- 91-082	
9. SPONSORING/MONITORING AGENCY NAME(S) AND ADDRESS(ES) AFIT/CI Wright-Patterson AFB OH 45433-6583		10. SPONSORING/MONITORING AGENCY REPORT NUMBER	
11. SUPPLEMENTARY NOTES			
12a. DISTRIBUTION / AVAILABILITY STATEMENT Approved for Public Release IAW 190-1 Distributed Unlimited ERNEST A. HAYGOOD, Captain, USAF Executive Officer		12b. DISTRIBUTION CODE	
13. ABSTRACT (Maximum 200 words)			
14. SUBJECT TERMS		15. NUMBER OF PAGES 33	
		16. PRICE CODE	
17. SECURITY CLASSIFICATION OF REPORT	18. SECURITY CLASSIFICATION OF THIS PAGE	19. SECURITY CLASSIFICATION OF ABSTRACT	20. LIMITATION OF ABSTRACT

final 9 May 91
Nursing Labor Costs

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RELATING NURSING CARE REQUIREMENTS
TO
DIAGNOSIS RELATED GROUPS (DRGs)

A Graduate Management Project Proposal

Submitted to the Faculty of

Baylor University

in Partial Fulfillment of the

Requirements for the Degree

of

Master of Health Administration

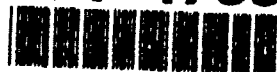
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Major Holly A. Slater, USAF, NC

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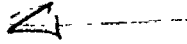
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Abstract

→ The implementation of the prospective payment system (PPS) to reimburse medical treatment facilities (MTFs) for care provided had a definite impact on healthcare facilities. According to the PPS, payments to healthcare facilities include coverage for all aspects of the provision of health care, including the care provided by nurses. With the costs of nursing labor continually rising, healthcare executives must become familiar with the costs of provide nursing care to patients.

Birch & Davis (1990) conducted a study of nursing care hours required for 80 percent of cases treated in U.S. Army MTFs. They noted a strong correlation, with the exception of four DRGs, between total nursing care hours and acuity among the top 114 DRGs.

This study will analyze the nursing care hours required for DRGs 138 and 139 at Wilford Hall USAF Medical Center (WHMC) and compare the results with those found in the Birch and Davis study. Analysis will be performed at both the diagnosis and the DRG level. Any variations in nursing care hours, if found, are expected to be at the diagnosis level. Variations in nursing care hours at the diagnosis level could be indicative of heterogeneity within the DRG. 

Introduction

Background

The development of the diagnosis related groups (DRGs) system of categorizing patients on the basis of resource consumption and the implementation of the prospective payment system (PPS) has introduced a level of competitiveness into the healthcare environment never before seen. Hospital payments under the PPS are based on the average resource use of patients in each DRG. Adjustments are made for indirect teaching expenses, hospital location, and the share of low-income patients treated. Despite these adjustments, many healthcare executives are concerned about the ability of the system (DRG) to account for the differences in the cost of care (McNeil, Kominski, & Williams-Ashman, 1988).

Since implementation of the PPS, dramatic changes have been seen in admissions, lengths of stay (LOS), acuity of the patients, and locales of treatment. In 1987, four years after implementation of PPS and utilization of DRGs, admissions declined by 11 percent and patient acuity increased (McGovern & Newbern, 1988; Hickey, 1987).

During the past two decades, professional nursing executives made progress in identifying relationships between inputs (nursing hours) and outputs (DRGs or patient discharges). Various methods have been developed to determine the amount and intensity of nursing care required for each patient, to associate costs with the identified nursing care needs, and to identify proportions of room charges which can be attributed to the direct and indirect costs of nursing care (McCloskey, 1989; Meeting, Saunders, & Curcio, 1988; O'Connor, 1988; Staley & Luciano, 1984).

Since the use of DRGs by the Medicare PPS is based on the assumption that resource consumption is fairly uniform within specific DRGs, it seems reasonable to assume that use of nursing personnel to provide the care is also similar within specific DRGs. Unfortunately, the latter assumption is incorrect as several research studies reveal that many DRGs contain patients with varying (heterogenous) patterns of nursing resource consumption (Bost & Lawler, 1989; Reschak, Biordi, Holm, & Santucci, 1987).

The existence of heterogeneity within DRGs makes the makes utilization of a DRG case mix history difficult to use as a predictor of future resource requirements. The two primary sources of heterogeneity

within DRGs appear to be variances in resource consumption and severity of illness. The two factors cannot be separated when considering the provision of nursing care. DRGs exhibit substantial variations in resource use as a result of varying severity of illness and the requirement to provide higher levels of nursing care (Green, McClure, Wintfeld, Birdsall, & Rieder, 1987). Because of the probability of a variance in the use of nursing care for individual cases, it is necessary to identify and refine heterogenous DRGs. This can be done through close examination of nursing care time expended for specific groups of patients, at the diagnosis or DRG level.

In 1990, Congress requested that the Department of Defense (DoD) conduct a study to assess the feasibility of using DRGs to predict nursing resources for military MTFs. The study assessed relationships between the Workload Management System for Nursing (WMSN) patient acuity system and DRGs. In general, findings showed that nursing care hours varied considerably among different DRGs, but were fairly well clustered within DRGs. A few DRGs demonstrated variances in nursing care requirements which could complicate the use of a DRG case mix as a predictor of staffing requirements (Birch & Davis, 1990).

Statement of the Problem

Proven methods which accurately and consistently associate nursing care requirements with specific classes of patients do not exist.

Literature Review

In 1983, Public Law 98-21, the Social Security Amendments of 1983, established a prospective payment system (PPS) based on the DRG categories. This payment system established prices for specific groups of hospitalization cases based upon categories of illness (DRGs) and enabled the federal government to implement a method of paying hospitals in an organized, equitable manner for care expected to be rendered to Medicare beneficiaries in the future (Griffith, 1987). The DRG system is based on a medical model which uses medical diagnosis classification of patients as the case-mix measure. Although the costs of nursing care are included in the computations, the pricing system does not incorporate methods of determining how much nursing care is required for each type of patient nor does it separate nursing resource consumption from other resource consumption (Cromwell & Price, 1988; Shaffer, 1988).

The changing economic incentives in the healthcare industry led to budget decentralization and the increasing tendency to place responsibility for allocated fund utilization at the department level. The shift in responsibility resulted in a greater number of nursing departments required to identify the costs of providing nursing care as a component of the patient's overall bill (Rosenbaum, Willert, Kelly, Grey, & McDonald, 1988). In order to determine the actual costs of providing nursing care, managers must use proven methods to determine the quantity of nursing care required for each patient's hospitalization and then appropriately associate that information with specific patients or groups of patients.

Awareness and utilization of management and cost accounting practices noticeably increased with the advent of the DRG payment system. The Health Care Financial Management Association reported that only 54 percent of the hospitals could determine their costs by DRG. The report also revealed that few of the facilities could associate costs with specific procedures (Eastaugh, 1987). There are many reasons why facilities would want to extend the costing of nursing services into DRGs. Determining how much nursing care is required for specific DRGs would help

nursing managers (a) determine what portion of the DRG cost is attributable to the nursing care provided for each patient, (b) compare the facility norms with other similar facilities, and (c) set standards for nursing care and staffing patterns. Hospital and nursing managers could also use the results to develop labor usage guidelines (standards) and identify trends for the facility's largest, most expensive cost center (nursing) (Thompson & Dier, 1988).

The most apparent reason for separating nursing labor costs from the traditional hospital room and board charges was the implementation of the DRG prospective payment system (Barhyte & Glandon, 1988). Some facility administrators and nursing service managers contend that the cost of providing nursing care is already known. This may be somewhat true if you simply divide the nursing department total costs by the number of patient days of care provided to obtain a per diem figure of costs per day per patient. However, this process bears little relation to the types or amounts of nursing care which the patient actually needed or received.

There are several steps which must be completed before the cost of nursing care can be directly attributed to a single patient or group of patients.

All studies stressed the need to (a) accurately and consistently identify the total nursing care time required to provide the level of care which the patient needs, and (b) associate that total nursing care time to specific patients or groups of patients (Kyle & Kinder, 1990; Barhyte & Glandon, 1988; Eastaugh, 1987; Staley & Luciano 1984). Methods of computation vary among institutions. The key to accurate identification is consistent use of the methods used to ensure a certain degree of accuracy.

The first step in associating nursing care requirements with DRGs is the development and implementation of a reliable staff allocation method which will provide for comparability of nursing labor requirements throughout the facility and across hospitals (Staley & Luciano, 1984). Nurse staffing allocation systems are frequently associated with patient classification systems (PCS). PCSs are scientifically developed methods which classify and quantify the amount and level of nursing care required by patients during their hospitalizations.

Methods of determining the amount and intensity of nursing care provided to patients were developed and implemented as early as the 1960s (Reschak, Biordi, Holm, & Santucci, 1987). The two most frequently used

methods are relative intensity measures (RIMs) and patient classification systems. The RIMs method quantifies the time spent in providing patient care by DRG and assigns relative values to the time spent in determining costs. The relative values assigned to the time reflect a relative intensity-of-illness trajectory for each patient, which correlated with nursing care delivered (Caterinicchio, 1983). The PCS method utilizes critical indicators to classify patients into categories which represent nursing workloads (requirements). Some PCSs are used to relate the workload to staffing. Critical indicators are based on the patient's documented nursing and medical orders (Giovannetti, 1979).

Well described in the literature, most PCSs were shown to be valid and reliable within the settings in which they are employed (Meyer, 1978; Nauert, Leach, & Watson, 1988). Using a PCS as the standard for allocating nursing labor enables nurse executives to determine the relative amount of nursing time each patient requires on a daily basis. Once the patients are classified, the total nursing care time required is tallied for each unit. These totals are then used to plan staffing for the next 24 hour period. The historical data may be used to analyze trends and to

plan for future peaks and lulls in patient care requirements, both at the unit and facility level.

Once a proven and reliable resource allocation system, or PCS, has been in use in the facility long enough to develop and document reliability of the instrument, scientific study of the relationships between nursing care requirements and DRGs can begin. The second step in determining the cost of providing nursing care is to associate levels of nursing care with specific groups of patients.

The Workload management System for Nursing (WMSN) combines PCS and nurse staffing methodology in one useful management tool. It is the primary system used to quantify nursing workload in the Department of Defense (DoD) medical treatment facilities (MTFs). The WMSN resulted from the combined research efforts of the U.S. Army and U.S. Navy to objectively quantify nursing workload, based on patient care needs (critical indicators), and determine the appropriate levels of nursing staff required to provide quality nursing care (Lieutenant Colonel D. Norton, USA, personal communication, November 10, 1990).

Reliability and validity for the WMSN was initially demonstrated in Army and Navy MTFs in 1984. Further refinements were completed and a revised

version of the system was implemented in Army and Navy facilities in 1985. In 1988, the Office of the Assistant Secretary of Defense (Health Affairs) adopted the WMSN as the basis for the Joint Service Inpatient Nursing Standards. Representatives of all services coordinated developments in automation, research, management, and education for the WMSN. The Air Force began using the WMSN in 1989 (Birch & Davis, 1990).

Several studies have been conducted to identify potential relationships between scientifically applied nursing resource allocation systems and DRGs (Kyle & Kinder, 1990; Bost & Lawler, 1989; O'Connor, 1988; Reschak, Biordi, Holm, & Santucci, 1987; Hancock & Fuhs, 1984; Staley & Luciano, 1984). Kyle and Kinder (1990) used a patient classification system (PCS) to project nursing resource requirements (staffing) to meet standards of care for patients assigned to a specific DRG. The results demonstrated that nursing is only part of the DRG costs and that it is the most unpredictable. This study also showed that it was possible to measure the cost of direct nursing care consumed by patients in a specific DRG.

Bost and Lawler (1989) used a Nursing Intensity Index (NII) as the basis for determining the amount and intensity of nursing care required in a North Carolina

hospital. The NII is thought to be a better PCS because it uses (a) the patient as the unit of analysis (rather than the nursing interventions), (b) the nursing process as its fundamental framework, and (c) conceptual nursing frameworks. This study demonstrated statistically significant relationships between NII, LOS, and charges. It also revealed that some DRGs did not reflect homogeneity with respect to nursing intensity levels. This last finding is consistent with assertions that the PPS does not account for patient acuity ranges within individual DRGs.

In an effort determine the feasibility of using DRGs to predict nursing resources for military, Congress directed the Department of Defense to conduct a study of the WMSN patient classification system in use in military MTFs. The study (Birch & Davis, 1990) assessed existing relationships between the WMSN and DRGs with the WMSN data as the dependent variable. The population consisted of 4,291 patients distributed into 114 DRGs at 24 U.S. Army. Ninety-five percent of the cases were from eight of the facilities represented. The findings revealed that nursing care hours varied considerably among the DRGs, but were relatively clustered within each one. One exception was noted: a small group of DRGs appeared to have mutually exclusive

groups of patients (i.e., a bimodal distribution). Birch & Davis concluded that the model tested produced realistic estimates of nursing care hours. However, DRGs with outliers should be individually assessed for determination of the most precise method of interpretation (Birch & Davis, 1990).

Purpose Statement

The purpose of the study is to identify the nursing care requirements for DRGs 138 and 139 at Wilford Hall USAF Medical Center and analyze the relationship(s) of those requirements to length of stay and acuity levels. The results of the analysis will be compared to the results of the Birch and Davis study which examined similar relationships identified within the U.S. Army medical treatment facilities.

Methods and Procedures

Definitions

Comorbidity. A pre-existing condition that will, because of its presence with a specific diagnosis, cause an increase in length of stay by at least one day in approximately 75 percent of the cases. (Lorenz & Jones, 1989)

Complication. A condition that arises during the hospital stay that prolongs the length of stay at least one day in approximately 75 percent of the cases. (Lorenz & Jones, 1989)

Diagnosis-Related Group (DRG). A system of classifying diseases and disorders of the body into major diagnostic categories, (e.g., diseases and disorders of the respiratory system). Each category contains a surgical and a medical division. The primary determinant of the DRG is the principal diagnosis, but proper assignment of the DRG also includes consideration of all diagnoses, procedures, conditions, complications, co-morbidities, and signs and symptoms which existed during the hospitalization. (Lorenz & Jones, 1989)

DRG 138. Cardiac arrhythmias and conduction disorders. Age over 69 years and/or the presence of complications or comorbidities (Lorenz & Jones, 1989).

DRG 139. Cardiac arrhythmias and conduction disorders. Age under 70 years and no complications or comorbidities (Lorenz & Jones, 1989).

Length of Stay (LOS). The length of the hospitalization, from the day of admission to the day of discharge. Some facilities count the day of admission but do not count the day of discharge unless

it is past a certain time of the day when the patient departs. Other facilities do not count the day of admission but count the day of discharge.

Patient Classification System (PCS). Patient classification is generally defined as the grouping of patients according to some observable or inferred characteristics (e.g., blood type, medical specialty, and diagnosis). In nursing, a patient classification system is a method which identifies and groups patients into care groups or categories, and to quantifies the categories as a measure of the nursing effort required. The basis of the PCS is that variations in nursing time are directly related to patient care needs (Giovannetti, 1979).

Total Nursing Care Hours (TNCH). TNCH reflects the total hours of nursing care (direct and indirect) for the entire patient stay and is determined by adding the daily nursing care hours for each day of the patient's stay.

Study Setting

Located in Southwest San Antonio, Texas, Wilford Hall USAF Medical Center (WHMC) is the largest hospital in the U.S. Air Force. WHMC is a tertiary care, referral center for 125 Air Force and other within the

military healthcare system. Locally, it serves a population of 70,000, a portion of which may also seek care from Brooke Army Medical Center which is located in Northeast San Antonio. These two facilities also serve a portion of the local civilian population for provision of emergency care.

WHMC is staffed for approximately 600 beds. Its daily census averages approximately 500. The facility has 32 nursing units, 10 of which provide intensive care for acutely ill or injured patients.

In fiscal year (FY) 1989, WHMC discharged 137 patients whose cases were classified as DRG 138 and 144 patients whose cases were classified as DRG 139. According to Retrospective Case Mix Analysis System (RCMAS) data for WHMC discharges during FY 1989, these two DRGs ranked as number 41 and number 37, respectively. Total discharges for the facility were reported as 26,025. These two DRGs accounted for only one percent of the facility discharges.

Instrument

The WMSN has been in use in WHMC for approximately one year. The implementation of the PCS was carried out in an organized and methodical manner. Appropriate operating instructions were developed prior to

implementation and distributed to all necessary areas of the facility (Major C. Bowe, USAF, personal communication, April 10, 1990).

General guidelines and usage instructions for the WMSN are contained in the Nursing Service Operating Instruction (NSOI) 168-1: Workload Management System for Nurses (Division of Nursing, 1990). Computation of the acuity level is accomplished daily, between 1200 and 1400 hours, using specially prepared worksheets. The final computation is then transferred to the nursing service information system for use at management level. The acuity level is also to be recorded in the medical record on the vital signs record. The NSOI states that the worksheets are not a part of the completed medical record after discharge but does not specify what is to be done with them (worksheets) once they are completed. Discussions with unit managers reveal that they are routinely kept on the unit from which the patient is discharged.

Population

The population studied includes all patients discharged from WHMC 1 January 1991 through 30 June 1991. The list of patients who would be included was developed from the Automated Quality of Care Evaluation

Support System (AQCESS) based upon the primary diagnoses entered into the system. After the full medical record review was completed, Primary diagnoses (Appendix A) included in the study are specified in The International Classification of Diseases, 9th revision, Clinical Modification (ICD-9-CM Jones, Uttenreither, Meisch, & Arron (Eds), 1980).

Study Design

This study is designed primarily as a replication of the Birch and Davis study in an effort to determine if WHMC patients who fall into DRGs 138 and 139 exhibit similar relational characteristics. Data gathered will be the same in this study as the Birch and Davis study but analysis will be completed at the diagnosis level as well as the aggregate DRG level.

The first phase of the study is determining cases to be included in the study. Preliminary data collection from AQCESS reveals 73 patients with the specified primary diagnoses were discharged between 1 January 1991 and 31 Mar 1991. Using extrapolation techniques, the potential population for the five month, 100 percent review study is approximately 120 patients. Each case will be processed through a DRG grouper and eliminated if not found to be classified as

either DRG 138 or 139. Data will be gathered for each case and cases with the same primary diagnosis will be grouped together.

The second phase of the study is the statistical evaluation of the data collected. Cases will be aggregated by primary diagnosis for initial analysis and then grouped according to DRG for final analysis. Using the primary diagnosis as the aggregate may reveal some differentiating characteristics which could support the theory that some DRGs do not represent homogenous groupings and that further refinement of the DRGs is necessary.

Data Collection

Nursing care requirements will be associated with DRG 138 and 139 through collection of diagnosis specific data and patient specific data.

Diagnosis specific data. A special report from AQCESS provided a list of cases with the following data about each: (a) the primary discharge diagnosis (by ICD-9-CM code), (b) the register number, (c) the patient's name, (d) the patient's age, (e) the admission date, (f) the discharge date, and (g) the length of stay.

Patient specific data. Patient specific data to be retrieved from the medical record includes (a) the register number, (b) the name, (c) the primary diagnosis, and (d) the assigned acuity level for each day of the hospital stay as computed according to the WMSN guidelines (Appendix B).

Verification of the location of the acuity level reveals that nursing personnel do not record the acuity level in the medical record in the prescribed manner (NSOI 168-1). Therefore, since the nursing service information system and AQCESS are not compatible programs, it is necessary to research the worksheets retained on the nursing units after the patient is discharged. Because the computed acuity level is not documented in the medical record, the patient's name and register number are required to ensure proper association of the medical record and the worksheets from which acuity data will be retrieved. Appropriate precautions will be taken to ensure the privacy of each patient is maintained. Data will be organized according to register number only to provide an appropriate audit trail; all other identification data will be destroyed after the study is completed.

Statistical Analysis

Statistical analysis will include determination of the mean, median, standard deviation, and coefficient of variation for each of the diagnoses within the two DRGs being studied. Cases will then be aggregated under the appropriate DRGs and the analysis will be reaccomplished. Discussion will include the effects of inclusion or exclusion of outliers within the case population for each diagnosis and each DRG.

Expected Findings

Because each record will be subjected to the DRG group process, inclusion of cases which are not true DRG 138s or 139s should be avoided. Therefore, it is not expected to obtain similar results as the Birch and Davis study. Analysis at the diagnosis level should reveal any variances in the nursing care hour requirements. If this study reveals results similar to that of the Birch and Davis study two assumptions should be possible: (a) the cases in both studies were correctly grouped, and (b) variances in nursing care hour requirements do exist within these two DRGs.

Utility of Results

The ability to follow trends in patient care needs and nursing personnel requirements for each DRG will allow healthcare executives to realistically assess the current facility case mix and determine future capabilities.

Completion of the study will also delineate problem areas with future utilization of data computed at the patient level which is poorly organized and stored. The present information management systems do not allow for easy retrieval or manipulation of data.

Close examination of the nursing care requirements at the diagnosis level will reveal problem areas within specific DRGs regarding computation of resource use and reimbursement.

Consistent correlations between nursing resource consumption and DRGs will give nursing and financial managers baseline data with which to begin identification of the costs of providing nursing care. It will also allow development of methods to assess proper staffing mix to meet patient needs.

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Appendix A

DRG 138 and 139 Diagnosis List

DRG 138: Cardiac Arrhythmia and Conduction Disorders. Age over 69 years and/or the presence of complications or comorbidities.

426 Conduction Disorders

426.0 Atrioventricular block, complete

426.1 Atrioventricular block, other and unspecified

426.10 Atrioventricular block, specified

426.11 First degree atrioventricular block

426.12 Mobitz (type) II atrioventricular block

426.13 Other second degree atrioventricular block

426.2 Left bundle branch hemiblock

426.3 Other left bundle branch block

426.4 Right bundle branch block

426.5 Bundle branch block, other and unspecified

426.50 Bundle branch block, unspecified

426.51 Right bundle branch block and left posterior fascicular block

426.52 Right bundle branch block and left anterior fascicular block

426.53 Other bilateral bundle branch block

- 426.54 Trifascicular block
- 426.6 Other heart block
- 426.7 Anomalous atrioventricular excitation
- 426.8 Other specified conduction disorders
 - 426.81 Lown-Ganong-Levine syndrome
 - 426.89 Other
- 526.9 Conduction disorder, unspecified
- 427 Cardiac dysrhythmias
 - 427.0 Paroxysmal supraventricular tachycardia
 - 427.1 Paroxysmal ventricular tachycardia
 - 427.2 Paroxysmal tachycardia, unspecified
 - 427.3 Atrial fibrillation and flutter
 - 427.31 Atrial fibrillation
 - 427.32 Atrial flutter
 - 427.4 Ventricular fibrillation and flutter
 - 427.41 Ventricular fibrillation
 - 427.42 Ventricular flutter
 - 427.5 Cardiac arrest
 - 427.6 Premature beats
 - 427.60 Premature beats, unspecified
 - 427.61 Supraventricular premature beats
 - 427.69 Other
 - 427.8 Other specified cardiac dysrhythmias
 - 427.81 Sinoatrial node dysfunction
 - 427.89 Other

- 427.9 Cardiac dysrhythmia, unspecified
- 428 Heart failure
 - 428.0 Congestive heart failure
 - 428.1 Left heart failure
- 746 Other congenital anomalies of the heart
 - 746.86 Congenital heart block
- 785 Symptoms involving cardiovascular system
 - 785.0 Tachycardia, unspecified
 - 785.1 Palpitations
- 996 Complications peculiar to certain specified procedures
 - 996.0 Mechanical complications of cardiac device, implant, and graft
 - 996.01 Due to cardiac pacemaker (electrode)

DRG 139: Cardiac Arrhythmia and Conduction Disorders. Age less than 70, without complications or comorbidities.

DRG 139 uses the same diagnoses and ICD-9-CM codes as those listed for DRG 138.

Note. From The international classification of diseases, 9th revision, clinical modification (ICD-9-CM) (2nd ed) by Jones, M. K.; Uttenreither, M.; Meisch, M.; & Arron, W.S. (Eds), 1980 (with all current errata as of October, 1990), Washington, DC: St. Anthony Hospital Publications, Inc.

Appendix B

Computation of Total Nursing Care Hours

Total nursing care hours are derived directly from summing daily patient acuity. To determine nursing care hours for a particular patient day, a patient category is selected by matching the daily points (calculated by completing the acuity worksheet) with the appropriate point range given below.

<u>Category</u>	<u>Point Range</u>
I	1 to 12
II	13 to 31
III	32 to 63
IV	64 to 95
V	96 to 145
VI	146 to 262

The category is also used to determine the direct care time, expressed in hours.

<u>Category</u>	<u>Direct Care Hours Per Day</u>
I	0.88
II	2.75
III	6.00
IV	10.00
V	15.13
VI	25.50

The category is then matched with one of six ward types to determine the indirect care factor.

Nursing Labor Costs

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<u>Unit Type</u>	<u>Indirect Care Factor</u>
Medical/Surgical	1.761
ICU/CCU/NICU	1.662
Obstetrics	1.778
Psychiatric	1.689
Newborn	1.630
Pediatrics	1.727

The direct care hours and indirect care factors are multiplied together to determine the nursing care hours required to satisfy a particular patient's needs for that patient day.

Note. From Reference manual: Workload management system for nursing by the Joint Manpower Office, Office of the Assistant Secretary of Defense (Health Affairs) 1989, Rockville, MD: U.S. Government Printing Office.