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A STUDY TO DETERMINE THE FEASIBILITY OF ESTABLISHING A PATIENT SELF-CARE UNIT AT MADIGAN ARMY MEDICAL CENTER

A GRADUATE MANAGEMENT PROJECT PROPOSAL

SUBMITTED TO THE FACULTY OF

THE U.S. ARMY/BAYLOR UNIVERSITY

IN PARTIAL FULFILLMENT OF THE

REQUIREMENTS FOR THE DEGREE

OF

MASTER OF HEALTH ADMINISTRATION

BY

MAJOR STEVEN H. CHOWEN

APRIL 1996

ABSTRACT

A case study of inpatient utilization at Madigan Army Medical Center was conducted in three phases to determine the number of inpatient bed-days coded as "self-care", to determine the potential for future populations of self-care patients, and to conduct a cost benefit analysis between establishing a self-care unit or keeping self-care patients in an inpatient bed. An investigation of Nursing Workload Management Data indicated that in 2605 inpatient bed-days were coded as self-care in 1994 and 1812 bed-days in 1995. Investigation of the lengths of stay for ten high volume Diagnostic Related Groups (DRG) indicated that future admissions using current practice patterns would potentially yield 2135 self-care days within these ten DRGs alone. Results of the cost benefit analysis indicated that establishing a self-care unit within Madigan Army Medical Center would increase variable costs by $42,649. It was recommended that the self-care unit not be established and that alternative uses for available ward space be explored.

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INTRODUCTION

Background

Healthcare cost and health care cost containment are the driving forces behind the transformation occurring in the United States healthcare system. Healthcare expenditures in the United States rose steadily from 6 percent of the Gross National Product(GNP)in 1967 to over 14 percent of the GNP in 1994 (Lamm, 1994, 365). Some analysts are predicting this figure will rise to between 17 and 19 percent by the year 2000 (Newhouse, 1994, 12). Healthcare's rapid rise in cost is attributed to numerous factors including: aging population, increased physician supply, rising incomes, technological advancements, defensive medicine, and steady price increases for goods and services that do not experience significant increases in productivity (Newhouse, 1994, 13). Concern over the rising cost of healthcare forced purchasers and providers of healthcare services to search for alternatives to the traditional methods of healthcare delivery.

The government is the primary purchaser of healthcare services in the United States. In the early 1980s the government began attacking rising costs through the power of legislation. Initial governmental attempts at cost control were through utilization controls (Tax Equity and Fiscal

Responsibility Act) and reimbursement restructuring (Prospective Payment System, Resource Based Relative Value Scale). Industry, the second major purchaser of health care services approached this problem not only following the government's lead, but also by making use of the power of the competitive marketplace encouraging employees to enroll in discounted managed care initiatives (Rosenstein, 1994, 53).

By mid 1980s, the Department of Defense(DoD) recognized that the current military health care system faced the same reduced funding, rising costs, and growing utilization as the civil health care system. Congress realized that government healthcare could benefit from managed care initiatives in much the same manner as the civil healthcare system. In 1988, Congress directed the DoD to conduct comprehensive demonstration projects [CHAMPUS Reform Initiative (CRI) and Catchment Area Management (CAM)]on the potential benefits of implementing alternative health care delivery systems (Rand,1990). Results of these studies provided a basis for the development of a DoD managed care program within the Military Health Services Support System (MHSS) known as TRICARE.

Reformation of DoD healthcare under TRICARE began in October, 1993. TRICARE is a managed care plan designed to ensure the most effective execution of the military healthcare mission. TRICARE provides medical services and

support to members of the armed forces, their dependents, and others entitled to DoD medical care (9 million beneficiaries). Under TRICARE non-active duty beneficiaries are offered three options: 1) they may enroll to receive health care in a military-civilian Health Maintenance Organization (with a Point of Service Option)system called "TRICARE Prime", 2) they may choose to use a civilian Preferred Provider Network, on a case-by-case basis, under "TRICARE Extra", or 3) they may remain in the standard Civilian Health and Medical Plan of the Uniformed Service (CHAMPUS) benefit plan called, "TRICARE Standard". CHAMPUS provides reimbursement (minus deductibles and copayments) for civilian health services received by military dependents and retirees.

The goals of the TRICARE managed health care system are to ensure access to quality health care, control rising health care costs, and provide responsiveness to changing national and military health care priorities (DoD, 1994, 1). In an effort to meet TRICARE's goal of controlling rising costs the DoD sought to replace financing modalities that originated in the late 1950s (Williams, et al, 1994, 25). Past methods of funding activities within the MHSS were based on a workload (Military Work Unit)production model of healthcare delivery that paralleled traditional fee-for-service reimbursement. The more units of output (bed days) created by the medical treatment facility (MTF)the higher

the future funding for the facility. Under the workload based system of funding MHSS healthcare costs continued to climb.

The DoD in an attempt to control rising health care costs, adopted a model of financing MTFs similar to civilian managed care organizations. In 1994, DoD instituted capitation financing for all MTFs (Williams, et al, 1994, 27). Under capitated financing all funds are tied to the number of beneficiaries within a healthcare plan. The MTF's resources are known up front and will not change unless the number of beneficiaries changes.

Under a capitation arrangement of a fixed amount of dollars per enrollee, the incentive is to avoid the admission if the patient can safely be treated at a less expensive lower level of care, minimize the length of stay, and be conservative in resource utilization (Rosenstein, 1994, 54). By contrast, traditional fee-for-service healthcare has little or no economic incentive to reduce access to hospitalization. In fact, the motivation under fee-for-service is to produce more output by keeping beds fully occupied (Kongstevdt, 1995, 4).

This change in financial incentive under capitated managed healthcare has driven healthcare organizations to develop alternatives to acute care delivery that reduce inpatient utilization (Kongstevdt, 1995, 131). It is therefore, imperative that leaders in military medicine

recognize the potential for economic efficiency in regards to both length of stay and inpatient resource consumption.

Recent entry into the capitated managed care environment indicates that military treatment facilities retain substantial opportunities to discover more efficient methods providing patient care. The intent of this study is to exploit these opportunities for efficiency by identifying specific practice methodologies within Madigan Army Medical Center, that will result in the reduction of inpatient days, effective manpower utilization, and reduced resource consumption.

Conditions Which Prompted the Study

Under the TRICARE managed care system, there are 12 regional areas located throughout the continental United States, Hawaii, and Alaska. Madigan Army Medical Center (MAMC), located at Ft. Lewis Washington, is the primary medical referral center for Region 11 of the TRICARE program and the command and control center for the Army Medical Department's Northwest Health Service Support Area (HSSA).

MAMC a 1.2 million square foot, 414 bed, tertiary-care and teaching facility provides over one million outpatient visits and 21,000 hospital admissions annually. As the primary referral center for Region 11, MAMC supports over 340,000 Department of Defense beneficiaries throughout the states of Washington, Oregon, and portions of Idaho. In its

role as the command and control center for the Northwest HSSA, MAMC directs Army healthcare activities in seven northwest states to include Alaska, Washington, Oregon, Idaho, Montana, Northern California, and Nevada.

MAMC faces several unique challenges regarding their large and geographically diffused beneficiary population. These challenges are not inherent to the typical managed care plan. First, MAMC's beneficiaries are referred for care over great distances. Patients are transported to MAMC aboard Air Force aeromedical aircraft from all corners of Region 11 catchment area, the Nortwest HSSA and beyond. The patient's inability to return home to recuperate often requires a stay in the local area until treatment is completed. It is believed that this situation may result in admissions that would be otherwise treated on an outpatient basis. Secondly, Madigan serves a segment of the active duty population that resides in military barracks and on ships. Due to the military member's unique housing situations they are often admitted for procedures (e.g., oral surgery, tonsillectomy) that civilian managed care plans typically would not admit. Finally, the infrastructure that supports the continuum of care in successful civilian integrated health care delivery systems is not in place within DoD managed care. Skilled nursing facilities, home health care, and long-term care facilities, elements essential to a continuum of care are not fully integrated into the services

provided by TRICARE. The inability to provide these alternative delivery services results in hospital stays beyond recommended utilization guidelines.

Just as in the competitive health care market, MTFs under TRICARE managed care have experienced a shift from inpatient to outpatient services. Over the past six years the average daily inpatient workload at MAMC dropped steadily (TRICARE 1995). Inpatient daily census decreased from an average of 268.2 in 1990 to 205.3 in 1995 (See Fig. 1).

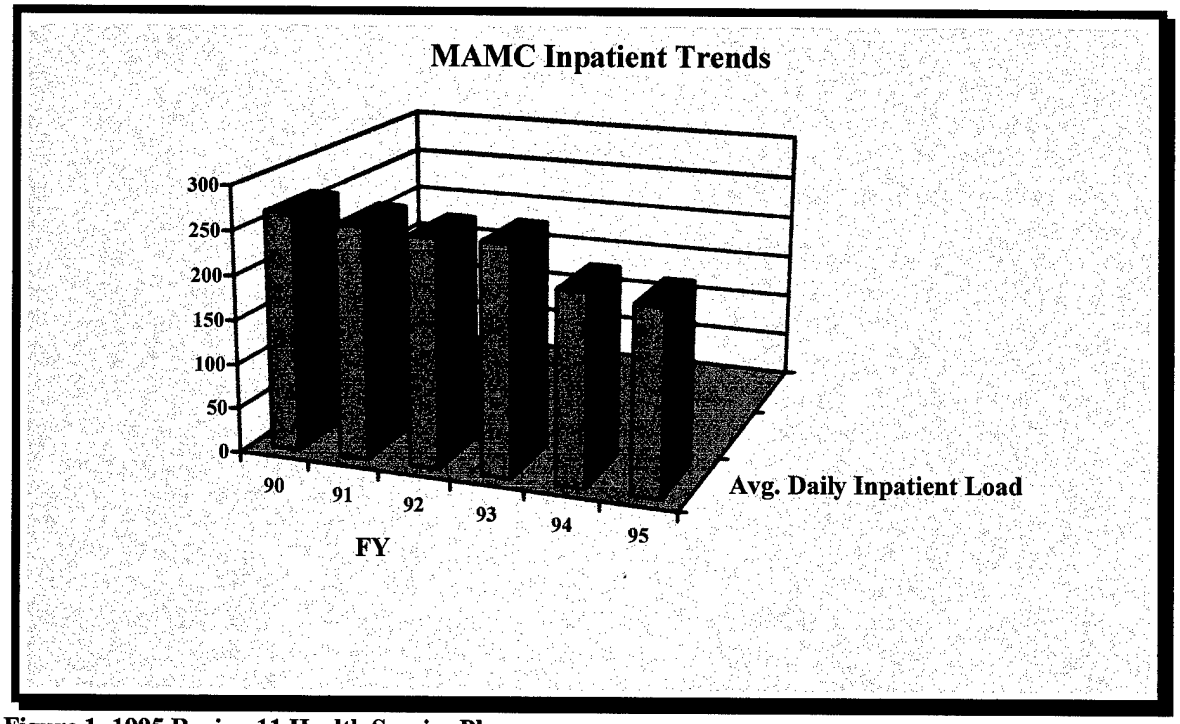

Figure 1. 1995 Region 11 Health Service Plan

This decline in census has led to an increase in available ward space within the hospital. The Commanding General, MAMC, has directed the Chief, Department of

Nursing, to investigate potential uses of this available space. One option under consideration is the establishment of a self-care unit within MAMC. Establishment of such a facility would provide an alternative to traditional inpatient care and in turn support the unique access requirements of MAMC's DoD beneficiaries, previously mentioned.

The availability of such a facility will potentially reduce lengths of stay for selected diagnoses and provide an alternative to admissions made based on the geographic location. Reduction of inpatient utilization by using this alternative method of patient care is consistent with the financial incentives of capitated managed care plans. Effective utilization of services facilitates cost avoidance and provides opportunities for the redistributed of resources within the managed care organization.

Prior to making a decision to establish such a facility it is necessary to determine if there is a need and a customer base to support its operation. A lack of alternative delivery services combined with unique beneficiary requirements are potential indicators of less than optimal inpatient utilization at MAMC. If this hypothesis is true, opportunities exist within MAMC's inpatient setting to reduce length of stay, while continuing to meet the special demands of our unique customer base.

Preliminary interviews with MAMC nursing staff and

informal concurrent audits of inpatient charts revealed patients occupying beds with acuity of care levels coded "1". Patients with this acuity level possess the ability to perform all activities of daily living (ADL) and to self-medicate using prescription medications. These initial findings indicate there is a potential customer base for a self-care unit. Interviews with aeromedical flight coordinators also indicated a significant number of customers arrive from great distances that could benefit from such a facility.

Statement of the Problem

Currently, alternative delivery systems (step-down facilities, home care, rehabilitation step-down) are very limited or absent from the MAMC's continuum of care. Absence of or limited access to these alternative methods of health care delivery may facilitate the ineffective utilization of inpatient resources resulting in unnecessary inpatient expenditures. Are there opportunities to maximize inpatient utilization at Madigan Army Medical Center through the establishment of alternative delivery systems, while continuing to provide quality care?

Literature Review

The onset of health care reform has changed the very character of health care and the organization of the health care delivery system (McNamee and Garland, 1993, 28). Two decades of spiraling health care cost increases forced healthcare leaders to confront the challenge of providing healthcare within the context of cost control (Relman, 1991, 3). To control escalating costs, private insurers and government payers have questioned the need for inpatient care, attempted to control the level of hospital payment, and encouraged the use of less costly providers and sites of care. The combination of flat or decreasing per deim rates and the continued decline in inpatient utilization are leaving hospitals with no choice but to join with physician partners and insurers to form integrated managed care organizations (Cerne, 1994, 28).

Utilization of hospital services usually accounts for up to 40% or more of the total expenses in a managed heath care plan (Kongstvedt, 1995, 121). In order to control the volume of services provided in managed care plans capitated budgeting and payment mechanisms are implemented. As previously stated, under a capitation arrangement of a fix amount of dollars per enrollee, the incentive is to avoid admissions if patients can safely be treated at a less

expensive lower level of care, minimize the length of stay, and be conservative in resource utilization (Rosenstein, 1994, 54). Control of institutional utilization is one of the most important aspects of managing overall health care costs in a capitated managed care plan (Kongstvedt, 1995, 134).

According to Milliman and Robertson, in order to establish an effective utilization management program the appropriate infrastructure must be in place to facilitate the management of resources (Milliman and Roberston, 1995, 10). Infrastructure needs that are essential to effective utilization management programs include holding capacity, around-the-clock service, step-down care capability, and access to outpatient services (Milliman and Roberston, 1995, 10).

These services run contrary to traditional acute care hospital inpatient operations. According to Kongstvedt, there are many instances where patients are ill or disabled but not to the extent that they need to be in an acute care hospital (Kongstvedt, 1995, 131). A common occurrence is the beneficiary or hospital customer who starts out needing the services of an acute care hospital (e.g., a patient had surgery) but their recovery requires far fewer resources than are available in the hospital. In other cases, there simply is no place for the patient to go (e.g., a patient is recovering from a broken femur but lives alone). In a few

cases, a patient is kept in the hospital for the convenience of a physician who does not want to make house calls or rounds at another institution. Last, there are times when a patient is kept in the hospital simply because "That's the way it's always been done" (Kongstvedt, 1995, 131).

By forming integrated delivery systems for beneficiaries that provide services along a continuum of care (preventive, ambulatory, acute, rehab., long-term) managed care organizations were able to reduce inpatient utilization by simply shifitng some services to a less expensive more appropriate setting. This shift in services within the managed care environment finds hospitals beginning to experience 50:50 inpatient revenues to ambulatory revenues. It is estimated that by the mid 1990s managed care inpatient utilization review efforts will identify all members potentially treated as outpatients and screen them from inpatient care (Coile, 1993,5). A study reported in the New England Journal of Medicine, utilized American Hospital Association and Health Care Financing Administration data, to determine that the era of easy reductions in the number of inpatient days is largely over (Schwartz and Mendelson, 1991, 1037).

Hospitals responded to the drop in inpatient care by seeking new sources of revenue and strategies for providing cost effective care. Front-runners rapidly expanded their capacity to perform ambulatory surgery and other outpatient

services and developed specialized units to provide inpatient rehabilitation care, subacute, skilled nursing, home health, and other community services (Altman and Young, 1994, 94).

Many of the scenarios previously mentioned are applicable to military medicine in one aspect or another. The need for step-down recovery facilities, facilities for the patient with no place else to go(e.g. soldiers living in barracks), and the existence of the, "That's the way it's always been done" mind set are apparent within military medicine. These issues are contrary to the practice of managed care. The demands for effective resource management in a capitated manage care environment requires leaders in military medicine to explore alternatives to traditional inpatient care.

Alternatives to traditional acute care hospitalization include step-down units, outpatient procedure units, hospice care, home health care. Less publicized alternatives to inpatient care are the self-care unit, the cooperative care unit, or the patient hotel. These alternative delivery options are similar in that they reduce direct nursing requirements, reduce length of stay, increase patient autonomy and produce outcomes equivalent to traditional acute care (Freidman et al, 1988; Weis, 1988; Moore et al, 1990). The difference is that self-care and cooperative

care units require nursing activities at reduced levels while, patient hotels require no direct nursing activities.

A review of the literature indicates that initiatives in self-care began in the early 1970s (Orem, 1971); while, cooperative care and patient hotels began to surface in the mid 1980s in response to the implementation of the DRG based reimbursement system (Friedman, 1984, 73). This literature review will address each of these alternative care options.

Small states that, "self-care" is the deliberate action to do for oneself what is perceived necessary to accomplish personal goals (e.g. recovery from illness)(Small, 1993, 19). Freidman reports that self-care is categorized into two types: universal self-care and health deviation self-care. Universal self-care consists of actions required to maintain normal human functioning, such as eating, sleeping, exercising, and elimination. Health deviation self-care includes actions required to meet demands of illness, injury, and/or health disability (Friedman et al., 1988, 173). Self-care units within acute care facilities facilitate the actions of both universal self-care and healthcare deviation self-care. Self-care units provide an environment that promotes normal human functioning and facilitates the actions required of health deviation healthcare through the individual patient and not through traditional direct nursing care. The goal of self care

programs is to encourage patients to be their own primary caregivers, responsible for decisions affecting their health, in partnership with nursing professionals who assume the role of facilitator/consultant rather than caretaker (Caporeal-Katz, 1983, 35). This shift of responsibility has implications for cost avoidance through reduced nursing intensity and earlier discharges.

A significant amount of information exists in the literature addressing the benefits for patients of self-care programs; however, little information is available that assesses the cost-effectiveness of this health care delivery model. An early study conducted at Vanderbilt University, reported a decrease in the nurse/patient ratio as a result of implementing self-care on a medical/surgical unit. Those involved in the study anticipated that their profit margin would increase as the practice became more acceptable (Gibson and Pulliam 1987, 20).

Cost-effectiveness of implementing a self-care program for cesarean section patients was studied at Jefferson Davis Hospital in Houston, TX. The study evaluated occupancy percentage, census, average daily acuity, length of stay on the self-care unit, actual unit expenditures and quality of care over a 120 day period (Freidman et al., 1988, 174-5). Results indicated a 12% decrease in occupancy coupled with a 15% drop in average daily census. Acuity levels decreased

from a mean of 3.5 hours to a mean of 3.2 hours resulting in a 9% savings in direct patient care hours. Length of stay for patients in the study decreased by 6%. The researchers deduced that these finding may indicate cost savings when evaluated over a longer period of time (Freidman et al., 1988, 177).

In an effort to create cost effective programs that promoted financial viability researchers at Newark Beth Israel Medical Center established two self-care units (Shendell-Falik, 1990, 40). In May 1984, the Young Adult Unit opened followed by the Independent Care Unit in January 1985. The Young Adult Unit is a 15-bed unit dedicated to the specific needs of 13-21 year olds. The Independent Care Unit is a 20-bed unit for patients who were willing to participate in their own care. Three separate studies were conducted on these units over the next three years. The first study conducted over a 6 month period compared lengths of stay (LOS)for cardiac catheterization patients from a traditional medical/surgical ward and the Independent Care Unit. In the cardiac catheterization without complex diagnosis, a total of 433 patients were reviewed. Results demonstrated a 0.5 day decrease in LOS for those in the Independent Care Unit versus those on the traditional ward (Shendell-Falik, 1990, 45). During the same period, 300 patients were reviewed for the diagnosis of cardiac

catheterization with a complex diagnosis. A decrease of 3.1 day in length of stay was evident for those on Independent Care (Shendell-Falik, 1990,45).

A second review of patients with a diagnosis of asthma was made between patients on the Young Adult Unit and those on a medical/surgical unit. A total of 82 patients were examined for 6 months. Patients in the Young Adult unit demonstrated a difference in length of stay of 2.0 days less than traditional care (Shendell-Falik, 1990, 45).

Evidence of successful self-care programs in military facilities is Tripler Army Medical Center's Self-care Unit. Tripler's Self-care unit is a 37-bed facility established to provide a special environment for patients who no longer require skilled nursing care and can independently perform their self-care needs (Tripler Army Medical Center, 1995). Patients utilizing the facility include those receiving chemotherapy or radiation therapy, those undergoing non-invasive procedures, those participating in occupational and physical therapy, and those patients in an air-evac status.

Unit supervisors reported a reduction in skilled nursing hours required. Tripler staff also conducted a cost benefit analysis that showed a cost avoidance of $789 per bed [Self-care Bed-$68 vs. Inpatient Bed-$857](Tripler Army Medical Center, 1995). Tripler's similarity of mission and

the success of their self-care unit indicates that this type of facility is potentially feasible at MAMC.

Patients well enough to leave the hospital but too sick to go home often end up occupying an inpatient bed. One cost containment strategy developed to support this patient population was the cooperative care unit. The cooperative care unit is designed to teach patients and their care partners how to care for themselves and ultimately better prepare for home discharge (Woods, et al, 1988, 596). In a study conducted at Methodist Hospital of Indiana, the cost of obstetric care delivered in a 19-bed cooperative care unit was compared with the cost for similar patients treated in a traditional inpatient maternity unit. The study sample contained 1,683 consecutive patients representing 23 diagnosis categories (Woods, et al, 1988, 597). The study indicated that lower costs for cooperative care patients were statistically significant ($P < 0.05$). For fiscal year 1986, hospital cost savings for the 576 patients who used the cooperative care unit were $80,640 or approximately $105,000 in total patient charges (Woods, et al., 1988,603). Researchers in this study concluded that Cooperative Care Units result in lower costs and should be made more available.

In 1987 researchers at the Medical Center of Vermont, a 500-bed tertiary care teaching facility, conducted a cost

analysis of their 12-bed Cooperative Care Unit. During the first six months of operation the Cooperative Care Unit resulted in a 32% savings in health care cost in relation to the cost for traditional nursing care (Weis, 1998, 144).

Researchers at the New York University Hospital concluded that their 104-bed Cooperative Care Center is a cost effective alternative to the more expensive staff-intensive, traditional hospital care (Chwalow, et al, 1990, 17). Follow-up analysis of both experimental (n=180) and control (n=190) groups concluded that there were comparable and equally positive post-hospitalization experiences (90% or greater of both groups). These findings indicate that costs can be reduced without sacrificing quality.

Housing patients in hospital owned or commercially owned hotels to control utilization of inpatient services began in the early 1980s. In 1980, 97-bed Boulder Memorial Hospital began housing patients at a nearby Hilton and reduced per diem costs by two-thirds and was able to care for additional patients without adding beds (Frew, 1981, 6).

Presbyterian-University of Pennsylvania Medical Center, a 308-bed not-for profit hospital, developed a hospital owned hotel to increase their discharge options (Anonymous, 1986, 6). The first year of service for the 24 bed facility resulted in an average patient stay of 4.8 days with

occupancy in the 80 to 90 percent range. Expected cost savings for the program were estimated at $750,000 (Anonymous, 1986, 8).

The Texas Kidney Institute at Hermann Hospital's, Hotel Alternative Program (HAP) was developed to reduce the LOS of patients who do not reside in the immediate area. The HAP uses a hospital associated hotel that is owned by non-hospital developers. A cost benefit analysis of the first twenty patients utilizing the facility reported a 94% saving ($5,450 vs. $92,713)(Bradley-Davis and Groneman, 1987, 24). Military installations that receive patients through the aeromedical evacuation system face similar dilemmas with individuals and families traveling from great distances.

Baptist Medical Center of Jacksonville, FL, a 531-bed acute care facility owns a financially successful 48-room hotel operated by their admitting services (Garfikel, 1989, 11). The goals of the facility is to provide services that support and complement the medical center's mission by addressing the needs of patients and their families, physicians, employees, and visitors; and to generate sufficient revenue to support the operational needs of a hotel. The hotel is located 3 floors above the hospital's labor and delivery department. Its convenient location enables the hospital to reduce the cost of antepartum hotel stays for high risk obstetric patients. Financial

performance of the hotel indicates revenue levels capable of supporting the hotel's operation and adding to the hospital's bottom-line (Garfinkel, 1989, 12).

The 93-room New Haven Medical Hotel, New Haven, CT, is a non-hospital owned facility which houses recuperating patients as well as non-medical guests. The hotel is entered into a cooperative effort with Temple Surgical Center and the Hospital of St. Raphael to house patients that do not require traditional nursing services. The cost for a patient stay at the hotel is $210, meals included (Smith, 1992, 14). These rates represented significant savings over traditional services and were considered cost effective alternatives by a number of HMOs and indemnity plans.

Determining the need for alternative care facilities is essential before initiating such a venture. In Great Britain researchers from the British Department of Epidemiology and Public Health conducted an extensive study on the appropriateness of bed use by determining patients' suitability for hotel accommodations (Harvey et al, 1993, 368). The study took place at the University Hospital of Wales, an 856 bed full service facility. Subjects for the study were patients occupying a total of 3972 bed days, accumulated over seven randomly chosen census days. Ten percent of the 3972 or 405 of the patients were judged

suitable for a patient hotel. Suitable patients were described as entirely self-caring, mobile and able to manage their own medication and either need to be resident for at least one night on the hospital site or recently required acute care and are awaiting discharge. Specialties indicating major use were obstetrics and gynecology, general surgery, and general and geriatric medicine (Harvey, 1993, 369). Researchers believed their study indicated a general hospital of this magnitude would generate a need for a mean of 72 patient hotel beds. Potential resources released for more appropriate purposes were estimated to be 2.7 million British pounds per annum in a 1000 bed hospital (Harvey, 1993, 373).

The literature reviewed indicates that are several types of alternative step-down patient care services in operation in both civilian and military systems. Although little research conducted directly assessed the cost-effectiveness of these alternative delivery models it did indicate that there is the potential to avoid cost and reduce resources for more appropriate utilization. One study reported that is possible to determine institutional requirements for patient hotel beds and for DRGs that benefit from this type of service.

The literature review provides a basis for further investigation of these alternative services at Madigan.

Unlike the majority of studies that focused on patient benefits of using self-care it is the intent of this study to focus on the cost-effectiveness of these services. Many of the successful self-care/hotel programs in the literature reported a cost savings; however, they fail to state how these savings were recaptured. This study will identify areas where cost can be avoided and determine how to recapture those costs for more appropriate reallocation.

Purpose

The purpose of this project is threefold. First, to analyze inpatient records to identify the number of bed days that occurred with a patient's nursing acuity levels recorded as self-care/minimal care. Second, to analyze patient admission data to compare the length of stays for selected diagnoses to CHAMPUS recommended lengths of stay in order to identify potential days for pre or post admission self-care. Third, to conduct a cost analysis between establishing and maintaining a self-care unit within Madigan Army Medical Center or continuing to admit patients capable of self-care to inpatient wards.

CHAPTER 2

METHODS AND PROCEDURES

Advanced automation on the patient wards at MAMC provides a unique opportunity to acquire inpatient utilization data. Currently, all inpatient charting at MAMC is accomplished using an automated system called the Clinical Information System (CIS). Terminals are located at each patients bedside and are used to record physician orders, nursing activities, discharge planning, and other patient information as required. Patient charts within CIS are accessible to various caregivers (LPNs, RNs, Physicians) at levels (charting, patient orders, pharmaceutical orders) appropriate to their skills and credentials. All entries on a patient's chart are recorded and stored in an archived data format.

Archived data will be used to identify the number of inpatient bed days that occur where a patient's chart is coded with an acuity category of "0" or "1". A patient coded with a category "0" is admitted as an inpatient and signed back out (on pass) of the hospital to take care of personal business. A patient coded with an acuity category "1" is capable of self care or minimal care. Either of these categories identifies a patient that is a potential candidate for a self-care unit based on the fact that they do not require direct nursing care. Patients with these

acuity codes are capable of all activities of daily living, are mobile, and can administer their own medications.

This retrospective study will look at inpatient data archived over a two year period. The data gathered will be configured to identify diagnosis, length of stay, and the ward upon which the patient was admitted. The data reported will identify the number of inpatient days and associated cost that could have been avoided by using a self-care unit. Total inpatient cost is established by using total inpatient days for patients in the acuity category of "0" or "1", multiplied by the cost of the associated type of inpatient bed-day.

30 bed-days (coded 1) X $800 (Surgical ward bed-day)= **$2400**

The next phase of this project analyzes inpatient admission data from the Patient Administration Department. Average lengths of stay (LOS) for the following DRGs will be compared to CHAMPUS recommended lengths of stay:

- Pre-labor
- Pre-Aclamcia
- Arthroscopic Knee Surgery
- Oral Surgery
- Tonsillectomy
- Chemo Therapy
- Kidney Dialysis
- Cardiac Catheterization

CHAMPUS recommended lengths of stay were used as the benchmarks for this study, since these guidelines are applied to the same services purchased for DoD beneficiaries

in the civilian healthcare system. Therefore, they represent LOS considered reasonable by the DoD for each respective DRG. The DRGs with lengths of stay longer than recommended CHAMPUS inpatient guidelines will be identified. Diagnostic related groups that exceed guidelines will provide a picture of the inpatient bed-days potentially avoided by implementing a self-care unit.

The last phase of this study addresses retrospective inpatient admission data covering the previous two years. Identification of the diagnostic categories with average lengths of stay longer than CHAMPUS guidelines will also provide demographic information (age, gender, active duty and retired military) regarding the potential type of customer that may utilize a self-care facility. This information will be used to determine operational requirements (capacity, amenities, staffing, supplies, special equipment) for a self-care unit if a decision is made to establish such a facility.

The final objective of the study is to conduct a cost benefit analysis between options. The cost of a bed-day for those DRGs identified with excessive lengths of stay will be determined using Military Expense and Performance Reporting Data (MEPRS). These costs will be compared with the cost of providing a self-care unit. Costs for the self-care unit will be determined using fixed operational costs (utilities, equipment)combined with variable costs (staffing, supplies).

Reliability and Validity

Patient acuity code data in this study, was developed for the Workload Management System for Nursing (WMSN), through a joint effort of the U.S. Army Nurse Corps and the U.S. Navy Nurse Corps. The WMSN was developed in the early 1980s and implemented in 1985 (Department of the Army, 1990, 1-1). The six patient care acuity categories used in WMSN were established using critical care indicators derived from clinical studies using proven work sampling techniques (Department of the Army, 1990,1-2). This system is in use by the U.S. Army Nurse Corps worldwide as a multi-use management tool. Sherrod, Rauch, and Twist established the validity for WMSN in the Nursing Care Hours Standards Study conducted in 1981 (Sherrod, et al., 1981). Validity of the data in this study is therefore, established through extensive use and acceptance of WMSN procedures.

Reliability of the patient acuity codes entered into the inpatient record is assured through required inter-rater reliability testing and quality control checks imbedded in the CIS automated inpatient record. The Department of the Army requires that inter-rater reliability be conducted quarterly in all nursing units to ensure that the system generates accurate and usable information (Department of the Army, 1990,4-1). To ensure reliability, patient acuity classifications are completed by two independent raters--a

unit nurse and an experienced classifier. Each nurse must classify independently, that is, neither knows the critical indicators the other has selected, until both have completed the classification process. When reliability scores fall below 80 percent, actions to identify and correct the problem are initiated. Inter-rater reliability testing is conducted monthly until a minimum score of 80 percent is achieved (Department of the Army, 1990, 4-1).

Reliability of the data entered into the automated information system, CIS, is assured through two mechanisms. First, the system itself prompts nurse providers to update the patient's acuity code whenever chart entries are made. This assures accurate and timely coding of the patient's nursing requirements. Secondly, the automated inpatient record requires that nurse staff supervisors approve charting data by entering a personal access code. If this code is not entered the chart update cannot be completed.

Validity and reliability for inpatient admission data collected for this study is assured through standardized collection practices. Inpatient data is collected using the Standard Inpatient Data Record (SIDR). Patient data is not entered on the SIDR until the inpatient record is completed by the attending physician. Records completed outside the standard collection period are entered retrospectively into the month the patient stay occurred. Completed SIDR information is sent to the Directorate of Patient

Administration Systems and Biostatistic Activities (PASBA), Ft. Sam Houston, TX. It is reviewed for accuracy and completeness and converted into an archived data base. The data is then sent back to Madigan Army Medical Center for statistical analysis.

Ethical Considerations

Every reasonable effort will be used to protect the confidentiality of patient information. Inpatient charts reviewed during this process will be queried electronically by diagnosis and acuity code. Therefore, names and identifying information will not be recorded. If there is a requirement to review individual records the review will take place in a secure area.

Patient admission data will be collected using DRGs and will not require specific identification of any patients. It is the intent of this study to collect and report only demographic and resource utilization data pertinent to the problem being investigated.

CHAPTER 3

RESULTS

The intitial phase of this study identified inpatient bed-days coded as requiring acuity level one nursing care. Monthly role-ups from calendar years 1994 and 1995 were complied using Nursing Workload Management System data from six different inpatient wards at Madigan Army Medical Center. The results of this phase identified 2605 acuity level one bed-days recorded in 1994 and 1812 acuity level one bed-days in 1995 (See Tables 1&2).

1994 PATIENT BED DAYS CODED AS NURSING ACUITY LEVEL DAYS

Ward	JAN	FEB	MAR	APR	MAY	JUNE	JUL	AUG	SEP	OCT	NOV	DEC	
OB													TOTAL
Mom/Baby 3S	33	44	47	24	21	44	31	44	39	15	48	29	419
Antepartum 3N	5	21	12	15	7	18	6	16	9	0	11	17	137
											DEPT. TOTAL		556
Med/Surg													
GYN 4S	15	33	25	28	17	15	12	19	0	12	10	11	197
Peds 4N	14	36	28	30	10	3	0	0	0	3	0	1	125
											DEPT. TOTAL		322
Med/Surg													
Intern. Med. 6S	23	65	75	52	41	27	28	47	21	31	30	26	466
Med/Neuro 6N	90	52	47	51	59	20	65	31	21	48	21	16	521
											DEPT. TOTAL		987
Med/Surg													
Gen Surgery 7N	32	25	22	38	27	19	47	34	51	31	57	56	439
Ortho* 8N	25	36	37	29	17	15	12	18	21	12	32	47	301
											DEPT. TOTAL		740

* Changed to 7S in July 1994

TOTAL ACUITY LEVEL ONE DAYS 2605

Table 1 . 1994 Acuity Level One Bed-days

1995 PATIENT BED DAYS CODED AS NURSING ACUITY LEVEL DAYS													
Ward	JAN	FEB	MAR	APR	MAY	JUNE	JUL	AUG	SEP	OCT	NOV	DEC	
OB													TOTAL
Mom/Baby 3S	25	17	16	10	2	0	12	0	0	0	4	1	87
Antepartum 3N	6	48	12	3	3	0	12	3	0	3	2	0	92
											DEPT. TOTAL		179
Med/Surg													
G/Surg 4S	18	9	3	15	6	15	16	37	12	25	12	5	173
Peds 4N	3	9	12	3	4	3	0	0	0	0	2	3	39
											DEPT. TOTAL		212
Med/Surg													
ntern. Med. 6S	25	31	18	9	14	15	37	47	36	40	42	27	341
Med/Neuro 6N	40	39	18	3	19	9	22	16	30	31	25	24	276
											DEPT. TOTAL		617
Med/Surg													
en Surgery 7N	80	59	34	24	19	18	22	28	18	25	34	13	374
Ortho 7S	31	50	65	71	15	30	43	47	31	19	22	6	430
											DEPT. TOTAL		804
TOTAL ACUITY LEVEL ONE DAYS								1812					

Table 2. 1995 Acuity Level One Bed-days

Resulting data showed a decrease in the number of acuity level one bed-days between 1994 and 1995 during each quarter, with an annual decrease of 793 bed-days (See Fig 2).

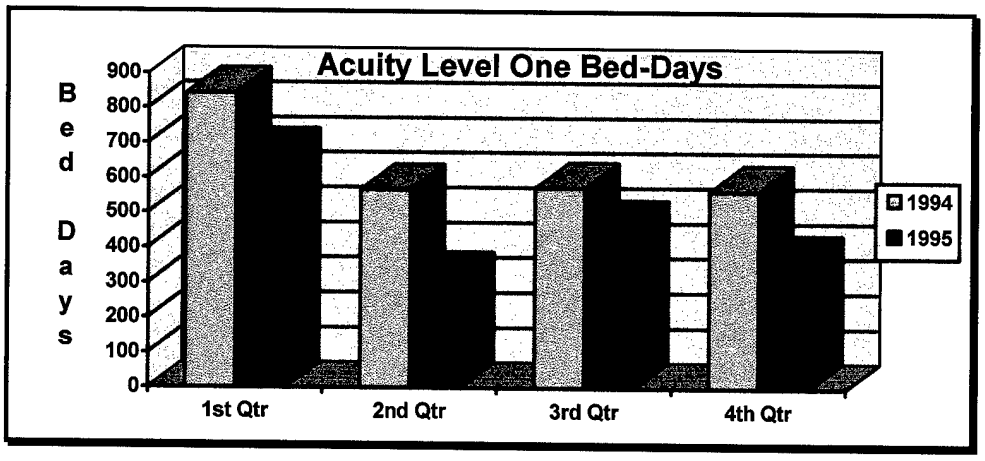

Figure 2. 1994-5 Quarterly Acuity Level One Bed-days for Madigan AMC

The second phase of this study identified potential days for pre or post admission self-care by comparing LOS for selected DRGs at Madigan with CHAMPUS mean lengths of

stay. Results indicated that Madigan has a shorter length of stay in four of the ten diagnostic categories previously identified by the Nursing Department as suspected generators of acuity level one bed-days. Three of the four DRGs that proved to be shorter in duration were inpatient population samples that included active-duty military only. The delta between specific DRG lengths of stay within Madigan (DRGs with LOS > CHAMPUS mean LOS) and CHAMPUS mean LOS identified a potential pool of inpatient bed-days that, could be reduced. This retrospective review indicated that as a best case, Madigan's inpatient census could have been reduced by 2135 bed-days over a two year period (See Table 1).

POTENTIAL BED DAYS FOR REDUCING INPATIENT LENGTH OF STAY

Diagnostic Related Group	Cases	Ttl Bed Days	Mean LOS	CHAMPUS LOS	DELTA	Potential Days
222 Knee Procedures(Active Duty)	237	327	1.4	2.1	-0.7	0
232 Arthroscopy (Active Duty)	73	80	1.1	1.8	-0.7	0
059 Tonsilectomy (Active Duty)	74	80	1.1	1.4	-0.3	0
379 Threatened Abortion	439	1486	3.4	2.3	1.1	483
383 Other Antepartum Diagnoses	35	173	4.9	2.4	2.5	88
410 Chemo w/out Leukemia	572	1516	2.6	2.4	0.2	114
492 Chemo w/Leukemia	91	458	5	6.3	-1.3	0
104 Coronary Bypass w/Cardiac Cath	174	2267	13	9.3	3.7	644
112 Pecutaneous Cardiovascular Proc.	199	1362	6.8	3.1	3.7	736
125 Circ.Dis.Exc AMI, w/ CC, w/o Complex	698	1572	2.3	2.2	0.1	70
					Total Potential Days	**2135**

Data derived from Standard Inpatient Data Record (SIDR)
CHAMPUS mean LOS from FY95

Table 3. Potential Bed-days for Reducing LOS

In the third phase of this study a cost-benefit analysis was conducted to determine the feasibility of establishing and maintaining a self-care unit within Madigan

Army Medical Center. This phase focused on the identification of variable cost centers that contributed significantly to the overall cost of inpatient services. Nursing services and Medical/Dental and administrative supplies were selected due to their direct impact on inpatient care costs and their ability to be quantified.

The cost of nursing care hours was established by using current Workload Management System for Nursing guidelines and 1996 civil service wage scales. First, the nursing hour requirements for acuity level one patient were determined using the maximum nursing services required for a patient in this category (increasing nursing services beyond this level increases the acuity category). An inpatient with an acuity level coded one requires 22.5 minutes of nursing care in a single bed-day. The total nursing hour requirement in 1995 for the eight inpatient wards included in the study was 679.5 hours (See Table 2).

Second, the hourly cost of nursing care was established using 1996 civilian nursing wage scales provided by Madigan's Human Resource Division (See Appendix B). Nursing hour requirements for each ward were multiplied by hourly wages for both Registered Nurses (RN) and Licensed Practical Nurses (LPN). Total nursing costs associated with bed-days coded as acuity level one for 1995 were $14,929 for RN care or $9,350 for LPN care (See Table 2).

FY 95 Nursing & Supply Cost for Acuity Level 1 Care

Ward		Bed Days	Nursing Hrs*	Nursing Costs LPN	Nursing Costs RN	Supply Costs** Medical/Den	Supply Costs** Other	Total Avg. Daily Cost	Total*** Annual Cost
OB									
Mom/Baby 3S		87	32.625	$448.92	$716.77	$5,321.02	$592.19		$6,629.98
Antepartum 3N		92	34.5	$474.72	$757.97	$5,626.82	$506.51		$6,891.29
3S	Avg. Cost/day			$5.16	$8.24	$67.97		$81.37	
3N	Avg.Cost/day			$5.16	$8.24	$66.67		$80.07	
Med/Surg									
Gen/Surg 4S		173	64.875	$892.68	$1,425.30	$25,880.56	$4,623.72		$31,929.58
Peds 4N		39	14.625	$201.24	$321.31	$9,718.70	$1,042.34		$11,082.35
4S	Avg. Cost/day			$5.16	$8.24	$176.33		$189.72	
4N	Avg.Cost/day			$5.16	$8.24	$275.92		$289.32	
Med/Surg									
Intern. Med. 6S		341	127.875	$1,759.56	$2,809.41	$69,667.70	$2,457.66		$74,934.77
Med/Neuro 6N		276	103.5	$1,424.16	$2,273.90	$23,207.18	$745.95		$26,227.02
6S	Avg. Cost/day			$5.16	$8.24	$211.51		$224.91	
6N	Avg.Cost/day			$5.16	$8.24	$86.79		$100.19	
Med/Surg									
Gen/Surg 7N		374	140.25	$1,929.84	$3,081.29	$47,882.43	$374.37		$51,338.10
Ortho 7S		430	161.25	$2,218.80	$3,542.66	$88,539.45	$2,797.80		$94,879.91
7N	Avg. Cost/day			$5.16	$8.24	$129.03		$142.43	
7S	Avg.Cost/day			$5.16	$8.24	$212.41		$225.81	
TOTAL		1812	679.5	**$9,350**	**$14,929**	**$275,844**	**$13,141**	**$1,334**	**$303,913**

* Nursing hours based on Workload Management System for Nursing
3 points x 7.5 min. of nursing care = 22.5 min./bed day

** Suppy cost based on direct expense plus expense from cost pools prior to stepdown
Taken from Medical Expense Performance Reporting System (MEPRS)

*** Total Cost Derived Using Using RN Wages Only

Total Using LPN Wage Scale **$298,334**

Table 4. Nursing and Suppy Costs for 1995

It could not be determine from the data as to what percentage of LPN or RN care was utilized therefore, each nursing level is applied as a separate approach to the cost equation.

Medical/Dental and Other supply costs were determined using Medical Expense Performance Reporting System (MEPRS)data for 1995. An average cost per bed-day was established by taking the total annual supply costs for a ward and dividing it by the total bed-days recorded on that ward. The average cost was multiplied by the number of acuity level one bed-days resulting in a total cost (based on average supply cost)of $275,844 for Medical/Dental

supplies and $13,141 for supplies coded as other (See Table 2).

Initially, supply dollar costs were determined using an average cost across the entire length of stay for all patients admitted to the eight wards addressed in the study. To establish a more realistic picture of the supply costs incurred during an acuity level one bed-day, average supply costs were reduced to a conservative 30% of the original average daily supply cost. This conservative approach resulted in total Medical/Dental supply costs of $81,496 and other supply costs of $3,641 (See Table 3).

FY 95 Nursing & Supply Cost for Acuity Level 1 Care

Using Conservative Supply Unitilization Estimates

Ward		Bed Days	Nursing Hrs*	Nursing Costs LPN	Nursing Costs RN	Supply Costs** Medical/Den	Supply Costs** Other	Total Avg. Daily Cost	Total*** Annual Cost
OB									
Mom/Baby 3S		87	32.625	$448.92	$716.77	$1,596.30	$177.66		$2,490.73
Antepartum 3N		92	34.5	$474.72	$757.97	$1,688.05	$187.87		$2,633.88
3S	Avg. Cost/day			$5.16	$8.24	$20.39		$33.79	
3N	Avg.Cost/day			$5.16	$8.24	$20.39		$33.79	
Med/Surg									
Gen/Surg 4S		173	64.875	$892.68	$1,425.30	$7,764.17	$1,387.12		$10,576.59
Peds 4N		39	14.625	$201.24	$321.31	$1,750.30	$312.70		$2,384.32
4S	Avg. Cost/day			$5.16	$8.24	$52.90		$66.30	
4N	Avg.Cost/day			$5.16	$8.24	$52.90		$66.30	
Med/Surg									
Intern. Med. 6S		341	127.875	$1,759.56	$2,809.41	$20,900.31	$737.30		$24,447.02
Med/Neuro 6N		276	103.5	$1,424.16	$2,273.90	$16,916.38	$596.76		$19,787.03
6S	Avg. Cost/day			$5.16	$8.24	$63.45		$76.85	
6N	Avg.Cost/day			$5.16	$8.24	$63.45		$76.85	
Med/Surg									
Gen/Surg 7N		374	140.25	$1,929.84	$3,081.29	$14,364.73	$112.31		$17,558.34
Ortho 7S		430	161.25	$2,218.80	$3,542.66	$16,515.60	$129.13		$20,187.39
7N	Avg. Cost/day			$5.16	$8.24	$38.71		$52.11	
7S	Avg.Cost/day			$5.16	$8.24	$38.71		$52.11	
TOTAL		1812	679.5	$9,350	$14,929	$81,496	$3,641	$458	$100,065

* Nursing hours based on Workload Management System for Nursing
3 points x 7.5 min. of nursing care = 22.5 min./bed day

** Suppy cost based on direct expense plus expense from cost pools prior to stepdown
Taken from Medical Expense Performance Reporting System (MEPRS)

*** Total Cost Derived Using Using RN Wages Only

Total Using LPN Wage Scale $94,487

Table 5. 1995 Nursing and Supply Costs

Total combined costs for nursing services and supply costs associated with acuity level one inpatient care are as follows:

Using Average Costing	**$303,913**	(All RN hrs)
	$298,314	(All LPN hrs)
Using Conservative Costing	**$100,065**	(All RN hrs)
	$94,497	(All LPN hrs)

Data From Fig. 2&3

Labor costs associated with staffing a self-care unit within Madigan AMC were established as a basis for cost comparison during the cost benefit analysis. Annual labor costs were determined using two different levels of staffing. Both levels of staffing were based on the pay and benefits for an enlisted soldier in the grade of E-4 and annual full-time equivalent hours of 2087 (based on 1996 Manpower Reporting Data). This skill level was selected as the minimum level necessary to performance the duties required to safely and effectively operate a self-care unit.

The first level of staffing addressed is based on one attendant, 24 hours a day, seven days a week. This scenario requires a minimum of five workers at an annual cost of $142,759 (See Table 4).

Annual Labor Costs for Self-Care Unit

Utilizing 3 Shifts 24 Hours/Day

Annual Hours*	2087
Pay (annual)**	$23,213
Benefits	$5,339
Hourly Wage***	$13.68
Total Annual Manpower Cost	**$142,759**

* Based on 1996 Manpower Reporting Data

** Based on Specialist E-4 using 1996 pay chart.

*** Includes Benefits

Table 6. Annual Labor Costs for 24 hour Staffing

The second staffing level consisted of one attendant eight hours a day, seven days a week. The annual cost of this scenario was calculated at $86,655 (See Table 5).

Annual Labor Costs for Self-Care Unit

Using a Single 8 hr Shift 7 Days/Week

Annual Hours*	2088
Pay (annual)**	$23,213
Benefits	$5,339
Hourly Wage***	$13.67
Total Annual Manpower Cost	**$85,655**

* Based on 1996 Manpower Reporting Data

** Based on Specialist E-4 using 1996 pay chart.

*** Includes Benefits

Table 7. Annual Labor Costs Limited Staffing

CHAPTER 4

DISCUSSION

Under capitated financing, Military Treatment Facilities are finding it necessary to shed antiquated ways of doing business that continue to support previous workload based funding systems. Clinicians and administrators are realizing, sometimes reluctantly, that there is a cost associated with doing the business of healthcare. Any decision that increases, decreases, or modifies healthcare services must be made based on both effective clincal practice and on sound business practices. Healthcare organizations that fail to adopt this approach will practice themselves out of business.

Madigan Army Medical Center is in the midst of the managed care wave that is sweeping this nation. Management and clinical decisions are made on a daily basis that impact directly on the healthcare services provided to the 340,000 Department of Defense beneficiaries within its region of responsibility. Increasing fiscal constraints due to governmental budgetary policy make it essential that all members of the Madigan staff make sound business decisions. These decisions must insure quality care for beneficiaries and guarantee the solvency of Madigan as an organization.

It is this quest for excellence in healthcare combined with a mandated responsibility for economic efficiency that has provided the impetus for this study. Throughout each phase of the project the best interest of both the patient and the organization shared a spot at the forefront of the effort.

The first phase of the study determined the number of inpatient bed-days that occured at Madigan with a nursing acuity level that equates to self-care patient (acuity level 1). Determing the number of self-care bed-days established the existance of an inpatient population that could be discharege to a self-care facility.

The intent in the initial proposal to this study was to retrieve inpatient acuity data through Madigan's automated inpatient charting system, CIS. However, during the course of the study, congressional dollars identified to purchase the query software for CIS were withheld until a the 1996 Defense Appropriations Bill was passed. Prior to submitting this project proposal Clinicomp Inc., the contractor that installed CIS, agreed to write and conduct a specific query program to support this project. Clinicomp Inc. changed their position when they found out that money earmarked for them would be delayed. They withdrew their

offer to run the query for the project resulting in the need to use a back-up plan.

Due to these developments a pre-planned back-up was implemented in order to complete this project in a timely manner and to provide Madigan leadership with realtime information. The back-up plan for this phase of the program involved gathering the required data manually from historical Nursing Workload Management System computer print-outs. These print-outs provided a record of each bed-day recorded as acuity level one during monthly reporting periods. The data recorded on the Nursing Workload print-outs is based on acuity coding entries made on CIS inpatient charts, therefore, the data collected is equivalent to that originally proposed. Data was collected over a two year period from 1994 to 1995 (See Appendix).

In 1994, there were 2605 acuity level one bed-days and 1890 acuity level one bed-days in 1995. Initially, these numbers appeared to be substantial and suggested a potential for significant cost avoidance by shifting acuity level one inpatients to an outpatient boarder status. Establishment of the existance of a seemingly significant number of acuity level one patients generated several questions: What variable inpatient costs are associated with acuity level one care, Can these costs be recouped, Will similar numbers

of self-care inpatients exist in the future? These questions are answered in phase two and three of this study but not necessarily in the order they are presented.

With the inpatient population at MAMC continuing to decline (179.2 down from 205.3 in FY 95), it is necessary to determine the future potential for an acuity level one population that would warrant the addition of a new service (self-care unit). To determine the existence of such a potential, it was necessary to identify excess utilization within the inpatient setting. For the purpose of this study, excess utilization is defined as bed-days greater than an established inpatient Length of Stay (LOS) benchmark for a given Diagnostic Related Group (DRG). The benchmark performance data used was the Civilian Health and Medical Program of the Uniformed Services (CHAMPUS) mean LOS for civilian healthcare purchased in 1995.

Madigan inpatient stays greater than the CHAMPUS mean LOS potentially harbor "self-care" days within those additional bed-days. Therefore, bed-days greater than the mean LOS represent a population of patients with the potential for discharge to a self-care/boarder status. Conversely, those with a lesser LOS than CHAMPUS would indicate some measure of utilization management proficiency

greater than comparable free market healthcare organizations.

A weakness of this approach is that it only identifies the gross number of inpatient bed-days and not individual self-care days. To determine the actual number of self-care days would have required a provider review each individual record, under each DRG used in the study sample. This approach would have proved too costly and time consuming for this study since 44,000 records were used in gathering FY 94 and FY 95 data.

In this phase of the study ten specific DRGs were identified within the four broader categories of active duty beneficiaries, pre-term labor, chemotherapy, and cardiac catheterization (See Table 1). These ten DRGs were selected based on number of admissions (high volume) and on specific recommendations from the Department of Nursing leadership.

The three DRGs addressed specific to active duty personnel, knee procedures (DRG 222), arthroscopy (DRG 232), and tonsilectomies (DRG 059) were found to have a LOS less than a CHAMPUS stay for the same DRG. This dispels an often generalized belief within the clinical setting that active duty personnel admitted under these diagnostic categories require longer than normal lengths of stay due to unique living arrangements (e.g. barracks, shipboard). Madigan is,

in fact, out performing comparable civilian healthcare organizations in regards to these specific DRGs (See Table 2).

The same performance efficiency holds true for patients receiving chemotherapy with the complication of leukemia (DRG 492). Madigan's mean LOS is 5.0 days while the CHAMPUS mean LOS is 6.3 days. These findings are sound evidence of Madigan's efforts to provide efficient, quality healthcare (See Table 2).

The other six DRGs in the study were found to have mean LOS greater than CHAMPUS mean LOS. These DRGs accounted for a total of 2135 bed-days which could possibly harbor self-care days within this number. Based on these finding it is believed that there are potential self-care days within these general diagnostic categories. However, these numbers may be substantially less if inpatient census levels continue to decline as greater efficiences are achieved.

Establishment of the potential existence of patients capable of self-care was critical to the continuation of this project. If Madigan was operating at a level of efficiency less than or equivalent to the CHAMPUS mean LOS for all DRGs, then the patient population to support a self-care service would be vitually nonexistant.

Identification of a potential inpatient population that would utilize a self-care facility established the need to conduct a cost-benefit analysis. The focus of this phase was to determine the potential for avoidance of inpatient bed-day costs achieved through discharging acuity level one patients (self-care) to a self-care unit. Once discharged, to the self-care unit, the patient would be seen on an outpatient basis at a lower cost.

Initially, it was proposed that the cost of bed-days in this study would be established using the Department of Defense Medical Expense Performance Reporting System (MEPRS). This system reports the cost of inpatient care based on bed type, personnel costs, supply costs, and intensity of care. The use of gross cost accounting methods similar to MEPRS appeared to be a widely accepted practice in the literature. However, the literature did not cite information that specifically assessed the effectiveness of this costing methodology. It is my contention that using gross costing data for bed-days (cost data that includes both fixed and variable costs) in many cases over-inflated the cost effectivenes of creating such a service. This over zealous approach to cost accounting was not done with malicious intent, but was done without regard for sound business practice. Combining both fixed and variable costs,

in most cases, is not reflective of the actual cost of starting a work-center within facility that already accounts overhead fixed costs.

Cost data reported by the Director, Tripler Army Medical Centers Self-care Unit, is a prime example of this inflated method of cost reporting (Tripler Army Medical Center, 1995). It was reported that the average inpatient bed at Tripler AMC cost $857 (fixed and variable costs included) and that the Self-care Unit bed cost $68 per day (Tripler Army Medical Center, 1995). Inpatient cost data was derived by using MEPRS data and taking an average cost of a bed-day from across all hospital wards. This methodology would not account for the variation of inpatient acuity levels and resource requirements associated with different wards (e.g. OB vs. Surgery). It is evident from the Madigan data collected that wards vary greatly in the number of acuity level one bed-days they generate. This results in the cost of doing business on these wards also being varied. Therefore, each ward must be evaluated separately.

In addition, the cost of a bed-day in Tripler's self-care unit was determined using only the variable cost of the labor required to staff the unit. Thus, the cost did not include fixed costs such as utilities, laundry service, and

housekeeping. If variable and fixed cost were included on one side of the eqation they must be included on the other side. Tripler's cost reporting failed to do so. It also did not include any variable costs (i.e. nursing, supplies), in the form of excess capacity, potentially retained by the organization in spite of reduced inpatient bed-days.

Tripler's method of expense reporting would indicate that a cost avoidance of $789 would occur for each bed-day avoided, as a result of, discharging an inpatient to its self-care unit. This paints an inaccurate picture of the situation because fixed costs in the self-care ward were not reported and the cost of an inpatient bed was inflated by using an average bed-day cost.

Based on these findings, the third phase of this study was designed to reflect an accurate picture of the financial implications of starting a self-care unit within Madigan Army Medical Center. Instead of using an average bed-day cost from across all wards, the cost of a bed-day was determined using eight separate wards. Fixed costs were deleted from the equation since the self-care unit bed-day would consume virtually the same dollars for utilities and contracted services as an inpatient bed.

Establishing a cost-effective self-care unit at Madigan would require a mechanism for recouping, retaining, or

redistributing the dollars generated through cost avoidance. Therefore, this project focused on the variable cost centers of nursing labor and materials (medical/dental supplies). These costs were combined by ward and compared to the cost of establishing a self-care unit. Potential dollars avoided by using the self-care unit would be recouped and or redistributed by eliminating inpatient nursing manpower and/or reducing medical, dental and other supply accounts.

In this study, nursing hours provided to acuity level one patients at Madigan in 1995 amounted to 679.5 hours (See Table 2). This is 1407.5 hours less than the annual hours of one full-time equivalent employee (2087 hours). The fact that acuity level one nursing hours equate to less than one full-time employee spread across eight wards makes it difficult to identify eliminate excess nursing manpower.

The cost of this care equates to $9,350 for LPN care or $14,929 for RN care using 1996 government service wage scales (See Table 2). These costs are less than one percent of the total 1995 nursing labor costs for all wards studied. Annual nursing costs varied significantly from ward to ward. Costs were from as little as $716 to as high as $3,542 (RN costs). Based on this data it was determined that labor played a lesser role in the cost avoidance equation.

However, in these times of diminishing resources, the costs associated with nursing labor were not disregarded.

Initially this study determined the daily medical, dental and other supply costs per inpatient bed-day were determined using the average cost of supplies from across each ward (See Table 2). After careful review of this data it was determined that the average cost of supplies consumed would not be reflective of the actual supply cost of a self-care bed-day.

Patients capable of self-care consume far less resources than patients that are within the intial days of their recovery process (Friedman et al., 1988, 174). Therefore, as a patient's health inproves during the course of their inpatient stay they consume far fewer supplies. Using this logic a more conservative apporach for costing was applied to medical, dental, and other supplies. Instead of using a straight average of annual supplies spent, it was determined that an acuity level one patient would consume approximate 30 percent of the average daily cost per patient. This approach resulted in a total 1995 acuity level one bed-day supply cost of $85,137 on the eight wards studied (See Table 3).

The total cost of labor and supplies that could potentially be extracted from Madigan inpatient wards was

then compared to the cost of operating a self-care unit. The operating cost of the self-care unit was determined using only the variable cost of labor for a single attendant, twenty-four hours a day, seven days a week (See Figure 3). This minimal staffing approach would result in a newly incurred cost of $142,759 compared to a potential cost avoidance of $100,065 from manpower and supply reductions across eight inpatient wards. Implementation of a self-care unit at the conservative levels discussed would cost Madigan an additional $42,649. These losses will increase if acuity level one patients are not promptly dicharged to a self-care facility and manpower and supply adjustments are not made to reflect actual demand. A continued decrease of Madigan's inpatient census would also reduce the demand for such a service if bed capacity remained high and bed utilization was low.

CHAPTER 5

CONCLUSION AND RECOMMENDATIONS

Implementation of a self-care unit at Madigan Army Medical Center will not increase efficiency or reduce cost. The addition of such a service will create a work center that increases expenditures by a minimum of $42,649. Implementation of a self-care unit at Madigan Army Medical Center is not recommended.

Madigan is currently resourced and staffed for 318 inpatient beds. This number is down considerable from the 365 beds staffed two years ago and down even further from Madigan's original charter of 414 beds. The current average daily inpatient census at Madigan is 179.2 patients. This figure is considerably less than the average of 268.2 patients per day in 1990.

These trends mirror similar findings made by the American Hospital Association (AHA). According to the AHA between 1992 and 1995 hospital admission rates per 1000 population dropped from 122 to 110 with an estimated drop to 85 by the year 2000. The AHA further reports that the number of hospital beds has been steadily decreasing from 923,000 in 1992, to 700,000 in 1995, to an estimated 500,000 in the

year 2000. The parallels between Madigan's patient workload shift and the patient workload shift in the free market healthcare setting (inpatient to outpatient) are evident. Madigan will continue to reduce its inpatient census much the same as our civilian counterparts who seek efficiency in a capitated managed care plans.

As inpatient numbers continue to decline the margin between hospital capacity and utilization will continue to widen within DOD medical facilities. Decreasing inpatient populations drive efficient and effective civilian healthcare organizations to rapidly reduce overhead while military facilities are hampered from swift reaction due to market forces, mandated wartime contingencies requirements, graduate medical education, and inflexible governmental employment policies.

The retention of any excess capacity further strengthens the position for not creating a self-care unit. Fixed costs and variable costs are already committed to the staffing and operation of 318 inpatient beds at Madigan AMC. The highest daily census since October 1, 1996 was 205 patients. This excess capacity is already paid for, therefore, the cost of housing an acuity level one patient ($5-$8 per day nursing; $20-$60 per day supplies) is a "sunk" cost. Moving them out to a self-care center will not

recapture variable costs already consumed by wages paid and supplies purchased. If an inpatient bed is paid for and excess capacity exists, the best course of action is for minimal and self-care patients to use them.

It has become evident through the course of my research that too much emphasis is often placed on the reduction of healthcare costs during the last few days of an inpatient stay. Minimal care/self-care bed-days continue to decline as practice patterns and patient education programs progress and evolve. Madigan recorded a decrease in acuity level one bed-days between 1994 and 1995 of 793 bed-days. As greater efficiencies are achieved in expediting the discharge of self-care patients the opportunities to reduce costs at the end of a patient's stay will disappear.

The last few days prior to discharge tend to be the least expensive inpatient days due to minimal direct nursing care and reduced medical supply consumption. Yet much focus and effort is directed at reducing these inpatient days. Using the model presented in Figure 3 it is clear that the greatest opportunity for cost efficiency is during the initial phases of an acute episode of care.

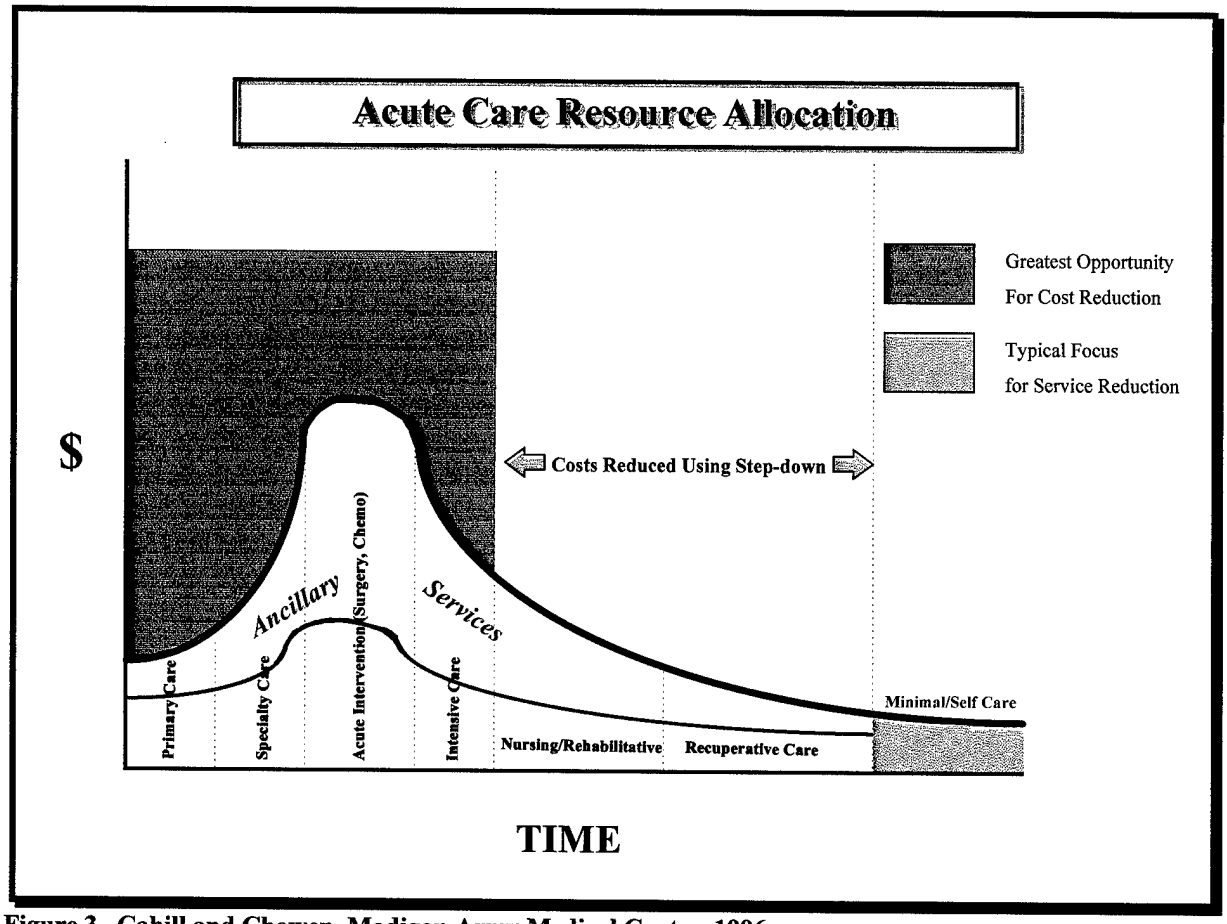

Figure 3. Cahill and Chowen, Madigan Army Medical Center, 1996

The focus for cost reduction and cost containment within the acute care setting must be redirected from the end of a patient's stay to the beginning of the acute care episode. It is recommendation that Madigan AMC shift any future costing research efforts to the areas highlighted in Figure 3.

Additionally, it is recommended that the number inpatient beds staffed and the mix of those beds be further investigated. Establishment of an optimal number of inpatient beds will facilitate the adjustment of personnel

and supply resources, potentially reducing Madigan expenditures.

Finally, the efficient reuse of any space vacated by bed reduction must be thoroughly investigated. Greater efficiencies may be achieved by consolidating some of Madigan's out-placed operations within vacated inpatient space. Vacated inpatient areas within the civilian healthcare market are increasingly being converted to physician practice offices, birthing rooms, rehab areas, and pain centers. Other potential uses include: ambulatory surgery suites, and sleep labs; wellness, preventive, and sports medicine clinics; office space for home healthcare, public health, and administrative offices (Nadel, 1996).

As the Military Health Services System becomes more entwined in the world of managed care the amount of excess capacity within its brick and mortar will increase. Therefore, it is incumbent upon the leaders of military medicine to plan strategically for the reuse or removal of this available space. Failure to anticipate future healthcare requirements and to address potential uses for excess space will result in more facility closures and/or the divestiture of DOD medical assets to private investors.

BIBLIOGRAPHY

Altman, Stuart, H. and Donald A. Young. (1994). Controlling Payment for Hospital Services. Critical Issues in U.S. Health Reform. Boulder: Westview Press.

Anonymous. (1986). Medical Hotel Increases Discharge Options Under Shortened Length-of-Stay. Hospital Guest Relations Report. 1(6): 5-8.

Bradley-Davis, Mary L. and Groneman, Susan. (1987). The Hotel Alternative Program: A New Trend for Cost-Containment. ANNA Journal. 14(1):22-24.

Caporael-Katz, b. (1983). Health, Self-care and Power: Shifting the Balance. Topics in Clinical Nursing. 83(10): 31-44.

Chawlow, A. Judith, Joyse Mamon, Engin Crosby, Anthony J. Grieco, David Salkever, Maureen Fahey, and David M. L Levine. (1990). Effectiveness of a Hospital-Based Cooperative Care Model on Patients' Functional Status and Utilization. Patient Education and Counseling.(15): 17-28.

Coile, Russell C. (1990). The New Medicine:Reshaping Medical Practice and Health Care Management. Rockville, MD: Aspen Publications

Cerne, Frank. (1994). Shaping up for Capitantion. Hospitals and Health Networks. 5(Apr):28-35.

Department of Defense. (1994). Policy Guidelines for Implementing Managed Care Reforms in the Military Health Services System. Feb.

Department of Defense. (1994). Utilization Management Policy: Direct Care System. (Nov).

Frew, N. (1981). Housing Patients in Nearby Hotel Cuts Two Thirds Off Per Diem Costs. Cost Containment. 3(8):6-7.

Friedman, Lynn H., Barbara J. Oberg, Moranda Mayo Dansby, Janice Sanders, Shirley Leonare, Billie Davis. (1998). Cost-Effectiveness of a Self-care Program. Nursing Economics. 6(4): 173-178.

Garfinkel, Paul. (1989). Integrating a Hospital-based Hotel into Admissions Administration. The Admitting Management Journal. 14(4): 11-2.

Gibson, K., and Pulliam, C. (1987). Cooperative Care: The Time Has Come. Journal of Nursing Administration. 17(3) 19-21.

Giloth, Barbara E. (1990). Promoting Patient Involvement: Educational, Organizational, and Environmental Strategies. Patient Education and Counseling.(15): 29-38.

Harvery, Ian, Rosemary Jenkins, and Lise Liewellyn. (1993). Journal of Epidemiology and Community Health (47): 368-72.

Kongstvedt, Peter R. (1995). Essentials of Managed Health Care. Maryland: Aspen Publishers, Inc.

Lamm, Richard D. (1994). The Ghost of Health Care Future. Inquiry. 31:365-367.

McNamee, M. and Garland, S.(1993). A Guide to Health Reform. U.S. News and World Report. 115(12):28-33.

Milliman and Robertson (1995). Utilization Management Seminar.

Nadel, Barbara A., (1996). Recycling the Hospital. Health Systems Review. (Jan-Feb). 35-38.

Newhouse, Joseph P., (1994). Open Issues in Financing and Coverage. Critical Issues in U.S. Healthcare Reform. Boulder, Westview Press. 12-31.

Orem, D.E.(1971). Nursing: Concepts of Practice. New York: McGraw Hill Book Company.

Rand Corportation. (1990). "Preliminary Results From an Evaluation of the CHAMPUS Reform Initiative." (Jan):1-70.

Relman, A. (1991). Where Does all That Money Go? Health Management Quarterly. 13(4):2-5.

Rosenstein, Alan H. (1994). Cost-effective Health Care: Tools for Improvement. Health Care Management Review. 19(Feb):53-61.

Schwartz, William, B. and Daniel N. Mendelson (1991). Hospital Cost Containment in the 1980s. The New England Journal of Medicine. 324(15):1037-1042.

Shendell-Falik, Nancy. (1990). Creating Self-care Units in the Acute Care Setting: A Case Study. Patient Education and Counseling. (15): 39-45.

Sherrod, S, Rauch, R. and Twist, P. (1981). Nursing Care Hours Standards Study Parts I-VIII DTIC Pub. Nos. ADA 109883-109886, Technical Information Center, Alexandria, VA

Small, Norma R. (1993). Self-care in Institutional Settings. Generations. (Fall):19-23.

Smith, Ernie. (1992). New Hotel for Recuperating Patients Also Popular With Commercial Guests. Hospital Security and Safety Management. 13(8):4.

Tripler Army Medical Center. (1995). Self-care Unit Information Paper (Jul).

Weis, Art. (1988). Cooperative Care: An Application of Orem's Self Care Theory. Patient Education and Counseling. (11):141-146.

Williams, Duke R., Cahill, William R., Brandel, Douglas A., and Mr. Richard Mercer. (1994). Unit Cost Resourcing in the Military Health Services System: Concepts and s Realities. Armed Forces Comptroller. Winter: 25-28.

Woods, Jon R., Robert M. Saywell, and J. Thomas Benson. (1988). Comparative Costs of a Cooperative Care Program Versus Inpatient Hospital Care for Obstetric Patients. Medical Care. 26(6): 596-606.