A COMPARISON OF TWO PATIENT CLASSIFICATION SYSTEMS IN DETERMINING NURSING CARE HOUR REQUIREMENTS

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by

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This study was conducted to determine if a difference between nursing care hour requirements based on the current patient classification system and nursing care hour requirements using the Workload Management System (WMS) existed. The nursing care hours were recorded using each of the two systems on separate halves of one ward. The two systems were compared. The two management systems were not equal in their predictions of nursing hour requirements. The WMS consistently predicted higher requirements. The author compared the advantages and disadvantages of the two systems in implementation.

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CHAPTER I

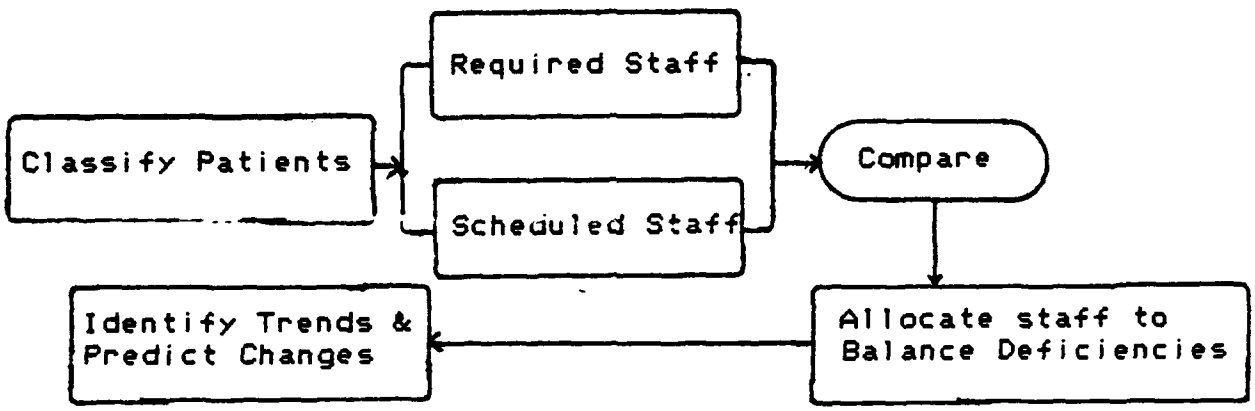
INTRODUCTION

In the past, staffing requirements were traditionally based on patient census, regardless of individual needs. However, the diversity of needs among patients frequently resulted in major fluctuations in nursing care requirements from day to day and from shift to shift, totally independent of the actual number of patients on the ward. In addition, both the nature and volume of nursing care have been altered by increasingly complex technology, specialization, and emphasis on health teaching. The resulting understaffing or overstaffing is costly, frustrating to the staff, and detrimental to the provision of patient care.

Over the past twenty years, various patient classification systems have been developed which attempt to identify these fluctuating care demands and provide the appropriate mix of nursing skills. In 1979, an estimated 120 different forms were in use.[1] Since 1980, interest in this area has been promoted by the Joint Commission on the Accreditation of Hospitals (JCAH). Nursing Standard III of the JCAH mandates that the quality and expertise of nurse staffing be based on identified

requirements for nursing care.[2] By classifying patients into categories according to their nursing care requirements, a patient classification system used in conjunction with a nurse staffing methodology provides a more objective and rational approach to determining the assignment of nursing resources and projecting future staffing patterns.

As an adjunct to the classification system,some form of nurse staffing methodology is essential to determine the actual number and mix of nursing personnel required to achieve this nursing care according to standards set by the institution. The flowchart below illustrates the dynamics of such a system.



SOURCE: Adapted from the Workload Management System Educational Workbook, United States Air Force Medical Service, p. 3.

Figure 1: Dynamics of a Patient Classification System

Patients are first classified into categories of care based on the hours of nursing care required. The recommended number and mix of personnel are then calculated based on the number of

patients in each category and changes are made in staffing as necessary to balance the variations. Over time, the system serves to validate the need for new and existing positions.[3]

Definition of terms used throughout the study are found at Appendix A..

PROBLEM DEVELOPMENT

At the present time, the United States Air Force (USAF) does not have a standardized system of patient classification in its medical treatment facilities. Desire for a more precise measurement of patient needs and subsequent required nursing personnel led the USAF to undertake a major nurse staffing study in 1981. After a review of various systems, one in use at Wilford Hall Medical Center was selected for testing. This acuity based study was initiated at selected Air Force medical treatment facilities to determine whether intensity of care or average daily patient load (ADPL) was a better predictor of manpower requirements. However, major weaknesses in the study rendered the test inconclusive.[4]

Major efforts had also been expended by both the US Army and the US Navy. In 1981 a comparative study of different patient classification systems being used at Naval hospitals was completed. As a result of this analysis, a determination was made to select and refine one standardized patient classification system for use in all Navy inpatient facilities. The system selected became known as the Workload Management

System (WMS). This system enabled patients to be categorized according to required nursing care and also provided guidelines for effective allocation and utilization of nursing resources. Numerical weights assigned to activities of nursing care were based on a four-year time-motion study just completed by the US Army. Nine factors, called critical indicators, were used to designate those activities with the greatest impact on nursing care time. Without any significant test period, the Navy implemented the WMS at all 34 of its facilities.

The Army became interested in the WMS after finding that their patient classification system was excessively time consuming. Named after the principal investigator in the four-year study, the Army's Sherrod System was very comprehensive and averaged approximately twenty minutes per patient, making it essentially unusable in practice. The Army selected five medical facilities as test sites to evaluate the appropriateness of WMS for possible implementation throughout the Army Medical Department. The system was approved in 1984 and is currently being implemented throughout Army hospitals at this time. [5]

In 1983, an evaluation of the Air Force staffing study by JWK International Corporation confirmed the finding that the test as devised was inconclusive. The firm recommended either redesign of the study or selection of another patient classification system for testing and use in the Air Force Medical Service.[6] A literature review was conducted. Of those

classification systems currently available, the WMS, based on the original work of Sherrod, et al, seemed the most appropriate option for evaluation. A new study was begun in January 1985 at six test sites to evaluate the reliability, validity, and utility of the WMS as a management tool in Air Force hospitals. In addition, the study planned to assess comparability of WMS patient classification with patient categorization into Diagnosis-Related Groups (DRGs). Results of this study are expected in July 1985.[7]

On a more limited scale, attempts were made to compare the patient classification system currently in use at David Grant USAF Medical Center (DGMC) with the WMS developed by the US Navy to determine if there was a difference in care hour requirements predicted by the two systems. The system in use at DGMC can be described as a prototype system. Patients are assessed daily and assigned to categories based on a composite description of care needs. While percentages of professional and non-professional care for a 24-hour period are used in tabulation of care hours, the system does not contain a staffing methodology to determine recommended number or mix of personnel. A copy of the Department of Nursing Operating Instruction can be found at Appendix B.

The WMS instrument represents a factor evaluative system in which nursing tasks are weighted as to their relative time consumption. These weights are then summed for each patient in order to determine a category. The WMS does employ a personnel

requirements chart, giving number and mix of personnel by shift. Copies of the worksheet used to classify patients, the nursing care hours chart, and the personnel requirements chart are located at Appendix c.

Categories at DGMC range from Category 0 (Intensive Care) to Category 5 (No Care). The WMS assigns patients to one of six categories ranging from Category 1 (Self Care) to Category 6 (Critical Care). Under the DGMC system, separate criteria have been established for each of the following units: surgical, medical, pediatric, gynecology, mental health, ICU, nursery/newborn, and antepartum/postpartum care. With the exception of mental health and obstetrics, the WMS attempts to integrate all these separate classifications into one comprehensive nursing care planning instrument which can be applied to all nursing care delivery systems on general or surgical units.[8]

STATEMENT OF RESEARCH

Was there a difference between nursing care hour requirements based on the current patient classification system and nursing care hour requirements utilizing the Workload Management System?

OBJECTIVES

1. Review of literature to identify trends in patient classification systems.

2. Establish information base on Workload Management System efforts of the US Navy, US Army, and US Air Force.

3. Develop patient classification forms to be used for collection and summarization of data.

4. Train staff selected to participate in the study.

5. Implement WMS on selected ward in conjunction with present system.

6. Administer questionnaire to raters to evaluate their perceptions of staffing adequacy based upon allocation of nursing manpower as defined by the current patient classification system and to evaluate user acceptability of the WMS.

CRITERIA

Hypothesis testing (Student's t distribution, paired data test) at the 5% level of significance was used to determine if there was a difference in nursing care hour requirements between the two systems. A reliability coefficient of .80, using Pearson's product-moment r, between researcher and staff was the goal in categorizing patients.

ASSUMPTIONS

1. Period selected for analysis was representative of nursing workload requirements for the facility.

2. Measure of task times to provide patient care reflected in the WMS was representative of task times in Air Force

hospitals.

LIMITATIONS

1. Air Force Manpower Standard 5206 (Medical/Surgical Nursing Units) does not establish minimum manpower requirements and recommended shift profile for facilities with over two medical/surgical wards.

2. Analysis was limited to one medical ward at David Grant Medical Center for a period of twenty-two days.

3. Because charts have not yet been developed which adequately provide for manning for twelve-hour shifts, data collection was confined to eight-hour shifts.[9]

4. Patient classification systems under study do not consider individual experience levels.

5. The use of one week for a learning curve may not accurately account for time taken by nurses to gain necessary experience with the WMS.

LITERATURE REVIEW

A review of the literature revealed patient classification systems which varied from the simple to the highly complex. The primary objective of all the systems was to match the needs of the patients with existing nursing resources. Two major approaches were used to accomplish this purpose:

(1) the first approach (prototype system) focused on patient needs by assigning each patient to one of

several categories based on an assessment of acuity and the patient's needs for nursing time, and assigning average amounts of direct care to each class rather than to each individual. Prototype systems were generally descriptive in their categorizations.

(2) the second approach (factor evaluative system) focused on nursing tasks and established standard times for direct nursing procedures, constructed a separate list of required procedures for each patient, and then summed these procedures to designate the category to which the patient was assigned.[10]

In his review of nurse staffing studies, Robert Vaughan identified six major shortcomings which existed in many of the systems:

(1) the studies generated far more data than were needed for practical application;

(2) the scheme for classifying patients varied among hospitals;

(3) most classification schemes left gray areas between classes within a hospital;

(4) the workload analysis systems were generally too tailored to one institution;

(5) most systems could not be easily updated when changes occurred in methods, physical unit layouts,

equipment, or redistribution of certain activities to other departments;

(6) most systems had no means of verifying that the operational classifying of patients was being done accurately.[11]

In addition, the majority of the systems used criteria that assessed physical care activities only, with the rationale that psychosocial requirements such as supportive/teaching activities were performed simultaneously with physical care and should be omitted.[12]

RESEARCH METHODOLOGY

After consulting with the Chief Nurse, ward C-2 was selected for the study. This is a 42-bed medical ward, with a combination of private and semi-private rooms and three open bays with eight beds each. Those patients with greater nursing care demands are assigned to the rooms, while less seriously ill patients are admitted to the bays. A medicine ward was chosen over a surgical ward because of a desire for a more stable patient population.

A total of seven training sessions were conducted to orient all selected nurses to the WMS and DGMC systems. In addition, the Chief Nurse, Assistant Chief Nurse, nursing education coordinators, evening/night supervisors, quality assurance nurse, and medical-surgical coordinator either attended the workshops or received briefings to gain a better

understanding of the new system and the research effort. It was anticipated that the evening/night supervisors would be the sounding boards for frustration which the nurses might feel due to the increased demands of the study, and this was discussed with each of them.

Classification of patients utilizing both the DGMC system and the WMS was begun the week following completion of training. Worksheets collected during the first week were analyzed separately for problems, questions, and unusual situations not reflected on the worksheet. These were discussed with the individuals as needed. Two of the nurses working were to be transferred at the end of the practice week and did not participate in the classification process. This prevented compilation and summarization of the data in the same manner as it was compiled later during the study month.

Data collection was begun the first Monday following the one week learning period and continued for four weeks, with patient classification occurring on each eight-hour shift. Worksheets were tabulated and daily summary sheets were prepared to illustrate care hours available and care hours required for each system. A sample of the daily summary sheet is contained at Appendix D.

Interrater reliability testing was conducted weekly to measure agreement among nurses and researcher in factoring patients. With a minimum of two nurses per shift, the ward was divided in half for assignment purposes. To ensure that

patients on both sides of the ward were compared and both nurses were tested, stratified random sampling procedures were performed, with at least 10% of the patients selected from each area. Patients were categorized by researcher and nurses. Percentage of agreement was calculated for both systems. Pearson's product-moment r was used to determine the strength of the relationship between the two systems. In the event that a reliability coefficient of less than .80 was obtained, results were compared and feedback provided to the nurse involved.

At the end of the period, a questionnaire was administered to the nurses to evaluate their perceptions of staffing adequacy based on the present allocation of nursing manpower and acceptability of the WMS. The questionnaire was extracted from those developed by the US Navy to measure validity and adapted for purposes of this study.

FOOTNOTES

[1]Phyllis Giovannetti, "Understanding Patient Classification Systems," Journal of Nursing Administration 9 (February 1979): 5.

[2]Accreditation Manual for Hospitals-1985, p. 97.

[3]Ruth R. Alward, "Patient Classification Systems: The Ideal vs. Reality," Journal of Nursing Administration 13 (February 1983): 14.

[4]-----, Draft Report, JWK International Corporation, Annandale, VA, n.d., p. 40-42.

[5]Phone conversation with Patricia Williams, Consultant for Nursing Affairs, Brooks Air Force Base, Texas, 19 March 1985.

[6]Draft Report, p. 42.

[7]Patricia Williams, Joanne Black, and Priscilla McKay, "Evaluation of the U.S. Army and Navy Workload Management System: Psychometric Characteristics and Staffing Allocations in the Air Force Medical Service," Research Proposal, Clinical Consultants Division, AFMS Center, Brooks AFB, Texas, 1983, p. 15.

[8]Department of the Air Force, David Grant USAF Medical Center (MAC), SGHN Operating Instructions 168-10, PATIENT CLASSIFICATION AND STAFFING PATTERNS, (Travis Air Force Base, CA: 16 January 1984), pp. 1-18; United States Air Force Medical Service, Workload Management System Educational Workbook, (Brooks Air Force Base, TX, n.d.), pp. 1-6.

[9]Williams, phone conversation, 19 March 1985.

[10]Faye G. Abdellah and Eugene Levine, "Better Patient Care Through Nursing Research," International Journal of Nursing Studies 2 (April 1965): 4.

[11]Robert G. Vaughan and Vernon MacLeod, "Nurse Staffing Studies: No Need to Reinvent the Wheel," Journal of Nursing Administration 10 (March 1980): 10.

[12]Jeanine A. Auger and Vivien Dee, "A Patient Classification System Based on the Behavioral System Model of Nursing, Part I," Journal of Nursing Administration 13 (April 1983): 38.

CHAPTER II

DISCUSSION

Staffing Challenges

Although workload for the study month was average with 153 patients either admitted to or already on the ward at the beginning of the month, it was by no means a stable month in terms of staffing. Thirteen nurses were authorized for ward C-2; however, the study was conducted with as few as nine who had completed orientation and without benefit of a ward clerk. This meant that the staff assumed additional administrative responsibilities usually delegated to the ward clerk in addition to their normal workload. Nurses and technicians in orientation were excluded due to varying skill and experience levels. These individuals functioned as extensions of the preceptors. One civilian nurse unexpectedly resigned immediately prior to the beginning of the study start date. Despite this loss, two military nurses scheduled for moves were transferred to other wards at the beginning of the study, leaving the ward very short staffed. Staffing was again affected in the middle of the month when one of the nurses broke her wrist and was placed on convalescent leave for the

remainder of the month. A "quick fix" was achieved for two days immediately following the accident by using float nurses from other wards. One of the nurses who had earlier transferred out was then pulled back to the ward.

Due to short staffing, twelve-hour shifts were worked on Saturdays and Sundays throughout the month. Finally, twelve-hour shifts were worked on the evening and night of 22 April because of illness of one of the staff members.

Practice Week

Initially, completion of the worksheet was tedious and slow. Almost one hour was required to classify 11 to 20 patients. Omission of critical indicators, incorrect credit marked for direct care performed, and classification for eight hours instead of twenty-four were the most frequent problems encountered during the practice week. These areas of concern were followed through individual discussions and comparisons of chart documentation. The charge nurse, medical-surgical coordinator, and evening-night supervisors also provided assistance and clarification to the staff.

Analysis of Test Data

Data collected during the month of April was analyzed by shift and by system. Nursing personnel assigned, nursing care hours available versus those required by each system, and average care hours for each 24-hour period are summarized for

review at Appendix E.

Comparison of the systems showed significant fluctuations in care hour requirements among the shifts. Table One gives the range of care hours among the three shifts for each day in the test period.

TABLE ONE

FLUCTUATIONS IN NURSING CARE HOURS AMONG SHIFTS

IN 24-HOUR PERIOD

DATE	FLUCTUATION= HIGHEST-LOWEST	
	WMS	DGMC
1 APR	7	51.5
2 APR	30	29
3 APR	17	16
4 APR	26	43
5 APR	7	15.5
8 APR	46	26.9
9 APR	21	42.5
10 APR	38	29.5
11 APR	20	26
12 APR	5	61.5
15 APR	*	*
16 APR	*	*
17 APR	17	57.9
18 APR	27	45.4
19 APR	47	93
22 APR	*	*
23 APR	20	84.5
24 APR	15	90
25 APR	23	74
26 APR	9	30.7
29 APR	7	61.5
30 APR	23	68

*Data incomplete

Fluctuations among the three shifts using the WMS worksheet ranged from a low of five hours (12 April) to a high of 47 hours (19 April), while variations among shifts using the DGMC system were much greater, from 15.5 hours on 5 April to as much as 93.5 hours on 19 April. Patient census or changing medical conditions alone does not fully explain these differences among shifts. Although crisis conditions did occur, dictating changes to doctor's orders and care plans, several of the patients on C-2 were long-term, chronic care or terminal patients and required only minor adjustments in response to therapy. Categories of care assigned to four such patients, who were on the ward for ten or more days, are shown at Appendix F for illustration. Rather, a combination of factors was involved:

(1) Subjectivity of the individual rater. As stated earlier, the DGMC system is a prototype system and is by its nature open to more subjective differences. The WMS, on the other hand, is a factor evaluative instrument, which is more objective in form. [1]

(2) Decreased nursing care requirements when patients were off the ward for extended periods. Several patients out on pass on any one shift significantly affected predicted care hours, due to the fact that these predictions were for a 24-hour period. This would not be as evident if patients were

classified consistently on one shift only.

(3) Number of admissions, transfers, or discharges on each shift. Although uncommon, as many as seven patients were admitted or discharged in a single 24-hour period, which also affected care hour requirements.

(4) Questionable values assigned to critical indicators of some patients under the WMS system. While numerical weights were to be increased in those instances when additional personnel assisted or when tasks were performed with increased frequency for a patient, there were instances when the rater inserted a value which appeared excessive. Verification of its validity was obtained when this occurred.

(5) Omission of critical indicators during one shift which were marked on both previous and later worksheets. This was attributed to unfamiliarity with the WMS instrument and indicated a need for further training and experience in its use.

In comparing DGMC to WMS by shift, hours required on days, with the exception of the last two days of the month, were consistently higher using Navy classifications (Figure 2). Without exception, WMS requirements on evenings were higher than DGMC requirements (Figure 3). However, this was not the case on night shift, where neither system consistently

Figure 2

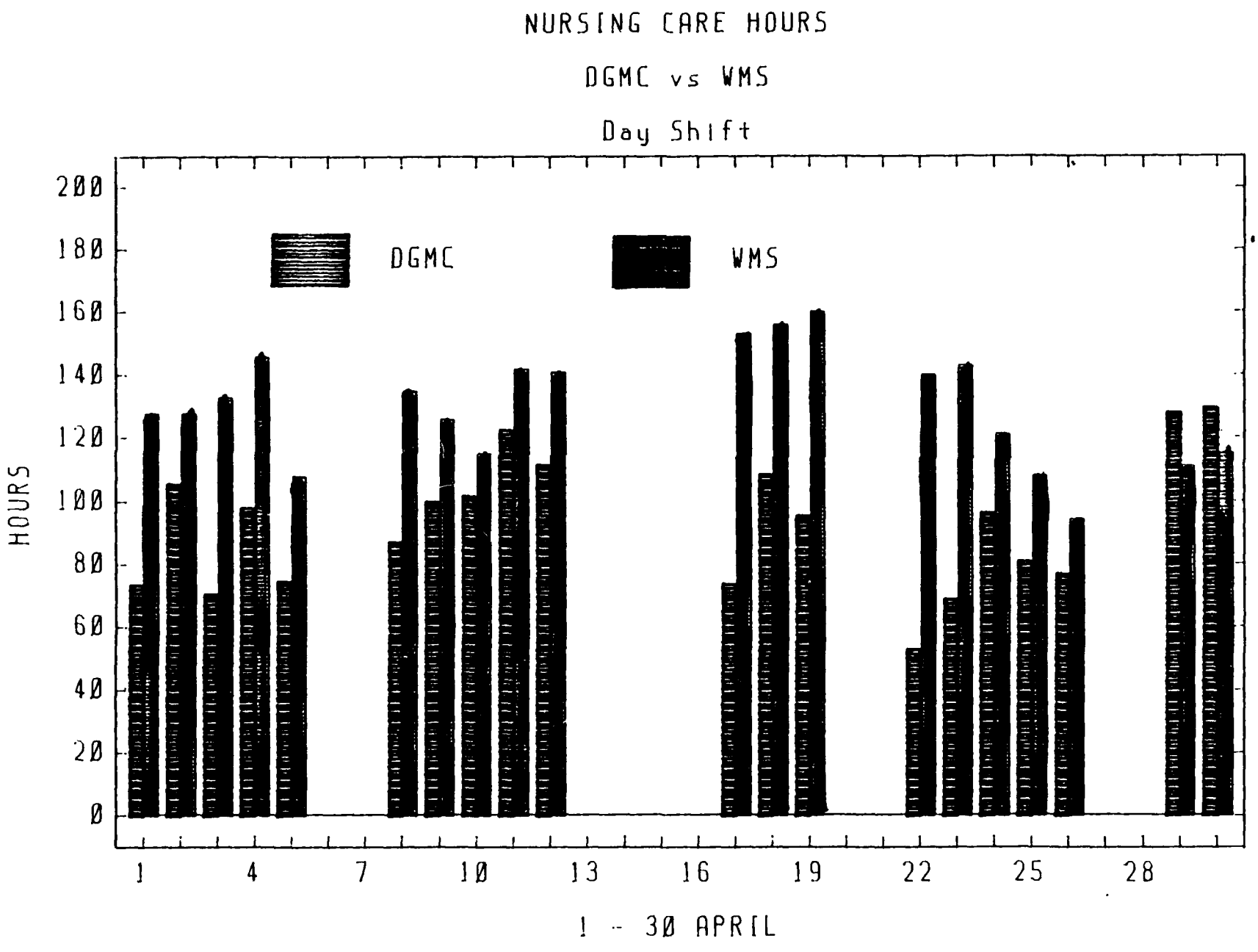
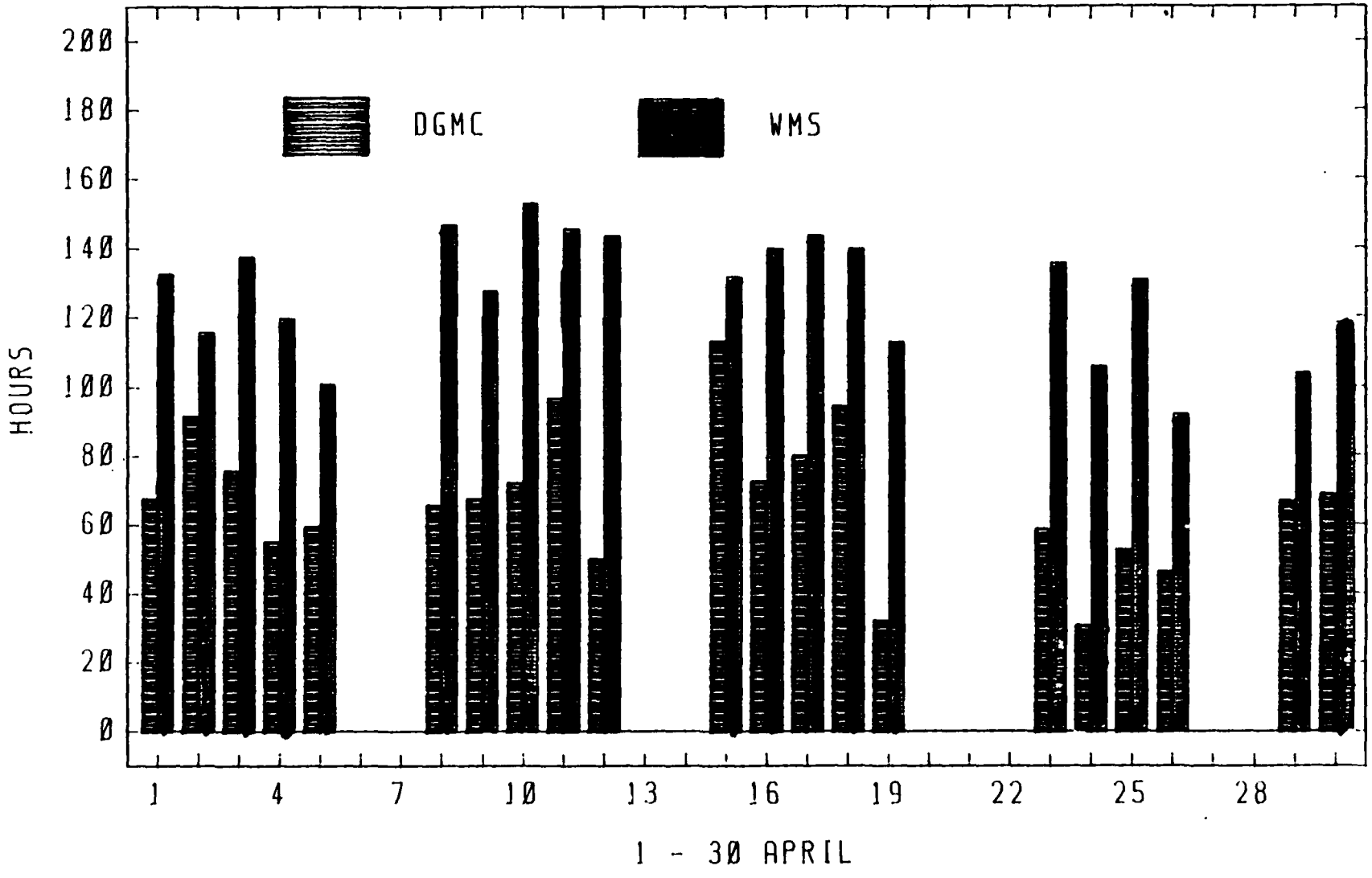

NURSING CARE HOURS
DGMC vs WMS
Day Shift
DGMC
WMS
HOURS
200
180
160
140
120
100
80
60
40
20
0
1
4
7
10
13
16
19
22
25
28
1 - 30 APRIL
GAPS INDICATE WEEKENDS OR NO DATA AVAILABLE

Figure 3

NURSING CARE HOURS

DGMC vs WMS

Evening Shift



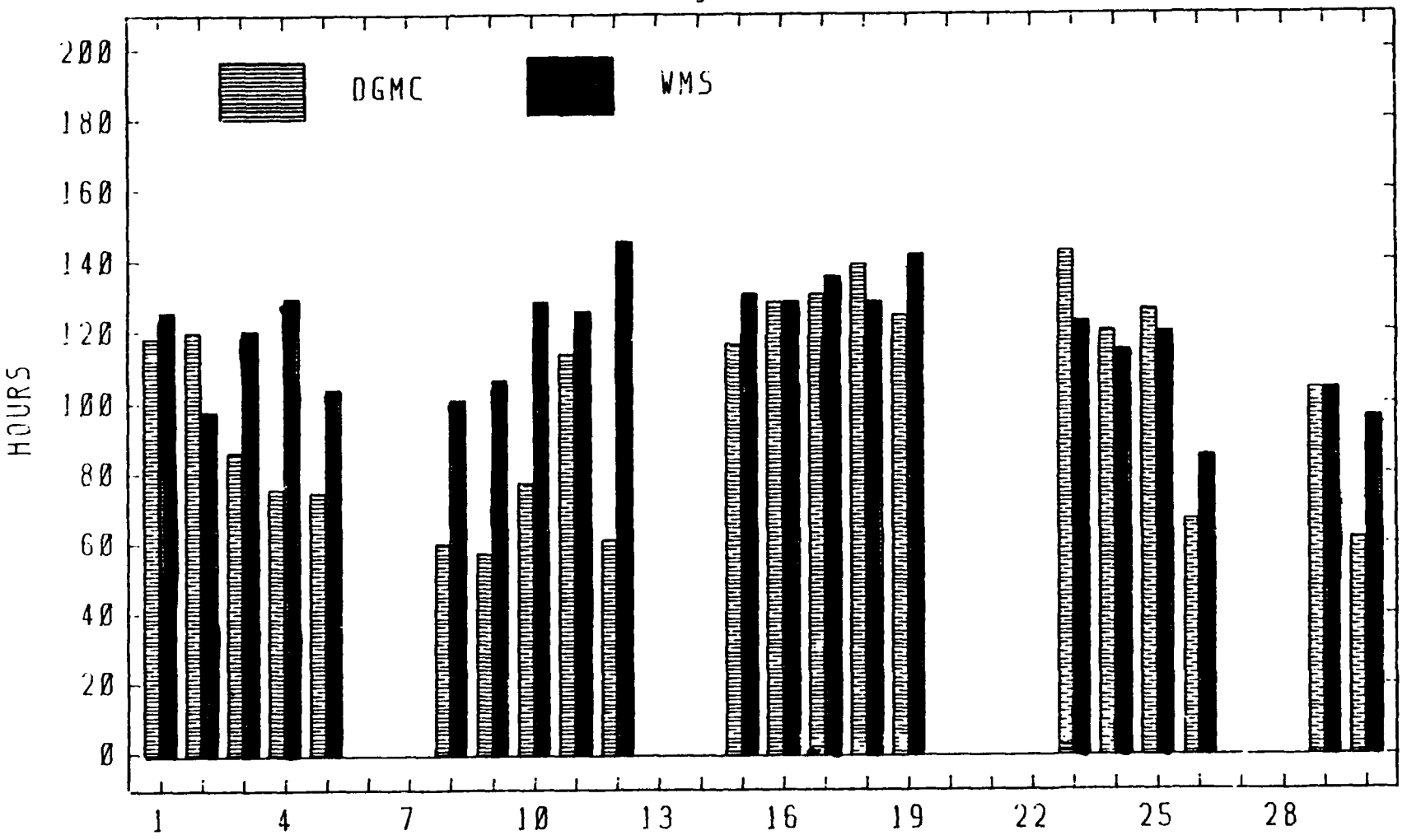
GAPS INDICATE WEEKENDS OR NO DATA AVAILABLE

Figure 4

NURSING CARE HOURS

DGMC vs WMS

Night Shift



1 - 30 APRIL

GAPS INDICATE WEEKENDS OR NO DATA AVAILABLE

illustrated increased requirements (Figure 4).

Statistical Comparison

Hypothesis testing using Student's paired t-test was employed to determine if there was a difference between the two systems in assessing nursing care hour requirements. Average care hours for each 24-hour period were calculated by system. Computation of data for paired comparisons test and prob-value are at Appendix G. The null and alternate hypotheses were as follows:

H_O : $\mu_d = 0$; the two systems are equal in determining nursing care hour requirements

H_A : $\mu_d \neq 0$; there is a difference between the two systems

level of significance = .05

critical values of t = less than or equal to -2.101 and equal to or greater than 2.101

computed t = 8.097

prob-value $< .01$

since t=8.097 is greater than 2.101, reject H_O; there is a difference between the two systems

Interrater Reliability Testing

In order for the patient classification process to generate accurate and useful information, all nursing personnel

must use the process consistently and in the manner intended. Reliability testing occurred each week. Researcher gathered information from the doctor's orders, progress notes, medication record, and nursing care plan. A simple percentage of agreement and a measure of the strength of the relationship between values of researcher and nurse classifier were computed. Results of interrater reliability testing are at Appendix H. Of 23 calculations, 13 (56%) of the correlation coefficients for DGMC and 15 (66%) of the correlation coefficients for WMS were .80 or better. Differences in ratings were attributed to the following reasons:

(1) researcher unfamiliar with patient, resulting in omission of structured teaching or sensory deprivation, or in ability to determine extent of patient involvement in activities of daily living. An additional benefit to be accrued from the use of a factor evaluative instrument is that it should lead to improved documentation as the nurse sees activities she/he is doing but not recording;

(2) subjectivity inherent in the DGMC system, which persisted throughout the study; and

(3) omission of critical indicators by the nurse classifier due to inexperience in the use of the WMS instrument.

Results of Questionnaires

At the end of the study month, questionnaires were distributed to ten nurses, to ascertain their perceptions of staffing adequacy based on the present allocation of nursing manpower and acceptability of the WMS system. Six were returned, for a response rate of 60%. Interestingly enough, two questionnaires were returned from each shift. A copy of the questionnaire and responses can be found at Appendix I.

As expected, responses were varied based on each nurse's perceptions of care during his or her shift. When examined closely, several items of importance can be obtained by management. Nurses were first asked to evaluate the quality of care provided to the patients during the shift. For the most part, those direct care activities specifically ordered by a physician (1a,1b,1e,1f,1g) were performed either "optimally" or "good", while activities of nursing (1c,1h,1i) not specifically written in the doctor's orders ranged from "optimal" to "poor".

Indirect care activities also were varied, with documentation, patient rounds, and orientation of new personnel receiving high marks. Each section should be examined separately, however, as there were also a significant number of "poor" or "fairly done" marks as well.

Responses to staffing adequacy (question 3) depended on the shift. Sixty-seven percent responded that quality of care for the shift was "good", with one response of "adequate" (day

shift) and one response of "fair" (evening shift). Three of the nurses felt that staffing for the shift was either "good" or "optimal", while the other three felt it was "poor" or "fair". Either one or two additional registered nurses and one or two additional technicians were identified, when additional staff was indicated on the questionnaire. All three shifts requested the services of a ward clerk. Finally, no one felt there were too many personnel assigned during their shift.

An evaluation of the DGMC patient classification system (questions 5-13) indicated that it was relatively easy to use and required minimal time to complete (5-30 seconds per patient), but the results were unreliable and inaccurate in determining the level of care required by the patients. Four of the nurses felt the system was not comprehensive, while three felt it was not useful as a management tool. Suggestions for improvement included the following comments:

(1) "I feel that the indicators are not specific enough- so that it is somewhat subjective as to which category the patients go in."

(2) "Not complete enough, everyone uses it differently."

(3) "I really don't know."

(4) "I'm not that familiar with the way management utilizes the system."

Ambivalence was evident in the evaluation of the WMS (questions 14 through 24). Although it accurately reflected the workload and level of care required by the patients, with 50% of the respondents indicating that it was comprehensive and useful as a management tool, dissatisfaction centered around the amount of time required to complete the instrument (30-60+ minutes). The nurses frequently remained beyond their shifts to complete the classification worksheets. Even as they became more familiar with the instrument, it remained time consuming simply because of its length. One of the nurses did in fact suggest the addition of an indicator which accounted for time consumed in completing the worksheet.

Several good suggestions were received on how to improve the design of the patient classification instrument, which should be evaluated for feasibility if the system is incorporated at DGMC: 1) more slots per page; 2) spread lines apart to document more easily; 3) omit unused indicators; and 4) color alternate columns.

Following are the comments received on how to improve the system:

(1) "I feel that it more accurately indicates the amount of time used for each activity."

(2) "Make it easier! Complete only once daily. We have too little time for patient care as it is- don't

further detract from this time! We often stayed overtime plus to complete your study."

(3) "Perhaps mark columns differently, difficult to follow names, too many pages- overall just hard to use."

(4) "Take out unused indicators."

The nurses were asked to compare the DGMC system to the WMS, using eight factors listed in question 25. The WMS was rated more accurate, more objective, more comprehensive, more useful for assessing nursing requirements, more time consuming, and more reliable. In only one area did the DGMC receive higher marks than the WMS- it was easier to use. If given a choice (question 26), two of the six nurses indicated they would continue to use the WMS, two would like to see another system developed, one preferred continued use of the DGMC system, and one felt no system of patient classification was necessary. Respondents felt that patients should be classified once in each 24-hour period, preferrably on the day shift which, as the busiest shift of the period, best illustrated changing requirements.

FOOTNOTES

[1]-----, Draft Report, JWK International Corporation, Annandale, VA, n.d., p. 12.

CHAPTER III

CONCLUSIONS

The purpose of this research project was to determine if there was a difference between nursing care hour requirements based on the current patient classification system and nursing care hour requirements utilizing the Workload Management System. Analysis of data using Student's t distribution confirmed that the two systems are not equal in their calculations. Almost without exception, WMS requirements on both day and evening shifts throughout the month were higher than DGMC requirements. Night shift requirements fluctuated.

Adequate documentation is available to trace development of the WMS. Information on the evolution of the DGMC system, however, was not available. It is known that the system originally tested in 1981 underwent several modifications and was incorporated in several Air Force hospitals. Which, if any, of these modified versions was subsequently adopted at DGMC is unknown.[1] Factors selected and values assigned to weights are essential for a comprehensive comparison of the two systems.

It was not the intent of this project to say which system

is more appropriate, however. Both systems can be used prospectively as management tools and retrospectively to gather management data. As a factor evaluative instrument, the WMS is more objective than the DGMC classification system. There is little ambiguity in determining whether a specific activity has been performed or not. Errors are usually made when the numbers are omitted or calculated incorrectly. The descriptive DGMC categories permit quick decisions concerning patient care without the burden of adding up tasks. This is a factor in acceptability by the nursing staff. However, because of its subjective nature, more complete and frequent training of users is required to generate reliable data.[2]

Results of reliability testing were less than anticipated. In a recent article by Giovannetti and Mayer, the concerns of reliability testing were discussed extensively. Two major conclusions were set forth: 1) those who assess patient status in the patient classification system require continuing instruction in its skills and practice to maintain them; and 2) acceptable reliability coefficients are only possible after appropriate instruction and take several months to achieve.[3] The selection of one week for a learning period was arbitrary. It is expected that several months of practice would increase the skill and reliability of the users, making the data generated useful for basing comparisons of staffing decisions.

The primary function of a patient classification system is to provide guidelines for allocating existing nursing

resources. The DGMC system does not have an accompanying staffing methodology, while the WMS predicts not only the number but also the level and mix of personnel required for each eight-hour shift. One of the major obstacles encountered in the military is an inability to meet staffing requirements predicted by the system, if they are greater than the number of personnel available. Over time, therefore, data provided by a classification system will be very useful to validate the need for additional personnel.

Several factors will influence the amount and kind of staff seen as being necessary to do the job, including the philosophy of nursing, perception of nursing practice and its components, expectations of effects to be achieved, and workload tolerated.[4] Continued monitoring of reliability and validity of the classification instrument is essential to its usefulness and acceptability as the practice of nursing continues to evolve.[5] As mentioned earlier, results are expected soon on an Air Force study of the WMS to determine if it provides the Air Force Medical Service with all the elements necessary for an effective and informative management tool.

FOOTNOTES

[1]Telephone conversation with Barbara Goodwin, Chairperson, Department of Nursing, David Grant USAF Medical Center, Travis AFB, CA, 11 April 1984.

[2]-----, Draft Report, JWK International Corporation, Annandale, VA, n.d., p. 18.

[3]Myrtle K. Aydelotte, Nurse Staffing Methodology: A Review and Critique of Selected Literature, Department of Health, Education and Welfare Publication No. (NIH) 73-433. Washington, D.C.: U.S. Government Printing Office, 1973, pp. 3-4.

[4]Phyllis Giovannetti and Gloria G. Mayer, "Building Confidence in Patient Classification Systems," Nursing Management 15 (August 1984): 32.

[5]Draft Report, pp. 13-14.

Air Force Manpower Standard 5206 (Medical/Surgical Nursing Units). This Air Force Manpower Standard is used to quantify the manpower required for varying levels of workload volume in the Medical/Surgical Nursing Units work center. Man-hour data source is operational audit (historical performance and technical estimate).

Category. In nursing patient classification systems, category refers to the representative groupings of patients according to their nursing care requirements.

Critical Indicators of Care. The descriptors of patients' nursing care requirements are referred to as the "critical indicators of care". Critical is not used in the medical sense; it means those components that are most crucial to correctly identify the appropriate category of care or those components that are highly associated or highly correlated to overall direct care time.

Direct Care. Direct care refers to nursing care given in the presence of the patient and/or family.

Indirect Care Time. Indirect care refers to all nursing care not in contact with a patient, that is, all tasks that are not direct care.

Interrater Reliability. Interrater reliability refers to the consistency or stability of measurement of the patient classification instrument from user to user.

NRN. NRN (not a registered nurse) refers to nursing service personnel other than registered nurses who have satisfactorily completed an orientation of the hospital, to include ward clerks, medical technicians, and licensed vocational nurses.

Numerical Weight. The number in the parentheses to the left of each specific indicator on the WMS worksheet is the numerical value assigned to that specific indicator, also referred to as points. One point is equal to 7-1/2 minutes and is based on time and motion studies.

Nursing Care Hour Requirements. This refers to the time necessary to provide total nursing care for hospitalized patients.

Patient Classification. Patient classification may be generally defined as the groupings of patients according to some observable or inferred properties or characteristics.

APPENDIX A

DEFINITION OF TERMS

Patient Classification System. In nursing, patient groups or categories have been used for the determination of numbers and assignment of nursing personnel. To encompass both the definition and the purpose, the term "Patient Classification System" is commonly used. It refers to the identification and classification of patients into care groups or categories and to the quantification of these categories as a measure of the nursing effort required.

RN. RN refers to a licensed professional registered nurse who has satisfactorily completed an orientation of the hospital.

SOURCE: Workload Management System Educational Workbook, United States Air Force Medical Service, n.d.

APPENDIX B

DGMC DEPARTMENT OF NURSING

OPERATING INSTRUCTION 168-10

DEPARTMENT OF THE AIR FORCE
David Grant USAF Medical Center (MAC)
Travis Air Force Base, CA 94535

SGHN Operating Instructions 168-10

16 January 1984

PATIENT CLASSIFICATION AND STAFFING PATTERNS

PURPOSE: To specify means by which each patient is classified according to criticality of nursing needs, assigned an appropriate category of care required, and provide professional and nonprofessional nursing personnel staffing on the basis of demonstrated patient daily acuity of care requirements.

1. Process: Patients will be classified by the nurse in charge on admission and as individual needs change. All patients will be re-evaluated daily for appropriateness of category at 1400 hours.

a. Patients will be assigned to one of five categories on the basis of pre-established written criteria (Attachments).

(1) Category 0: Intensive care (ICU scoring systems)

(2) Category 1: Maximum Care

(3) Category 2: Intermediate Care

(4) Category 3: Minimum Care

(5) Category 4: Self Care

(6) Category 5: No Care

b. The number of patients classified in each category will be entered on the 24 Hour Nursing Report, AF Form 587, at 1400 hours daily.

c. Each patient's category will be maintained on the inpatient unit status board opposite their name.

2. Personnel Management/Staffing: Numbers of personnel, rank authorizations and AFSC are established according to Air Force manpower standards and formulas by major area functional code. Distribution of personnel among inpatient units is determined according to patient classification data patterns on each unit.

a. Clinical Coordinators are responsible for redistributing professional and nonprofessional manning according to prevailing patient category demands.

b. SGHN is responsible for maintenance of patient classification data for all inpatient units, recognizing changing patient need trends, and readjusting baseline numbers of personnel assigned to each unit. Computation of professional and nonprofessional personnel hours required and/or present patient hours is performed on a continuing basis for data pattern comparison and staffing readjustments.

c. Basic guidelines for computing professional/nonprofessional hours required for patients in each category are in Atch 1. Intensive care unit and nursery requirements are computed on the basis of point scores and staffing ratios as in Atch 7 and 8.

Supersedes SGHN OI 160-6, dtd Oct 81

3. Patient Management: Redistribution of discharge of patients for disaster management, admission of casualties or in situations requiring admission of an unexpected influx of patients will be done on the basis of categories to which patients are assigned. SGHN will notify SGH or the Medical Center Command Post and provide a listing of patients by name, unit and category number in Category 4 and 5 who can be discharged or redistributed as soon as possible. SGHN is responsible for determining the appropriate redistribution of patients and personnel in order to maintain required care manhours available according to patient's classified needs.

Barbara A. Goodwin

BARBARA A. GOODWIN, Colonel, USAF, NC
Chairman, Department of Nursing

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THOMAS T. COOLIDGE, Colonel, USAF, MC
Deputy Commander/Dir Hosp Svcs

9 Atchs
1. Computation Guide for Nursing Care Hours
2. Surgical Criteria
3. Medical Criteria
4. Pediatric Criteria
5. GYN Oncology Criteria
6. Mental Health Criteria
7. Intensive Care - Therapeutic Intervention Scoring System
8. Nursery/Newborn Classifications and Criteria
9. Antepartum/Postpartum Criteria

DATE REVIEWED	SIGNATURE	DATE REVIEWED	SIGNATURE

COMPUTATION GUIDE FOR NURSING CARE HOURS BASED ON CATEGORY OF PATIENT

In estimating nursing service personnel requirements by category of patients, the following standards or norms of care are to be used as a guide. These standards are based upon a 24-hour period of coverage.

	Day	Evening	Nights	Total
Category I (Extensive Care)	3.5	2.5	1.5	7.5
Category II (Moderate)	2.0	1.4	0.6	4.0
Category III (Minimal)	0.5	0.3	0.2	1.0
Category IV (Self Care)				0.5

Category I	7.5 Total	Professional	60%	4.5
		Non-Professional	40%	3.0
Category II	4.0 Total	Professional	30%	1.2
		Non-Professional	70%	2.8
Category III	1.0 Total	Professional	20%	.2
		Non-Professional	80%	.8
Category IV & Category V	.5 Total	Professional	0%	0
		Non-Professional	100%	.5

Computation - Add the number of shifts of RNs in the 24-hour period, i.e., 6 RN shifts, x 8 hours per shift = 48 RN hours available per that 24 hours.

Multiply the number of Category I, II, etc., patients by the number of recommended RN hours required per 24 hours (6 Cat I patients x 4.5 = 27 hours required) and compare total to number of RN hours available (48).

SURGICAL CRITERIA

(May be utilized for medical patients if criteria applies)

Category I - An acutely ill patient who needs maximum nursing care.

1. A patient with extreme symptoms -- usually termed acutely ill.
2. One who requires continuous treatment and/or observation for vital signs.
3. Patient must be rigidly controlled.
4. Behavior pattern of the individual is very marked. (2 or more of the following elements).
   a. Continuous oxygen - respirators.
   b. N/G tube
   c. Chest tubes - continuous suction.
   d. Patient with complications--requires very close observation and treatments.
   e. Patients recovering from anesthesia -- major or minor surgery.
   f. Patients termed S.I. due to trauma, loss of blood, shock, etc.
   g. OD's -- pending hemorrhage.
   h. Active bleeding present.
   i. Hyperalimentation.
   j. Renal dialysis
   k. Heparin Lock - receiving 3 or more medications every 6 hrs or more frequently.

Category II - patient requiring moderate (intermediate) care, treatment meds, observation.

1. Symptoms have subsided or have not yet appeared--a moderately ill [illegible]
2. Requires periodic treatment and/or observation and/or instruction.
3. Behavior of patient deviates moderately from norm.
4. Activity must be controlled.
   a. IV fluids - Blood.
   b. Patients with surgical condition, postoperative--BRP, not fully ambulatory
   c. Patients in traction, frames, Circo-electric beds, etc.
   d. Minor surgery - post anesthesia.
   e. Heparin locks, chemotherapy, pulmonary toilet, vivonex, jejunostomy, dubhoff tube feedings.
   f. Post M.I.
   g. Requires assistance with bathing, shaving, eating.
5. Patient admission (day) for patients requiring long admission form but not meeting criteria of cat

Category III - Requires minimal care but still under professional observation and treatment.

1. Mildly ill - convalescent
2. Requires little treatment and/or observation and/or instruction.
3. Behavior pattern shows little untoward emotional response.
4. Patients requiring preps for X-ray, lab studies--professional nursing supervision required.
   a. Patients with restriction of motion--patients in casts.
   b. Those requiring partially controlled activity.
   c. Ambulatory postoperative.
   d. Postoperative patients up and about--some personal assistance--meals on unit.
   e. Preoperative patients.

Category IV - Patients require no professional nursing care or supervision. Need can be met by nonprofessional personnel.

1. Completely self-care.
2. Capable of self administration of all medications by prescription.
3. Minor dressing changes, casts, prep for lab, X-ray tests - by nonprofessionals.
4. Transport self to meals, physician office/location, lab, X-ray, OT, PT, Clinics.
5. 902X0 and 906X0 presence. Need only nurse resource on another unit for referral
   a. Patients waiting for administrative action.

Category V - No Care. Meets Category IV Criteria Plus:

1. Patients require absolutely no professional/nonprofessional nursing support, evaluation.
2. MEB/PEB patients who require only MEB, Patient Squadron, and 906X0 support

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# of patients	Nurse Cat I (4.5)	Tech Cat I (3.0)	N Cat II (1.2)	T Cat II (2.8)	N Cat III (0.2)	T Cat III (0.8)	N/T Cat IV (0.5)	#
1	4.5	3.0	1.2	2.8	0.2	0.8	0.5	1
2	9	6	2.4	5.6	0.4	1.6	1.0	2
3	13.5	9	3.6	8.4	0.6	2.4	1.5	3
4	18	12	4.8	11.2	0.8	3.2	2.0	4
5	22.5	15	6	14	1.0	4.0	2.5	5
6	27	18	7.2	16.8	1.2	4.8	3.0	6
7	31.5	21	8.4	19.6	1.4	5.6	3.5	7
8	36	24	9.6	22.4	1.6	6.4	4.0	8
9	40.5	27	10.8	25.2	1.8	7.2	4.5	9
10	45	30	12	28	2.0	8.0	5.0	10
11	49.5	33	13.2	30.8	2.2	8.8	5.5	11
12	54	36	14.4	33.6	2.4	9.6	6.0	12
13	58.5	39	15.6	36.4	2.6	10.4	6.5	13
14	63	42	16.8	39.2	2.8	11.2	7.0	14
15	67.5	45	18	42	3.0	12	7.5	15
16	72	48	19.2	44.8	3.2	12.8	8.0	16
17	76.5	51	20.4	47.6	3.4	13.6	8.5	17
18	81	54	21.6	50.4	3.6	14.4	9.0	18
19	85.5	57	22.8	53.2	3.8	15.2	9.5	19
20	90	60	24	56	4.0	15.6	10	20
21	94.5	63	25.2	58.8	4.2	16.0	10.5	21

MEDICAL CRITERIA

Category I (2 or more elements) (May be utilized for surgical patients if criteria applies)

1. Bedrest without bathroom privileges; transport per litter or wheelchair
2. Must be fed
3. Disoriented; combative; dangerously non-compliant
4. CVP lines
5. NG irrigations
6. Vital sign checks Q 2 hrs or more; hematocrits Q 4 hours
7. Strict Isolation, except totally stable patients
8. Suicidal
9. Unstable bleeders; immediate post-liver biopsy, immediate post-arteriogram
10. Medications, treatments, I&O's by staff

Category II (2 or more elements)

1. Bedrest with limited, assisted ambulation; transport per litter or wheelchair
2. IV's other than CVP lines
3. Limited orientation
4. NG tube for feeding or suction only
5. Staff-dependent, at least for monitoring, for treatments and preps
6. I&O's maintained by staff
7. Active teaching program in progress
8. Vital sign checks Q4-8 hours; ward hematocrits Q8 hours
9. Heavily PRN medication dependent
10. Patient admission (day) requiring long admission form but not meeting criteria of Category I.

Category III

1. Ambulatory or self-care with bathroom privileges
2. If IV, patient managed or KVO only
3. I&O maintained by patient
4. Vital sign checks Q8 hours; ward hematocrits BID or QD
5. Fully oriented; compliant; manages well during short passes
6. Treatments, preps and some appointments monitored by patients
7. Work-up in progress, with test preps, special diets, etc.
8. Self medications, with little use of PRN meds
9. Moderate to few teaching needs
10. Essentially stable for greater than 48 hours

Category IV

1. Unassisted ambulation; meals in dining room
2. No IV; no I&O's; no tests in progress unless self-managed, vital signs BID or QD
3. Self medications and treatments
4. Teaching needs met
5. Stable: requires little nursing documentation; nearly ready for discharge to self care

Category V

1. No teaching needs; rare charting requirements; fully stable
2. MEB, PEB, post-convalescent leave patients (except first 1-3 days when workup, appointments or teaching are in progress.)
3. Interacts mainly with ward clerk
4. Patients on weekend pass

PEDIATRIC CRITERIA

Category I - Children Who Require Close Supervision and/or Complete Care:

Less than 5 years of age
Mentally retarded
Must be bathed/fed/diapered/dressed/etc.
Ambulatory with close supervision

Patients Who Require Close Observation Due To:

Oxygen and/or Croup tent therapy
Chemotherapy
Hyperalimentation/Vivonex
Immediate Postoperative monitoring
Postoperative Complications
Hyperpyrexia
Respiratory illnesses
Numerous or frequent treatments
Airway suctioning
Chest tubes/N.G. tubes
IV fluids/blood
Bedrest
Isolation
Assignment to private room
Heparin locks/dialysis shunts
Casts
Medications

Category II - Children Who Require Moderate Supervision/Observation/Or Care

Ages 6-12 years
Some children in large wards where parents are present.
Ambulatory with moderate supervision
Minor illnesses and/or surgical procedures
Tends partially to own ADL
Requires medications
Certain preoperative patients

Category III - Children Who Require Minimal Supervision/Observation

Adolescents
Self-care except for medications
Ambulatory with no supervision

Category IV - On Pass

Category V - Not Used

GYN ONCOLOGY CRITERIA

Category I - Critically or terminally ill GYN/Cancer patients (2 or more elements)

Central line
Hyperalimentation
Peripheral Line
Replacement
Foley
Dennis Tube
N/G Tube
Colostomy
Ureterostomy
Wound with Dressing Changes
Patients on Morphine IV Drips.

Radium Patients

Complete Bedrest; Very Limited Mobility in Bed
Requires Assistance with Turning, Eating, Bathing
Foley, IV Therapy

Ectopic Pregnancy

Emergency if rupture; Bedrest, IVs, Blood, STAT surgery, Vital Signs Every 15 minutes.

Patients with Complications of Cobalt Therapy

SBO (NG, DT, IV, Surgery, Colostomy)
Fistulas (NC, DT, IV, Vivonex, Surgical Diversion of Bowels/ureters)

Postoperative Patients

Major Abdominal Surgery - 1st or 2nd day

Patients Receiving Chemotherapy

Acute PID

BR with BRP; IVs; Observe for Acute Abdomen

Category 2 - Cancer Patients

Vivonex Bowel Prep for O.R., Nutrition, Wound/Fistula Healing.
Chemotherapy

Postoperative Patients (Day 3-5)

IVs
Pulmonary Therapy

PID Patient

Abdomen with Small Amount Tenderness; IVs discontinued
P.O. Ampicillin
Patients admission (day) for patients requiring long admission form but not meeting criteria of Category 1.

Category 3 - Cancer Patients

On Cobalt/Tolerating with Minimal Side Effects
Rechecks, Often with Colostomies, Ileostomies, and Uterostomies.

Postoperative Patients

IVs discontinued; regular diet; may have Foley, Penrose Drain

Preoperative Patients with TABs, Surgery

Category 4 - Postoperative Patients- after day 5, requiring small amount of nursing care.
Cancer Rechecks Able to go on Pass

Category 5 - Patients on Pass.

Category 1
1. Requires constant observation and supervision
2. Is a level of threat to himself or others (i.e., homicidal, suicidal, combative).
3. Frequently hallucinating, severely confused and/or disori
4. Is severely depressed.
5. Designated "locked ward" status, i.e., substance abuse, drug addiction, prisoner, [illegible]

Category 2
1. Requires frequent observation and supervision.
2. Has developed minimal impulse control.
3. Occasionally hallucinating, moderately confused and/or disoriented.
4. Is moderately depressed.
5. Is responsible on a limited basis for own behavior.

Category 3
1. Requires moderate amount of observation and supervision.
2. Has fair impulse control.
3. Seldom hallucinates, mildly confused and/or disoriented.
4. Is mildly depressed.
5. Is largely responsible for own behavior.

Category 4
1. Requires only non-professional observation and supervision.
2. Has good impulse control.
3. Rare hallucinations, seldom confused and/or disoriented.
4. Is minimally depressed.
5. Is completely responsible for own behavior.

Category 5
1. Requires no professional therapeutic intervention.
2. May attend group and/or 1:1 therapy
3. Usually spends most of time off the unit.

INTENSIVE CARE
THERAPEUTIC INTERVENTION SCORING SYSTEM

4 Points

a. Cardiac arrest and/or countershock within 48 hours.
b. Controlled ventilation with or without PEEP.
c. Controlled ventilation with intermittent or continuous muscle relaxants.
d. Balloon tamponade of varices.
e. Pulmonary artery line--Swan-Ganz
f. Atrial or ventricular pacing in operation
g. Hemodialysis in unstable patient.
h. Peritoneal dialysis
i. Pressure activated blood infusion
j. Measurement of cardiac output
k. Platelet infusions
l. IABA (intra aortic balloon assist)
m. Emergency operative procedure (within 24 hours)
n. Lavage of acute GI bleeding
o. Emergency endoscopy or bronchoscopy

3 Points

a. Hyperalimentation
b. Pacemaker on standby
c. Chest tubes
d. Assisted respirations
e. Spontaneous PEEP
f. Concentrated K drip (greater than 60mEq/L or 10mEq/hr)
g. Nasotracheal or orotracheal intubation
h. Endotracheal suctioning (non-intubated patient)
i. Complex metabolic balance (frequent intake, output, continuous weight)
j. Multiple ABG, bleeding and stat studies
k. Frequent infusions of blood products, albumin or plasminate
l. Bolus IV medication
m. Multiple (greater than 3) parenteral lines.
n. Vasoactive drug infusion
o. Continued antiarrhythmia infusions
p. Cardioversion
q. Hypothermia blanket
r. Peripheral arterial lines
s. Acute digitalization
t. Active diuresis for fluid overload or cerebral edema
u. Active treatment for metabolic alkalosis or acidosis
v. Emergency thora-, para-, and peri-cardio centesis
w. Acute anticoagulation
x. Coverage with more than 2 IV antibiotics
y. Treatment of seizures or metabolic encephalopathy (within 48 hours)
z. Chest physiotherapy every one hour
aa. Extensive irrigations, packings, or debridement of wound, fistula or colostomy
bb. Monitoring ICP

2 Points

a. CVP (Central venous pressure)
b. 2 (+) lines
c. Hemodialysis for chronic renal failure
d. Fresh tracheostomy (less than 48 hours)
e. Spontaneous respiration via endotracheal tube or tracheostomy
f. Tracheostomy care
g. Replacement of excess fluid loss
h. Chest physiotherapy every 2 hours
i. Doppler
j. Continuous antibiotic irrigation through drains in wounds
k. Kayexlate enemas
l. Miller-Abbott or Cantor tube

1 Point

a. ECG monitoring
b. Hourly vital signs or neuro vital signs
c. Keep open IV route or one IV
d. Chronic anticoagulation
e. Standard intake and output
f. Frequent STAT chemistries
g. Intermittent IV medications
h. Multiple dressing changes
i. Complicated orthopedic traction
j. IV antimetabolite therapy
k. Decubitus ulcer therapy
l. Urinary catheter
m. Supplemental oxygen (nasal or mask)
n. Antibiotics IV
o. Chest physiotherapy, IPPB every 4 hours
p. Hemovac
q. Gastrointestinal decompression - N/G tube
r. Vivonex
s. Ambulation - 1 point per each time per shift
t. Transporting patients to X-ray, nuclear medicine, etc.
u. Cholecystectomy tube or drain, or T-tube
v. Jujunostomy drain
w. Penrose drain to suction
x. Gastrostomy tube
y. Antiacids per N/G tube every 1 to 2 hours
z. Epidural catheter
aa. Crutchfield tongs

Patients suitable for intermediate care averages 12 to 13 TISS points and need a nurse: patient ratio of 1:4. Therefore, one highly skilled nurse could logically be capable of caring for four (4) intermediate care patients (totaling 48) or three patients averaging 14 to 18 TISS points (totaling 48) or two patients averaging 18 to 24 TISS points (totaling 48) or one very critically ill patient (averaging 40 to 50 points).

NURSERY/NEWBORN CLASSIFICATIONS AND CRITERIA

Category 0 - Intensive Care

1. This category includes both crisis care and acute care infants.

2. Caretaker-patient ratio will be either 2:1 or 1:1, and will be determined by the number of points awarded the infant.

3. Category 0 patients will include:
   - infants with birth weight of 1500 grams or less
   - infants with gestational age of less than 34 weeks
   - infants returning from major surgery
   - infants during or 8 hours following a cardiopulmonary arrest
   - infants with the onset of seizure activity, up to 48 hours

4. Typical treatments and procedures will include:
   - assisted ventilation on Baby Bird respirator
   - nasal CPAP
   - placement and maintenance of central venous or arterial line
   - administration of potent drugs (ex: Dopamine, Isuprel, Nipride, Insulin, Digitalis
   - frequent vital signs (q 15 min to q 1 hr)
   - arm and leg blood pressures
   - feedings every 1 to 2 hours
   - use of special formulas (ex: Vital, Vivonex, ¼, ½ or 1/3 strength formulas)
   - tracheostomy care
   - suction of endotracheal tube
   - use of cardiac monitor
   - use of trending monitor
   - use of apnea monitor
   - use of transcutaneous oxygen monitor
   - total blood exchange transfusion
   - mini exchange
   - IPPB
   - postural drainage and percussion
   - deep suction
   - insertion and maintenance of chest tube(s)
   - gastrostomy tube care
   - colostomy care
   - strict Intake and Output (totaled every 4 hrs)
   - weight
   - phototherapy
   - peritoneal dialysis
   - blood replacement
   - blood product infusion (platelets, FFP, plasmanate)
   - use of rotating ace bandages
   - saran wrap or green house for heat and volume control
   - lavage [illegible] GI bleeding
   - lumbar puncture
   - strict isolation
   - hemodialysis
   - enema
   - 24 hr urine collection
   - blood work from the central line
   - blood work from femeral stick
   - specific gravity and/or clinitest on each void
   - guiac and/or clinitest all stools and emesis

Atch 8

Category I - Maximum Care

1. This category includes the transitional infant.

2. Caretaker-patient ratio will be 1:2-3, and will be determined by the number of points awarded the infant.

3. Category I patients will include:
   - infants who have developed pneumonia and require 3-14 days of IV antibiotic therapy
   - premature infants, in no acute distress, who are "growing up"
   - infants who require isolation from other infants but are themselves not ill (ex: Herpes, rubella)
   - chronic care infants who are receiving physical therapy, or whose parents are learning specialized home care (ex: colostomy, tracheostomy, gastrostomy tube care)
   - the first 24 hours of a normal newborn's life

4. Typical treatments and procedures will include:
   - cardiac monitor
   - apnea monitor
   - isolette
   - isolation procedure
   - vital signs q 4 hr to q 8 hr
   - daily weight
   - feedings every 2, 3 or 4 hours
   - use of special formulas (ex: Vital, Vivonex, ½, 1/3, ¼ strength formulas)
   - instruct and assist mothers with breast feeding
   - placement and maintenance of scalp vein IV
   - administration of IV and IM medications
   - administration of po and topical medications
   - administration of oxygen by blow-by or Oxyhood
   - phototherapy
   - nasogastric tube feeding
   - bottle feeding
   - dextrostick before feedings
   - bath, skin, cord and eye care
   - infant psychomotor and social stimulation
   - parent teaching, assistance and explanation
   - septic work up (to include cultures of throat, rectum, blood, suprapubic urine, CSF)
   - use of trending monitor
   - gastrostomy tube care (after healing has occurred)
   - gastrostomy tube feeding
   - daily X-ray (CXR and/or KUB)
   - micro lab by heel stick
   - PKU on 3rd day of life
   - observation for apnea, seizures, bradycardia

- thermo regulation in overhead radiant warmer
- heelstick for Hct, serum solid or dextrostick
- cut down care
- wound care
- nasogastric of salum sump tube care
- frequent lab work by micro stick (CBC, lytes)
- portable X-ray
- blood gas from a central line
- blood gas from radial or femeral stick
- cardiac pacemaker
- endotracheal intubation
- replacement of fluid loss
- indwelling urinary catheter
- gastrointestinal decompression with intermittent suction
- admission routine (to include Vit K lmg IM, Silver nitrate 1 drop each eye, weight, measures, gastric aspirate slides and culture, throat and rectal cultures, lab work, vital signs)
- instruct and assist mothers on pumping breasts for maintenance of milk supply until baby is able to breast feed directly

Category 2 - Intermediate Care

1. This category includes normal newborn infants.

2. Caretaker-patient ratio will be 1:4-6, and will be determined by the number of points awarded to the infant.

3. Category 2 patients will include:
   - the normal term infant after the first 24 hours of life
   - any infant following an uncomplicated circumcision

4. Typical treatments and procedures will include:
   - bottle feeding every 3-4 hours
   - instructing parents on bottle feeding
   - instructing mother on breast feeding
   - daily weight
   - vital signs q 24 hours
   - instructing parents on bathing and cord care
   - instructing parents on care of the uncircumcised male infant
   - instructing parents on care of the circumcised male infant
   - reviewing available resources with parents (ex: infant care books, well baby clinic, community resources)

4 Points

- Baby Bird Respirator
- Nasal CPAP
- Venous or arterial line insertion
- Total blood exchange transfusion
- Mini exchange
- Peritoneal dialysis
- Strict isolation
- Hemodialysis
- Insertion of chest tube
- Obtaining blood work from a central line
- Parent teaching/instruction
- Placement of scalp-vein
- Cardiac pacemaker
- Endotracheal tube placement
- 24 hour urine collection
- Bottle feed difficult infant (premature, neurological damage)

3 Points

- Trach care
- Colostomy care
- Strict Intake and Output
- Blood replacement
- Blood product infusion
- Lavage for GI bleed
- Lumbar puncture
- Enema
- Placement of nasogastric or Salum Sump tube
- Obtain blood gas from line
- Obtain blood gas from radial/femeral stick
- Suprapubic tap for urine collection
- Replacement of fluid loss (drainage)
- Placement of indwelling urinary catheter
- Micro-lab collection

2 Points

- CVP or transducer
- Suction endotracheal tube
- CPPB treatment
- Assist ventilation with deep suction
- Chest tube to Emerson drainage
- Chest tube to water seal
- Gastrostomy tube care
- Phototherapy
- Rotating axe bandages
- Saran wrap or green house
- Hanging hyperalimentation solution
- Administration of IV, IM or PO medication
- Urine collection
- Hct
- Serum solid
- Dextrostick
- Nasogastric feeding
- Gastrostomy tube feeding
- Assist mother with breast feeding
- Bottle feed normal infant
- Oxygen by blow-by of Oxyhood
- Cut-down care
- Wound care
- Hold infant for portable X-ray
- Bath
- Infant stimulation
- Radiant warmer
- Isolette
- Obtaining gastric aspiration

1 Point

- Vital signs
- Arm and leg blood pressures
- Preparation of special formulas
- Cardiac monitor
- Trending monitor
- Apnea monitor
- Transcutaneous oxygen monitor
- Percussion and postural drainage
- Intake and Output
- Diaper count
- Weight
- Application of topical medications (creams, ointments or eye drops)
- Urine specific gravity
- Urine or Stool clinitest
- Guiac of stool or emesis
- Thermo regulation
- Routine cord care
- Open crib
- Measurements (length, chest, abdomen, head)
- Culture (nose, cord, throat, rectal, wound)

ANTEPARTUM/POSTPARTUM CRITERIA

Category I - A patient who needs maximum nursing care.

1. Requires continuous treatment and/or observation and/or instruction.
   a. In labor and delivery
   b. In Recovery Room

2. Requires a great many services
   a. Continuous oxygen
   b. IV fluids and/or blood
   c. N/G tube
   d. Recovering from anesthesia
   e. Active bleeding
   f. Hyperalimentation

3. Complete bedrest, i.e., third trimester bleeding, incompetent cervix.

Category II - A patient who is able to perform some or all acts of self-care but requires daily professional treatments, observation and/or instruction. Intermediate care.

1. Requires frequent treatment and/or observation and/or instruction, post partum.
   a. Vaginal delivery within 24 hours
   b. Post partum hemorrhages within 48 hours
   c. Post-op C-Sections within 72 hours with foley and IV's out
   d. Diabetics until discharge
   e. Post partum-post tubal ligation within 48 hours
   f. Post magnesium sulfate infusion on toxograph not in the recovery room
   g. Asthmatics until discharge
   h. Infected wounds requiring cleaning and packing

2. Symptoms have subsided or have not yet appeared in antepartum patients
   a. Premature rupture of membranes
   b. Diabetics, uncontrolled
   c. Premature labor
   d. Pyelonephritis
   e. Pregnancy induced hypertension

Category III - Requires minimal care but needs periodic professional observation, treatment and/or instruction.

1. Requires teaching and supervision of activities in preparation for discharge or rehabilitation.
   a. Cleaning of open wounds
   b. Post partum after 24 hours
   c. C-sections after 72 hours without IV's, foley catheter and fully ambulatory

2. Requires periodic professional observation
   a. [illegible] gestation
   b. [illegible] for observation (short term)
      1. Abnormal gravidity
      2. Dehydration
      3. Abdominal pain, not premature labor
   c. Mother re-admitted for bonding before infant discharge

ATCH 9

Category IV - Requires no professional care - most needs met by nonprofessional staff.

1. Waiting administrative action
2. Complete self-care, awaiting infant discharge

Category V - No care

1. On pass

APPENDIX C

WMS PATIENT ACUITY WORKSHEET, NURSING CARE HOURS CHART, AND PERSONNEL REQUIREMENTS CHART

Procedure:

1. Fill in the time and date on the patient classification worksheet. The signature of the shift charge nurse is necessary for accountability.

2. Write in the names of all patients on the lines at the top of the worksheet. (use two worksheets if necessary)

3. Select the critical indicators in each section as appropriate. Two or more activities in one section may apply; if so, total the numbers to get a score for that section. Total the points in each section and record the sum in the box on the worksheet.

4. Total the points for each patient and record in the space at the bottom of the column.

5. Determine each patient's category by matching the total points with the appropriate point ranges. Place a mark in the box to identify the category.

6. Count the number of checks to determine the number of patients in each category.

7. Using the Nursing Care Hours Requirements chart, select the number of care hours required for each category of patients. Example: 18 hours of nursing care are required to care for nine Category I patients in a 24-hour period.

8. Total the number of nursing care hours required.

9. Locate the appropriate point range on the Personnel Requirements Chart. This chart will give the total number of personnel required for a 24-hour period and the level and mix of personnel for each eight-hour shift.

UNIT:_____ DATE:_____ TIME:_____

SIGNATURE:_____

PATIENT ACUITY WORKSHEET

Point Values	Critical Indicators	Patient's Name
	VITAL SIGNS (MANUAL TPR, BP)	
(2)	Vital signs qid or less	
(3)	Vital signs q4h or x 6	
(6)	Vital signs q2h or x 12	
(12)	Vital signs q1h or x 24	
(2)	Rectal or axillary temps q4h or more	
(2)	Apical or femoral or pedal pulses or FHT q4h or more	
(2)	Tilt tests q4h or more	
(6)	Routine post-op	
	MONITORING	
(2)	Intake and output q8h	
(8)	Intake and output q2h	
(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 (manual) q2h or x 12	
(6)	Cardiac/apnea/temp/pressure monitors (not cumulative)	
(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	
(5)	Cardiac output q4h or x 6	
	ACTIVITIES OF DAILY LIVING	
(6)	Infant/toddler care (≤5 years)	
(2)	Self care (adult or child ≥ 5 years)	
(6)	Assisted care (> 5 years) - positions self	
(14)	Complete care (≥ 5 years) - assist with positioning	
(32)	Total care (≥ 5 years) - position and skin care q2h	
(4)	Extra linen change and partial bath 2x per shift	
(14)	Turning frame (2 staff to turn q2h)	
(8)	Peds recreation/observation ≤ 5 years (exclude NBN)	
(4)	Isolation (Mask and Gown)	
	FEEDING	
(5)	Tube feed adult/child/neonate q4h or x 6	
(10)	Tube feed adult/child/neonate q2h or x 12	
(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	
(4)	Heparin lock or Broviac	
(6)	Simple (change bottle q5 - 8 hours)	
(8)	Complex (2 or more sites or change bottle q4h)	
(2)	Medication q8h or x 3	
(3)	Medication q6h or x 4	
( )	Medication q4h or x 6	
(4)	Blood products (4 points for each unit)	

TOTAL POINTS

CATEGORY	POINTS
I	0 - 12
II	13 - 31
III	32 - 63
IV	64 - 95
V	96 - 145
VI	+ 146

Census =

Patient Acuity Worksheet (continued)

Point Values	Critical Indicators
	TREATMENTS/PROCEDURES/MEDICATIONS
	Simple > 15 and < 30 Minutes Total
(2)	Start IV or NG insertion or Foley insertion or EKG
(2)	OR prep or enemas or ace wraps/elastic stockings
(2)	Simple dressing or tube care, Foley care (exclude Trach)
(2)	S&A or SpGr or Guiac or spin HCT x 6 (ADDITIVE)
(2)	Lab studies x 6; ABG or blood culture x 3
(2)	Medications q3h - q8h (exclude IV)
(2)	Irrigations or Instillations x 4 or less
(2)	Restraints (2 or 4 point or posey)
(2)	Assist OOB to chair/stretcher and return x 3
(2)	Assist OOB, walk & return x 1
(2)	Infant circumcision or phototherapy
(2)	Accompany patient off ward > 15 minutes and < 30 minutes
(2)	Other activities requireng > 15 minutes and < 30 minutes
	Complex > 30 minutes and < 1 Hour Total
(4)	Chest tube insertion or lumbar puncture
(4)	Thoracentesis or paracentesis
(4)	Complex dressing change (> 30 minutes to complete)
(4)	Straight catheterization x 4 or more
(4)	Medication q2h or more (exclude IV)
(4)	Range of motion exercises x 3
(4)	Accompany patient off ward > 30 minutes
(4)	Other activities requiring > 30 minutes and < 1 hour
	Special Procedures > 1 Hour Total
(8)	Each hour requiring continuous staff attendance/assistance
	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 q6h or x 4
(6)	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 (Must be documented)
	Teaching
(4)	Admission assessment and orientation
(4)	Preoperative teaching
(4)	Special structured teaching (diabetic, cardiac) colostomy care, etc.) (ADDITIVE)
	Emotional Support (in excess of 30 minutes q 24 hrs) (NOT ADDITIVE)
(1)	Patient/family support (anxiety, denial, loneliness, etc.)
(4)	Lifestyle modification (Prosthesis,behavior,image,etc.)
(6)	Sensory deprivation (retarded, deaf, blind, etc)
(10)	Maximum points for emotional support
	CONTINUOUS
(96)	Patient requiring 1:1 coverage all shifts
(146)	Patient requiring greater than 1:1 coverage all shifts

NOTES:
1. For any treatment/procedure that requires multiple nursing staff to perform, multiply the critical indicator point value by the number of staff required.
2. Adjust points to accommodate frequency, i.e., intake and output q1h = 16.
3. Count only those procedures performed by the nursing staff.

NURSING CARE HOUR REQUIREMENTS

	CATEGORY					
PATIENTS	I	II	III	IV	V	VI
1	2	5	11	19	29	47
2	4	10	22	38	58	94
3	6	15	33	57	87	141
4	8	20	44	76	116	188
5	10	25	55	95	145	235
6	12	30	66	114	174	282
7	14	35	77	133	203	329
8	16	40	88	152	232	376
9	18	45	99	171	261	423
10	20	50	110	190	290	470
11	22	55	121	209		
12	24	60	132	228		
13	26	65	143	247		
14	28	70	154	266		
15	30	75	165	285		
16	32	80				
17	34	85				
18	36	90				
19	38	95				
20	40	100				
21	42	105				
22	44	110				
23	46	115				
24	48	120				
25	50	125				

PERSONNEL REQUIREMENTS CHART

TOTAL HOURS	TOTAL 24 HOUR STAFF	DAY		EVENING		NIGHT	
		RN	NRN	RN	NRN	RN	NRN
0-40	6	1	1	1	1	1	1
41-48	7	1	2	1	1	1	1
49-56	7	1	2	1	1	1	1
57-64	8	1	2	1	2	1	1
65-72	9	2	2	1	2	1	1
73-80	10	2	3	1	2	1	1
81-88	11	2	3	2	2	1	1
89-96	12	2	4	2	2	1	1
96-104	13	2	4	2	2	1	2
105-112	14	2	4	2	3	1	2
113-120	15	3	4	2	3	1	2
121-136	17	3	5	2	4	1	2
137-152	19	4	5	2	4	2	2
153-168	21	4	6	3	4	2	2
169-184	23	4	6	3	5	2	3
185-200	25	4	7	4	5	2	3
201-216	27	5	7	4	6	2	3
217-232	29	5	8	4	6	2	4
233-248	31	6	8	4	7	2	4
249-264	33	6	9	4	7	3	4
265-280	35	6	10	5	7	3	4
281-296	37	6	10	5	8	3	4

APPENDIX D

DAILY SUMMARY SHEET

DAILY SUMMARY SHEET DATE: _____

	DAYS		EVENINGS		NIGHTS	
	RN	NRN	RN	NRN	RN	NRN
SCHEDULED						
TOTAL WHO ACTUALLY WORKED						
ORIENTEES						
ADMISSIONS/ DISPOSITIONS/ TRANSFERS						

KEY: ORIENTEES - On ward for less than one month, including nurse interns and reservists.

(TO BE COMPLETED BY CAPT DELAFOSSE)

NAVY

CLASS	PATIENTS			CARE HOURS		
	D	E	N	D	E	N
I						
II						
III						
IV						
V						
VI						

DGMC

CLASS	PATIENTS			CARE HOURS		
	D	E	N	D	E	N
5						
4						
3						
2						
1						
0						

APPENDIX E

SUMMARY OF NURSING CARE REQUIREMENTS AND AVAILABLE MANHOURS

	1 APR				2 APR				3 APR			
	D	E	N	Total	D	E	N	Total	D	E	N	Total
RNs assigned*	3	2	2		3	2	2		3	2	2	
Hours per shift	8	8	8		8	8	8		8	8	8	
RN hours available	24	16	16	56	24	16	16	56	24	16	16	56
Technicians assigned*	4	1	1		5	1	2		5	2	2	
Hours per shift	8	8	8		8	8	8		8	8	8	
Technician hours available	32	8	8	48	40	8	16	64	40	16	16	72
TOTAL care hours available per 24 hour period				104				120				128
TOTAL care hours required per 24 hour period based on each 8 hour shift- DGMC	73.5	67.5	119	avg 86.67	105.5	91.5	120.5	avg 105.8	70.5	75.5	86.5	avg 77.5
Difference: available-required	30.5	36.5	-15		14.5	28.5	-.5		57.5	52.5	41.5	
TOTAL care hours required per 24 hour period based on each 8 hour shift- WMS	128	133	126	avg 129	128	116	98	avg 114	133	138	121	avg 130.7
Difference: available-required	-24	-29	-22		-8	4	22		-5	-10	7	

* Excludes orientees

	4 APR				5 APR				8 APR			
	D	E	N	Total	D	E	N	Total	D	E	N	Total
RNs assigned*	3	2	2		3	2	2		3	2	2	
Hours per shift	8	8	8		8	8	8		8	8	8	
RN hours available	24	16	16	56	24	16	16	56	24	16	16	56
Technicians assigned*	4	2	2		4	1	2		5	1	1	
Hours per shift	8	8	8		8	8	8		8	8	8	
Technician hours available	32	16	16	64	32	8	16	56	40	8	8	56
TOTAL care hours available per 24 hour period				120				112				112
TOTAL care hours required per 24 hour period based on each 8 hour shift- DGMC	98	55	76	avg 76.33	74.5	59.5	75	avg 69.67	87	65.5	60.1	avg 70.87
Difference: available-required	22	65	44		37.5	52.5	37		25	46.5	51.9	
TOTAL care hours required per 24 hour period based on each 8 hour shift- WMS	146	120	130	avg 132	108	101	104	avg 104.3	135	147	101	avg 127.7
Difference: available-required	-26	0	-10		4	11	8		-23	-35	11	

* Excludes orientees

	9 APR				10 APR				11 APR			
	D	E	N	Total	D	E	N	Total	D	E	N	Total
RNs assigned*	3	2	2		3	1	2		3	2	2	
Hours per shift	8	8	8		8	8	8		8	8	8	
RN hours available	24	16	16	56	24	8	16	48	24	16	16	56
Technicians assigned*	5	1	1		5	2	1		4	2	1	
Hours per shift	8	8	8		8	8	8		8	8	8	
Technician hours available	40	8	8	56	40	16	8	64	32	16	8	56
TOTAL care hours available per 24 hour period				112				112				112
TOTAL care hours required per 24 hour period based on each 8 hour shift- DGMC	100	67.5	57.5	avg 75	101.5	72	77.6	avg 83.7	122.5	96.5	114.5	avg 111.2
Difference: available-required	12	44.5	54.5		10.5	40	34.4		-10.5	15.5	-2.5	
TOTAL care hours required per 24 hour period based on each 8 hour shift- WMS	126	128	107	avg 120.3	115	153	129	avg 132.3	142	146	126	avg 138
Difference: available-required	-14	-16	5		-3	-41	-17		-30	-34	-14	

* Excludes orientees

	12 APR				15 APR				16 APR			
	D	E	N	Total	D	E	N	Total	D	E	N	Total
RNs assigned*	3	2	2		2	2	2		2	2	1	
Hours per shift	8	8	8		8	8	8		8	8	8	
RN hours available	24	16	16	56	16	16	16	48	16	16	8	40
Technicians assigned*	4	2	2		4	2	2		5	2	2	
Hours per shift	8	8	8		8	8	8		8	8	8	
Technician hours available	32	16	16	64	32	16	16	64	40	16	16	72
TOTAL care hours available per 24 hour period				120				112				112
TOTAL care hours required per 24 hour period based on each 8 hour shift- DGMC	111.5	50	61.6	avg 74.37	**	113	117	avg **	**	72.5	129	avg **
Difference: available-required	8.5	70	58.4		**	-1	-5		**	39.5	-17	
TOTAL care hours required per 24 hour period based on each 8 hour shift- WMS	141	144	146	avg 143.7	**	132	131	avg **	**	140	129	avg **
Difference: available-required	-21	-24	-26		**	-20	-19		**	-28	-17	

* Excludes orientees
** Data not available

	17 APR				18 APR				19 APR			
	D	E	N	Total	D	E	N	Total	D	E	N	Total
RNs assigned*	2	2	2		3	2	2		2	2	2	
Hours per shift	8	8	8		8	8	8		8	8	8	
RN hours available	16	16	16	48	24	16	16	56	16	16	16	48
Technicians assigned*	4	2	2		5	2	2		5	2	2	
Hours per shift	8	8	8		8	8	8		8	8	8	
Technician hours available	32	16	16	64	40	16	16	72	40	16	16	72
TOTAL care hours available per 24 hour period				112				128				120
TOTAL care hours required per 24 hour period based on each 8 hour shift- DGMC	73.1	80	131	avg 94.7	108.2	94.1	139.5	avg 113.9	95.2	32	125	avg 84.07
Difference: available-required	38.9	32	-19		19.8	33.9	-11.5		24.8	88	-5	
TOTAL care hours required per 24 hour period based on each 8 hour shift- WMS	153	144	136	avg 144.3	156	140	129	avg 141.7	160	113	142	avg 138.3
Difference: available-required	-41	-32	-24		-28	-12	-1		-40	7	-22	

* Excludes orientees

	22 APR				23 APR				24 APR			
	D	E	N	Total	D	E	N	Total	D	E	N	Total
RNs assigned*	3	1	1		3	1	2		2	2	2	
Hours per shift	8	8	8		8	8	8		8	8	8	
RN hours available	24	8	8	40	24	8	16	48	16	16	16	48
Technicians assigned*	6	2	2		4	2	2		5	2	2	
Hours per shift	8	8	8		8	8	8		8	8	8	
Technician hours available	48	16	16	80	32	16	16	64	40	16	16	72
TOTAL care hours available per 24 hour period				120				112				120
TOTAL care hours required per 24 hour period based on each 8 hour shift- DGMC	52.6	**	**	avg **	68.5	58.5	143	avg 90	96	30.5	120.5	avg 82.33
Difference: available-required	67.4	**	**		43.5	53.5	-31		24	89.5	-.5	
TOTAL care hours required per 24 hour period based on each 8 hour shift- WMS	140	**	**	avg **	143	136	123	avg 134	121	106	115	avg 114
Difference: available-required	-20	**	**		-31	-24	-11		-1	14	5	

* Excludes orientees
** Data not available

	25 APR				26 APR				29 APR			
	D	E	N	Total	D	E	N	Total	D	E	N	Total
RNs assigned*	2	2	2		1	2	2		3	2	2	
Hours per shift	8	8	8		8	8	8		8	8	8	
RN hours available	16	16	16	48	8	16	16	40	24	16	16	56
Technicians assigned*	6	3	2		5	2	2		4	2	2	
Hours per shift	8	8	8		8	8	8		8	8	8	
Technician hours available	48	24	16	88	40	16	16	72	32	16	16	64
TOTAL care hours available per 24 hour period				136				112				120
TOTAL care hours required per 24 hour period based on each 8 hour shift- DGMC	80.5	52.5	126.5	avg 86.5	76.7	46	67	avg 63.23	128	66.5	104	avg 99.5
Difference: available-required	55.5	83.5	9.5		35.3	66	45		-8	53.5	16	
TOTAL care hours required per 24 hour period based on each 8 hour shift- WMS	108	131	120	avg 119.7	94	92	85	avg 90.33	111	104	104	avg 106.3
Difference: available-required	28	5	16		18	20	27		9	16	16	

* Excludes orientees

30 APR

	D	E	N	Total
RNs assigned*	3	2	2	
Hours per shift	8	8	8	
RN hours available	24	16	16	56
Technicians assigned*	5	2	2	
Hours per shift	8	8	8	
Technician hours available	40	16	16	72
TOTAL care hours available per 24 hour period				128
TOTAL care hours required per 24 hour period based on each 8 hour shift- DGMC	129.5	68.5	61.5	avg 86.5
Difference: available-required	-1.5	59.5	66.5	
TOTAL care hours required per 24 hour period based on each 8 hour shift- WMS	115	119	96	avg 110
Difference: available-required	13	9	32	

* Excludes orientees

APPENDIX F

CATEGORIES OF CARE ASSIGNED TO FOUR PATIENTS ON WARD C-2 TEN DAYS OR MORE

DATE		PATIENT A		PATIENT B		PATIENT C		PATIENT D	
		WMS	DGMC	WMS	DGMC	WMS	DGMC	WMS	DGMC
1 APR	D	2	3	2	2	3	2	2	2
	E	1	3	2	2	2	2	1	4
	N	1	4	2	1	2	1	1	2
2 APR	D	2	4	2	2	2	2	1	3
	E	1	2	2	1	2	2	1	2
	N	1	4	2	2	2	1	1	2
3 APR	D	1	4	3	2	2	2	1	4
	E	1	2	2	2	2	2	1	4
	N	1	4	2	2	2	1	1	3
4 APR	D	2	4	2	2	2	2	2	2
	E	1	2	2	2	2	2	1	4
	N	1	3	2	2	3	2	1	3
5 APR	D	1	4	3	2	2	3	1	2
	E	1	2	2	2	2	2	1	4
	N	1	2	2	2	2	2	1	3
8 APR	D	1	4	3	2	2	2	1	2
	E	1	3	3	1	2	2	1	5
	N	1	3	2	2	2	2	1	3
9 APR	D	1	4	3	2	2	3	1	2
	E	1	3	3	1	2	2	1	5
	N	1	3	3	2	P	P	1	3
10 APR	D	1	3	3	2	1	2	1	2
	E	1	2	3	1	2	2	1	5
	N	1	3	3	2	1	2	1	3
11 APR	D	1	3	3	2	2	2	1	3
	E	1	2	3	2	2	2	1	3
	N	1	4	3	2	1	2	1	3
12 APR	D	1	3	3	2	2	2	1	3
	E	1	3	3	2	2	4	D	D
	N	1	4	3	2	1	2		
15 APR	D	1	2	2	1	D	D		
	E	1	3	2	1				
	N	1	3	2	1				

16 APR	D	1	3	3	2
	E	1	2	2	1
	N	1	2	2	2
17 APR	D	1	3	3	2
	E	1	2	3	1
	N	1	2	3	2
18 APR	D	1	3	3	1
	E	2	3	3	1
	N	1	3	3	2
19 APR	D	1	3	4	1
	E	1	4	2	2
	N	1	3	3	1
22 APR	D	1	4	3	2
	E	I	I	I	I
	N	1	3	2	1
23 APR	D	2	3	3	1
	E	2	3	3	1
	N	1	3	3	1
24 APR	D	1	3	3	1
	E	1	5	3	3
	N	1	3	3	1
25 APR	D	1	3	3	1
	E	2	5	3	2
	N	1	2	3	1
26 APR	D	1	3	3	1
	E	2	5	2	2
	N	1	5	2	2

D - Discharged

P - Out On Pass

I - Incomplete Data

APPENDIX G

HYPOTHESIS TESTING OF DATA

$H_0 : \mu_d = 0$; the two systems are equal in determining nursing care hour requirements

$H_A : \mu_d \neq 0$; there is a difference between the two systems

Level of significance = .05

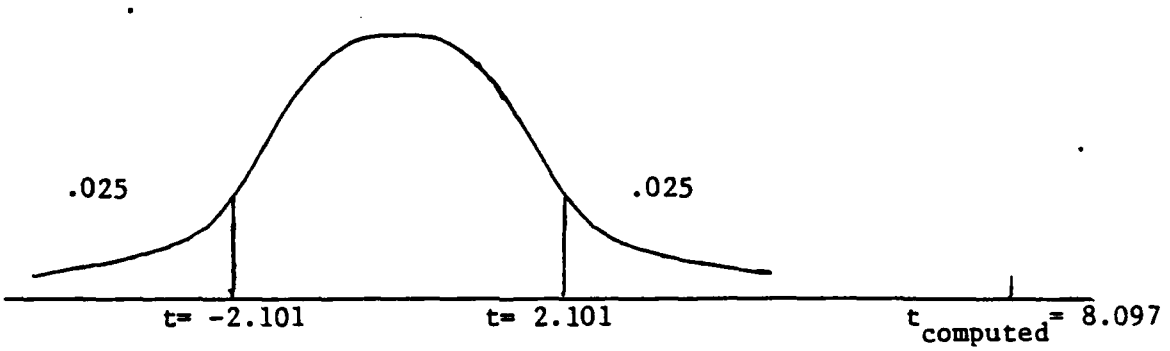
critical values of t = less than or equal to -2.101 and equal to or greater than 2.101

X_1 =WMS
X_2 =DGMC
n =19

Day of Month	X_1	X_2	$d=X_1-X_2$	d^2
1	129	86.7	42.3	1789.29
2	114	105.8	8.2	67.24
3	130.7	77.5	53.2	2830.24
4	132	76.3	55.7	3102.49
5	104.3	69.7	34.6	1197.16
8	127.7	70.9	56.8	3226.24
9	120.3	75	45.3	2052.09
10	132.3	83.7	48.6	2361.96
11	138	111.2	26.8	718.24
12	143.7	74.4	69.3	4802.49
17	113.9	94.7	19.2	368.64
18	141.7	144.3	-2.6	6.76
19	138.3	84.1	54.2	2937.64
23	134	90	44	1936
24	114	82.3	31.7	1004.89
25	119.7	86.5	33.2	1102.24
26	90.3	63.2	27.1	734.41
29	106.3	99.5	6.8	46.24
30	110	86.5	23.5	552.25
n=19	ΣX_1 =2340.19	ΣX_2 =1662.29	Σd =677.9	Σd^2 =30836.5
	$\bar{x}_1$ = 123.2	$\bar{x}_2$ = 87.5	$\bar{d}$ = 35.7	

$$s_d = \sqrt{\frac{n(\Sigma d^2)-(\Sigma d)^2}{n(n-1)}} \qquad \sqrt{\frac{19(30836.5)-(677.9)^2}{19(19-1)}} = 19.22$$

$$t = \frac{\bar{d}-\mu_d}{s_d/\sqrt{n}} = \frac{35.7 - 0}{19.22/\sqrt{19}} = 8.097$$



Since t=8.097 is greater than 2.101, reject H_o; there is a difference between the two systems

Prob-value

at t_{18}, table only goes to 2.8784 ($t_{.995}$), so $p < .01$ that H_o is true; therefore, H_o has very little credibility

i.e. if H_o were true, there would be less than 1 chance in 100 of getting a sample mean as high as the 35.7 actually observed

APPENDIX H

RESULTS OF INTERRATER RELIABILITY TESTING

Nurse Rater	Date	# of Patients Rated	% of Census	# in Agreement- DGMC System	% Agreement- DGMC System	# in Agreement- WMS System	% Agreement- WMS	r - DGMC	r - WMS
A	2 APR	4	13	3	75	4	100	.82	1.00
B	2 APR	4	13	3	75	4	100	.82	1.00
C	3 APR	4	13	3	75	4	100	0	1.00
D	3 APR	4	13	3	75	4	100	0	1.00
E	3 APR	4	13	3	75	1	25	.85	.71
F	3 APR	4	13	3	75	1	25	.85	.71
G	12 APR	4	11	1	25	2	50	.42	.85
D	12 APR	4	11	1	25	4	100	.90	1.00
H	12 APR	4	11	2	50	4	100	.87	1.00
I	12 APR	4	12	1	25	4	100	.85	1.00
B	12 APR	4	13	1	25	3	75	.90	.87
E	12 APR	4	13	1	25	4	100	0	1.00
J	18 APR	5	13	2	40	4	80	0	0
A	19 APR	5	13	0	0	4	80	-.41	0
E	19 APR	5	13	3	60	5	100	.88	1.00
D	19 APR	5	17	3	60	5	100	.88	1.00
B	19 APR	5	16	0	0	5	100	0	1.00
K	25 APR	5	15	4	80	3	60	.67	.67
I	25 APR	5	14	0	0	2	40	.87	0
D	25 APR	5	14	0	0	4	80	1.00	.61
H	25 APR	5	15	3	60	5	100	.80	1.00
B	25 APR	5	14	2	40	5	100	.38	1.00
C	25 APR	5	14	3	60	4	80	0	.67

APPENDIX I

NURSING CARE EVALUATION QUESTIONNAIRE

AND RESPONSES

NURSING CARE EVALUATION FORM

*Date:*_____ *Shift:*_____

PLEASE COMPLETE AT OR TOWARDS THE END OF THE SHIFT

1. Evaluate to the best of your knowledge the quality of nursing care provided the patients during this shift. Using the following scale, circle your response.

5 - Optimal care
4 - Good care
3 - Adequate care
2 - Fair care
1 - Poor care
0 - Not applicable

DIRECT CARE:

THE PERFORMANCE AND ASSESSMENT OF:

a. *Vital signs*	5(3)	4(2)	3(1)	2	1	0
b. *monitoring activities (I & O; circulation, fundus and neuro checks; cardiac, apnea, temperature & pressure monitoring)*	5(1)	4(3)	3(1)	2(1)	1	0
c. *activities of daily living (baths, weights, toileting, positioning & routine patient assessment)*	5(1)	4(2)	3(2)	2	1(1)	0
d. *nutritional activities (tube feedings, bottle feedings, TPN)*	5	4(2)	3(2)	2	1	0(2)
e. *treatments, procedures, and medication administration (dressings, ambulation of patients, assisting the MD)*	5(3)	4(1)	3(1)	2(1)	1	0
f. *respiratory treatments (O_2, IPPB, incentive spirometer, chest PT, trachea care, suctioning)*	5(3)	4(2)	3	2	1(1)	0
g. *intravenous therapy (dressing changes, IV medication, blood products)*	5(3)	4(2)	3	2(1)	1	0
h. *teaching (pre-op, admission, special)*	5(2)	4	3	2	1(1)	0(2)

i. *patient and family emotional support (modification of lifestyle, sensory deprivation)*	5(2)	4(1)	3(2)	2	1(1)	0

2. Evaluate to the best of your knowledge the accomplishment of the following aspects of work during this shift. Using the following scale, circle your response.

5 - Optimally done
4 - Well done
3 - Adequately done
2 - Fairly done
1 - Poorly done
0 - Not applicable

INDIRECT CARE:

a. *Documenting nursing care*	5	4(3)	3(2)	2	1(1)	0
b. *Processing and implementing new physician's orders*	5(1)	4(4)	3(1)	2	1	0
c. *Processing and implementing new nurse's orders*	5(2)	4(2)	3(1)	2	1(1)	0
d. *Initiating and updating patient care plans*	5	4(2)	3(2)	2(1)	1	0(1)
e. *Performing administrative duties (committees attended, schedules determined, evaluations written)*	5(1)	4(1)	3(1)	2(1)	1(1)	0(1)
f. *Making patient rounds*	5(2)	4(3)	3	2(1)	1	0
g. *Making patient rounds with the physicians*	5	4	3	2(2)	1(2)	0(2)
h. *Insuring scheduled meal times and break periods for ward personnel*	5(3)	4	3	2(1)	1(2)	0
i. *Orienting new personnel*	5(1)	4(3)	3	2(1)	1	0(1)

3. Circle the number that corresponds with the response that best describes the shift just completed.

a. In general, the quality of nursing care provided the patients during this shift was:

5 - Optimal
(4) *4 - Good*
(1) *3 - Adequate*
(1) *2 - Fair*
1 - Poor

b. In general, the staffing for this shift was:

(1) *5 - Optimal*
(2) *4 - Good*
3 - Adequate
(2) *2 - Fair*
(1) *1 - Poor*

c. Staffing changes were needed:

(3) *1 - Yes*
(3) *2 - No*

d. Additional staff was needed:

(3) *1 - Yes*
(3) *2 - No*

Indicate how many more staff members you feel were needed:

1-2 *RNs*
1-2 *Paraprofessionals (Technicians)*
1 *Ward Clerks*
_____ *Other (Specify)"*_____

e. Less staff was needed:

1 - Yes
(6) *2 - No*

Indicate how many staff members you feel were not needed:

_____ *RNs*
_____ *Paraprofessionals (Technicians)*
_____ *Ward Clerks*
_____ *Other (specify):*_____

4. How long does it take you to classify a patient? (on the average)

Navy _____ *minutes* _____ *seconds* Range: 30sec. to 5-10 min.

DGMC _____ *minutes* _____ *seconds* Range: 5sec. to 3 min.

DGMC CLASSIFICATION SYSTEM

The following questions are in reference to the DGMC Patient Classification System.

5. How would you rate the ease of using this classification system?

(1) *1 - Very easy*
(3) *2 - Easy*
3 - Moderately easy
(2) *4 - Difficult*
5 - Very difficult

6. Do you believe the categories of care (O to V) determined by the DGMC system accurately reflect the level of care your patients require?

1 - Always
(1) *2 - Usually*
(1) *3 - Half of the time*
(3) *4 - Sometimes*
(1) *5 - Never*

7. How would you rate the usefulness of the DGMC system as a management tool?

1 - Very useful
(2) *2 - Useful*
3 - Undecided
(2) *4 - Not useful*
(2) *5 - Hindrance to management*

8. How do you feel about the DGMC system as a whole?

1 - Very satisfied
2 - Satisfied
(4) *3 - Neutral*
(1) *4 - Dissatisfied*
(1) *5 - Very dissatisfied*

9. What do you see as the major strengths of this system? (You may select more than one.)

(4) *1 - Ease of use*
2 - Comprehensive (Content is complete)
3 - Accurately reflects the workload
(4) *4 - Requires minimum time to complete*
5 - Reliable. (Same results obtained from one staff member to another)
6 - Useful as a management tool
*7 - Other Specify:*_____
(1) *8 - There are none*

10. What do you see as the major weaknesses of this system? (You may select more than one)

1 - Difficult to use. Complex
(4) *2 - Not comprehensive. (Content is not complete)*
(5) *3 - Inaccurate. (Does not reflect the workload)*
4 - Requires too much time to complete.
(5) *5 - Unreliable. (Different results obtained from one staff member to another)*
(3) *6 - Not useful as a management tool*
*7 - Other. Specify:*_____
8 - There are none

11. Are there any significant critical indicators missing from this system that you believe should be included?

(2) *1 - Yes. Specify:*_____
(1) *2 - No*

12. Are there any significant critical indicators that you believe should be deleted from this system?

*1 - Yes. Specify:*_____
(3) *2 - No*

13. How would you improve the DGMC Patient Classification System

See narrative, page 22

NAVY CLASSIFICATION SYSTEM

The following questions are in reference to the Navy's Patient Classification System.

14. How would you rate the ease of using the Navy's system?

(1) *1 - Very easy*
(1) *2 - Easy*
(1) *3 - Moderately easy*
(2) *4 - Difficult*
(1) *5 - Very Difficult*

15. Do you believe the categories of care (I to VI) determined by the Navy system accurately reflect the level of care your patients require?

1 - Always
(6) *2 - Usually*
3 - Half of the time
4 - Sometimes
5 - Never

16. How would you rate the usefulness of the Navy system as a management tool?

(1) 1 - Very useful
(3) 2 - Useful
(2) 3 - Undecided
4 - Not useful
5 - Hindrance to management

17. How do you feel about the Navy system as a whole?

(1) 1 - Very satisfied
(2) 2 - Satisfied
3 - Neutral
(3) 4 - Dissatisfied
5 - Very dissatisfied

18. What do you see as the major strengths of this system? (You may select more than one)

(1) 1 - Ease of use
(3) 2 - Comprehensive (Content is complete)
(5) 3 - Accurately reflects the workload
4 - Requires minimum time to complete
(3) 5 - Reliable. (Same results obtained from one staff member to another)
(3) 6 - Useful as a management tool
7 - Other. Specify:_____
8 - There are none

19. What do you see as the major weakness of this system? (You may select more than one.)

(2) 1 - Difficult to use. Complex.
2 - Not comprehensive. (Content is not complete)
3 - Inaccurate. (Does not reflect the workload)
(5) 4 - Requires too much time to complete.
5 - Unreliable. (Different results obtained from one staff member to another)
6 - Not useful as a management tool
7 - Other. Specify:_____
(1) 8 - There are none

20. Are there any significant critical indicators missing from this system that you believe should be included?

(2) 1 - Yes. Specify: Time consumed to complete the system
Categories for time spent with patients outside the parameters
(4) 2 - No

21. Are there any significant critical indicators that you believe should be deleted from this system?

1 - Yes. Specify:_____
(4) 2 - No

22. *Should the point value of any of the critical indicators of the Navy system be changed?*

(1) 1 - Yes. *Specify:* IV's and blood draws
(5) 2 - No

23. *Could the Patient Classification Worksheet be better designed to facilitate its use?*

1) if you didn't have to go from front to back
2) more slots per page
3) lines spread apart to document more easily

(4) 1 - Yes. *SPecify:* 4) maybe
2 - No

24. *How would you improve the Navy Management System?*

see narrative, page 23

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25. *How does the DGMC patient classification system compare with the Navy system? Check the system that most accurately reflects each factor.*

	NAVY	DGMC
1. More Accurate	6	
2. More Objective	6	
3. More Comprehensive	6	
4. Easier to use	1	4
5. More useful for assessing nursing requirements	5	
6. More time consuming	6	
7. More reliable	6	
8. Like it better	2	1

26. *Given a choice would you:*

(2) 1 - Continue to use Navy Management System
(2) 2 - Develop another system
(1) 3 - Use existing system
(1) 4 - Use no classification system

27. How often do you think patients need to be classified in order to accurately capture your workload?

(1) *1 - Every shift*
(4) *2 - Once every 24 hours*
(1) *3 - Once per week*
*4 - Other. Specify:*_____

28. Should you be required to classify your patients once a day, which shift do you believe would best reflect your workload?

(6) *1 - Days*
2 - Evenings
3 - Nights

SELECTED BIBLIOGRAPHY

BOOKS

Accreditation Manual For Hospitals - 1985. Chicago: Joint Commission on Accreditation of Hospitals, 1984.

Aydelotte, Myrtle K. *Nurse Staffing Methodology: A Review and Critique of Selected Literature.* Department of Health, Education and Welfare Publication No. (NIH) 73-433. Washington, D. C.: U.S. Government Printing Office, 1973.

Daniel, Wayne W. *Biostatistics: A Foundation For Analysis in the Health Sciences*, New York: John Wiley and Sons, 1983.

Downie, N. M. and Heath, R. W. *Basic Statistical Methods*, 4th ed. New York: Harper and Row, 1974.

PERIODICALS

Abdellah, Faye G. and Levine, Eugene. "Better Patient Care Through Nursing Research." *International Journal of Nursing Studies* 2 (April 1965): 1-11.

Alward, Ruth R. "Patient Classification Systems: The Ideal vs. Reality." *Journal of Nursing Administration* 13 (February 1983): 14-19.

Auger, Jeanine A. and Dee Vivien. "A Patient Classification System Based on the Behavioral System Model of Nursing: Part 1." *Journal of Nursing Administration* 13 (April 1983): 38-43.

Barham, Virginia Z. and Schneider, William R. "MATRIX: A Unique Patient Classification System." *Journal of Nursing Administration* 10 (December 1980): 25-31.

Clayton, A. and St. Germain, D. "A Four-Year Experience with GRASP." *Dimensions in Health Service* 58 (November 1981): 8-11.

Cleland, Virginia. "Relating Nursing Staff Quality to Patients' Needs." *Journal of Nursing Administration* 12 (April 1982): 32-37.

Cochran, Sr. Jeannette and Derr, Duane. "Patient Acuity System for Nurse Staffing." *Hospital Progress* 56 (November 1975): 51-54.

Cullen, David J.; Keene, Roberta; Waternaux, Christine; and Peterson, Harriet. "Objective, Quantitative Measurement of Severity of Illness in Critically Ill Patients." *Critical Care Medicine* 12 (March 1984): 155-160.

Dee, Vivian and Auger, Jeanine A. "A Patient Classification System Based on the Behavioral System Model of Nursing: Part 2." *Journal of Nursing Administration* 13 (May 1983): 18-23.

Des Ormeaux, Susan P. "Implementation of the CASH Patient Classification System for Staffing Determination." Supervisor Nurse 8 (April 1977): 29-35.

Edgecumbe, Robert H. "The CASH Approach to Hospital Management Engineering." Hospitals 39 (16 March 1965): 70-74.

Engever, L. "Nursing Workload: the Busyness Factor." Dimensions in Health Service 58 (November 1981): 18-20.

Fedorowicz, Jane. "Will Your Computer Meet Your Case-Mix Informational Needs?" Nursing and Health Care 4 (November 1983):493-497.

Giovannetti, Phyllis. "Understanding Patient Classification Systems." Journal of Nursing Administration 9 (February 1979): 4-9.

Giovannetti, Phyllis, and Mayer, Gloria. "Building Confidence in Patient Classification Systems." Nursing Management 15 (August 1984): 31-34.

Henninger, Dawn and Dailey, Chris. "Measuring Nursing Workload in the Outpatient Department." Journal of Nursing Administration 13 (September 1983): 20-23.

Horn, Susan D.; Chachich, Bette; and Clopton, Cathy. "Measuring Severity of Illness: A Reliability Study." Medical Care 21 (July 1983): 705-714.

-------. "Measuring Severity of Illness: Comparisons Across Institutions." American Journal of Public Health 73 (January 1983): 25-31.

Jelinck, Richard C.; Zinn, Tim K.; and Byra, James R. "Tell the Computer How Sick the Patients Are and It Will Tell How Many Nurses They Need." Modern Hospital 121 (December 1973): 81-85.

Kelly, Mary and Montgomery, John E. "Development of Staffing Formulas for Nursing Personnel Based on Patient Classification and Quality of Care Considerations." Military Medicine 147 (February 1982): 115-121.

Knaus, William A.; Zimmerman, Jack E.; Wagner, Douglas P.; Draper, Elizabeth A.; and Lawrence, Diane E. "APACHE--Acute Physiology and Chronic Health Evaluation: A Physiologically Based Classification System." Critical Care Medicine 9 (August 1981): 591-597.

Kraegel, Janet M.; Schmidt, Virginia; Shukia, Ramesh K.; and Goldsmith, Charles E. "A System of Patient Care Based on Patient Needs." Nursing Outlook 20 (April 1972): 257-264.

Kreitzer, Sharon L.; Loebner, Elaine S.; and Roveti, George C. "Severity of Illness; the DRG's Missing Link?" Quality Review Bulletin 8 (May 1982): 21-34.

Lagona, Teresa G. and Stritzel, Mary M. "Nursing Care Requirements as Measured by DRGs." Journal of Nursing Administration 14 (May 1984): 15-18.

McCormick, Patricia; Roche, Joan M.; and Steinwachs, Donald. "Predicting Nurse Staffing." Hospitals 47 (1 May 1973): 68-79.

Meyer, Diane. "Workload Management System Ensures Stable Nurse-Patient Ratio." Hospitals 52 (March 1, 1978): 81-85.

Muller, Charlotte. "Paying Hospitals: How Does a Severity Measure Help?" American Journal of Public Health 73 (January 1983): 14-15.

Ryan, Tula; Barker, Betty L.; Marciente, F. Anthony. "A System for Determining Appropriate Nurse Staffing." Journal of Nursing Administration 5 (June 1975): 30-38.

Scherer, Kathleen and MacKenzie, Lillian. "The Dilemma of Patient Classification Systems." Dimensions in Health Service 57 (September 1980): 34-35.

------, "Variable Staffing Adds Up the Patient Needs to Determine How Many Nurses Should Provide the Care." Modern Hospital 121 (December 1973): 87-88.

Vaughan, Robert G. and MacLeod, Vernon. "Nurse Staffing Studies: No Need to Reinvent the Wheel." Journal of Nursing Administration 10 (March 1980): 9-15.

OTHER SOURCES

Department of the Air Force. David Grant USAF Medical Center (MAC), SGHN Operating Instruction 168-10, Patient Classification and Staffing Patterns. Travis Air Force Base, California, 16 January 1984.

Department of the Air Force. Headquarters US Air Force, Air Force Manpower Standard 5206, Medical/Surgical Nursing Units. Washington, D. C., 17 March 1981 (Change 2, dated 30 March 1984).

------. Draft Report, JWK International Corporation. Annandale, VA, n.d.

Goodwin, Barbara. Chairperson, Department of Nursing, David Grant USAF Medical Center, Travis Air Force Base, California. Telephone conversation, 11 April 1984.

Misener, T. R.; Frelin, A. J.; and Twist, P. A. Time Spent in Indirect Nursing care--Final Report. Fort Sam Houston, Tx.: Health Care Studies and Clinical Investigation Activities, August 1983.

United States Air Force Medical Service, Workload Management System Educational Workbook. Brooks Air Force Base, Texas, n.d.

Vail, James D.; Rimm, Elizabeth; and Norton, Dena A. The Workload Management System for Nursing. Washington, D. C.: Walter Reed Army Medical Center, n.d.

Williams, Patricia. Consultant for Nursing Affairs, Brooks Air Force Base, Texas. Telephone conversation, 19 March 1985.

Williams, Patricia; Black, Joanne; and McKay, Priscilla. "Evaluation of the U.S. Army and Navy Workload Management System. Psychometric Characteristics and Usefulness for Patient Classification and Staffing Allocations in the Air Force Medical Service." Research Proposal, Clinical Consultants Division, AFMS Center, Brooks AFB, Texas, 1983.