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Projections indicate that the cost of military healthcare will increase from the current $27 billion to in excess of $40 billion by 2020. In 2002, the Bureau of Medicine and Surgery implemented programs, such as, case management in an effort to help control costs. A review of the literature has found that case management programs are generally undervalued due to a lack of analysis of the contribution to organizational goals. This study demonstrates the value of case management at Naval Hospital Jacksonville's Family Practice Clinic by examining pre and post case management costs for its 127 closed cases. The value of the program is assessed through an evaluation of return on investment. Return on investment is determined by comparing cost savings and cost avoidance against the financial expenditures involved in operating the case management program. The results of the study demonstrated that case management has a positive return on investment from both the cost savings and cost avoidance perspective and therefore should continue regardless of external funding by higher authority.

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Running Head: CASE MANAGEMENT ROI

Case Management Return on Investment: An Analysis of Naval Hospital Jacksonville's Family Practice Clinic Case Management Program

A Graduate Management Project
Submitted in partial fulfillment of the requirements for the
Degree of Master in Health Care Administration

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Abstract

Projections indicate that the cost of military healthcare will increase from the current $27 billion to in excess of $40 billion by 2020. In 2002, the Bureau of Medicine and Surgery implemented programs, such as, case management in an effort to help control costs. Effective fiscal year 2006, the Bureau will discontinue funding case management and facilities will have to determine cost effectiveness and internally fund any future case management efforts. A review of the literature has found that case management programs are generally undervalued due to a lack of analysis of the contribution to organizational goals. This study demonstrates the value of case management at Naval Hospital Jacksonville's Family Practice Clinic by examining pre and post case management costs for its 127 closed cases. The value of the program is assessed through an evaluation of return on investment. Return on investment is determined by comparing cost savings and cost avoidance against the financial expenditures involved in operating the case management program. The results of the study demonstrated that case management has a positive return on investment from both the cost savings and cost avoidance perspective and therefore should continue regardless of external funding by higher authority.

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Introduction

The Military Healthcare System (MHS) is not isolated from nationwide escalations in the cost of delivering healthcare, nor the need to control these costs. Between 1988 and 2003, the number of personnel on active duty decreased by 38% while MHS healthcare spending increased from $14.6 billion to $27.2 billion (Congressional Budget Office, 2003). The combined effect of the decline in the number of personnel and the increase in spending resulted in a per capita expenditure increase from $6,600 to $19,600. The Congressional Budget Office projects that by the year 2020 military healthcare spending will increase from the current $27 billion to $40-$50. In order to reduce this exponential growth in healthcare expenditures, the MHS must adopt preemptive measures to contain expenditures, while at the same time improving the effectiveness and efficiency of the healthcare delivery system.

The MHS is comprised of Military Treatment Facilities (MTF) and civilian-network care provided through contractual healthcare arrangements. It operates under the cognizance of the Assistant Secretary of Defense for Health Affairs (ASD/HA), which orchestrates healthcare policies to each service branch, through the TRICARE Management Activity (TMA). TMA is responsible for fiscal oversight of the TRICARE program which functions in similar fashion as a health maintenance organization and is the healthcare program serving eligible beneficiaries of the MHS. Eligible beneficiaries include active duty personnel, retirees, and their respective family members. The increasing need to control healthcare expenditures and improve efficiency is drastically influencing the manner in which the MHS delivers care particularly as it transitions into its third generation of managed care contracts under TRICARE. Under the latest contractual arrangement, MTFs are operating under a system called Revised Financing. Prior to Revised Financing, MTFs were provided operating budgets to cover the cost of care delivered within

their facilities. If the MTF referred a beneficiary to a civilian healthcare organization, the TRICARE contractor assumed responsibility for paying the provider the cost of that care and was later reimbursed based on its contractual arrangement with the TMA. Under the new arrangement, MTFs are now not only fiscally responsible for the cost of care delivered within their facilities, but are also held responsible for the cost of care provided by civilian network providers to their enrolled population (Mr. Lorenzen, personal communication, 7 August 2004).

While the financial burdens of healthcare delivered outside of the MTF were previously placed upon TMA and other MHS leadership, this burden has now shifted to MTF leadership. MTFs are now tasked with developing and monitoring programs that facilitate the delivery of healthcare services through the most cost efficient and effective means possible. While implementation of these programs is important, measuring and determining their value is as equally important. In order to fill the need of improved effectiveness and efficiency, these programs must demonstrate self-sufficiency and utility within an organization.

Naval Hospital Jacksonville

Under the direction of Commander, Navy Region Southeast and Chief, Bureau of Medicine and Surgery (BUMED), Naval Hospital Jacksonville (NHJ) is the fourth largest hospital in the Department of the Navy and operates the Navy's largest Family Physician Training Program. It is comprised of a hospital, an addiction rehabilitation center, and seven freestanding ambulatory clinics in Georgia and Florida. There are three primary components of the command mission. The first objective is to support wartime commitments through a ready staff of deployable personnel. The second is to provide healthcare services to afloat and ashore service members, their family members, and other area beneficiaries. The third objective is to

administer graduate and postgraduate education programs for both medical students and medical department officers. (Naval Hospital Jacksonville Patient Guide, 2004).

The hospitals primary mission of ensuring a ready staff of deployable personnel directly supports Navy Medicine's mission of Force Health Protection (FHP). The four tenants of FHP are: to "create and sustain a healthy force, to deploy with them (personnel serving in combat), to restore health when needed: deployed, and at home, and TRICARE for life" (Navy Medicine Strategic Plan, 2004, p. 1). The third tenet of FHP, "to restore health when needed: deployed, and at home" is explained through the following strategic statement, "...we are with them to deliver world class care: treatment, stabilization, medical evacuation. At exactly the same time AND level of importance, we deliver care to the spouses and families at home" (Navy Medicine Strategic Plan, 2004, p. 1).

In support of FHP, NHJ military staff members have met and continue to meet the Navy's needs by providing both peacetime healthcare to beneficiaries in the Jacksonville area as well as deploying to hostile environments and providing that same care without distraction. The staff of NHJ is comprised of 2,284 military, 529 civil service, and 216 contract personnel. Of the 2,284 military personnel, 768 members are assigned to one of three deployable teams: the hospital's stand-alone Fleet Hospital, Second Force Service Support Group, or as a member of the Casualty Receiving and Treatment Ships team.

During the last 24 months, over 500 active duty personnel, more than 21% of the military staff members, deployed in support of Force Health Protection initiatives. The two competing strategic requirements of a ready, trained, staff of military healthcare members and the requirement to ensure uninterrupted healthcare to Sailors, families, and retirees seeking care in the peacetime environment poses daily challenges for NHJ. The organizations leadership must

balance unique provider/patient relationship challenges that are not experienced in civilian healthcare facilities. Specifically, there is a challenge to maintain access to and continuity of care for beneficiaries while military staff members deploy to provide healthcare in combat and when these staff members deploy to acquire necessary training to deploy (Embrey, 2005). Although BUMED and TMA provide supplemental staffing through various means, the organization must proactively manage staff changes to make every attempt to provide consistent access to care for their beneficiaries.

The hospital has 62,000 enrolled beneficiaries that include active duty personnel, family members, retirees, and other eligible beneficiaries (J. Head, Personal Communication, September, 8, 2004). The facility has a level II tertiary emergency room, a 60-bed inpatient capacity (expandable to 178 beds), and offers a broad range of outpatient services. Over the last three calendar years, the facility has experienced interesting trends. Enrollment has decreased by 21% while the number of outpatient visits increased by 12% and the number of admissions has doubled (J. Head, Personal Communication, September, 8, 2004). Combined with the staffing constraints and MHS Revised Financing requirements, these trends have placed significant pressure on the organizations leadership to optimize efficiencies in the care provided to area beneficiaries. In similar fashion to other healthcare facilities, Naval Hospital Jacksonville has adopted three programs to aid in these efforts. These programs are utilization, referral, and case management (J. W. Sentell, Personal Communications, August 7, 2004).

According to the Department of Defense Medical Management Guidebook (draft), the objective of the utilization management program is to ensure that patients admitted receive the most appropriate level of care and to monitor treatment plans to validate medical necessity. Nurse managers meet these objectives by monitoring the quality, risk, and cost concerns of care

rendered through an extensive review of medical charts and comparisons of the care with industry practices and protocols. Referral management is an attempt to recapture care, encourage continuity of care, and recommend the most effective use of resources by tracking and evaluating internal and external provider referrals. Both utilization management and referral management rely primarily on collaboration with providers and other healthcare support personnel. Case Managers collaborate with patients (inpatient and outpatient), the patients' family, and healthcare providers to ensure timely quality care is delivered that minimizes redundant or unnecessary treatments, maximizes the continuity of care when numerous providers are involved, and enhances the use of available resources while containing costs. The primary goal of Case Management (CM) is to improve efficiencies in the delivery of healthcare (Department of Defense Medical Management Guidebook, draft).

The Case Management Society of America defines case management as a "collaborative process that assesses, plans, implements, coordinates, monitors, and evaluates options and services to meet an individual's health needs through communication and available resources to promote quality, cost-effective outcomes" (as cited in the Department of Defense Medical Management Guidebook, draft, Section II, p. 2). The primary goal of CM is to ensure each case managed patient receives the best healthcare outcome through the delivery of the most appropriate healthcare services available while maximizing these resources in a cost-effective manner (Department of Defense Medical Management Guidebook, draft). Rieve (2000) stated, "crucial to the development of such a program is to have the right people in the right positions with the right amount of committed resources, information access, and technical support" (p. 2). A case manager's role is to seek quality and cost effective outcomes by coordinating care and

resources from several aspects, to include: financial, legal, ethical, and geographic considerations (Department of Defense Medical Management Guidebook, draft).

Yaksic, DeWoody, and Campbell (1996), illustrated the utility of a case management program through a study of chronic ventilator patients. Patients were selected for case management because of the complexity of their needs in the chronic ventilator unit and the need for a lengthy inpatient stay due to the requirement for ventilation. Implementation of a case management program detected numerous problems that were impeding the delivery of care. These problems were identified and remedied by the case managers who coordinated the patient's care through collaborations amongst a multidisciplinary team of professionals. The nurse case manager monitored the entire continuum of care that was provided to the patients developing ways to coordinate and streamline care provided. The results of the case managers' efforts were remarkable, in less than one year, the average length of stay decreased from 75.5 days to 57.8 days and the average cost per case declined from $189,080 to $141,426.

Under the direction of BUMED, NHJ implemented a CM program in calendar year 2002 (J. W. Sentell, Personal Communications, August 7, 2004). Today, there are 12 case managers: eight registered nurses and four are social workers. These case managers monitor the Family Practice Clinic, active duty catastrophic care, and care rendered in five of the ambulatory clinics. Since the program's inception, there have been 882 patients enrolled for a multitude of healthcare related reasons. The case managers enter case specific data in Canopy CM®, a web-based CM System. Canopy CM® enables case managers to keep track of all open and closed cases. Use of this system ensures portability of case information, enables case managers to monitor workload, and provides a standardized method for generating reports that are easily compared. When BUMED initially funded the program, the program included a salary grant and

procurement of the database system. The Bureau of Medicine and Surgery funded these salaries through the end of fiscal year 2005 at which time it is expected that each facility's leadership must decide if they will continue the program.

Research Problem

Without additional salary funding from BUMED, Naval Hospital Jacksonville will be required to fund the CM employee salaries internally if they choose to continue the program. At present, the CM program has not been analyzed for utility and value to the organization. Without a financial analysis, the value of the CM program may be unrealized by the organizations leadership. This situation could threaten the existence of the program if the hospital is faced with financial constraints and is forced to choose between its various optimization initiatives. The question to be addressed in this study is whether the CM program is self-sufficient and to what extent does it bring value to the organization's goal of improving the cost-effectiveness and efficiency of care that is rendered.

Yates (1996) explains that cost effectiveness is assessed through a comparison between outcomes attained from a service and the consumed resources necessary to deliver that service. In this study, the services are the interventions of the case managers, the outcomes would be the changes to length of stay and changes in the number of outpatient visits/inpatient stays. This assessment will be performed through analysis of return on investment (ROI). The hypothesis for this study is that the ROI of CM is a positive dollar value. Although the Family Practice Clinic (FP) will be the focus of this study, future studies may consider other CM units within the facility.

Literature Review

Between 1985 and 1998, national healthcare expenditures increased from $428 billion to $1.1 trillion and per capita spending more than doubled from $1,735 to $4,094 by 1998 (Shi & Singh, 2001). This massive increase in healthcare spending created a public outcry for reform of healthcare industry practices by the nation's citizens, insurance companies, politicians, and other stakeholders. Prior to the demand for reform, healthcare financing was traditionally provided through indemnity plans (Henderson, 2002). Indemnity plans are fee-for-service arrangements that reimburse healthcare providers (physicians, physician assistants, and healthcare facilities) based on the number and type of patient care visits, offering little incentive for cost containment (Kolb & Horwitz, 1995, Dzyacky, 1997). Billed charges were not disputed, there were no list price comparisons, and there was little control over the volume or quantity of care provided (Coddington & Moore, 2003). The reimbursement structure encouraged facilities to provide high volumes of care, a practice known as churning (Kongstvedt, 2001).

The public outcry for reform has transformed into limitations and restrictions that demand accountability in the areas of process flow, outcomes, and cost containment (Rieve, 2000). In addition to the quest for accountability and cost containment, there is industry wide concern for patient outcomes and the quality of the care delivered (Measuring the benefits of clinical decision support: return on investment, 1999). The need for change in the healthcare delivery system prompted the birth of managed care. Managed care is "a term used to describe any number of contractual arrangements that integrate the financing and delivery of medical care." (Henderson, 2002, p. 42) In a managed care environment, one strategy to reduce costs is to share the financial risk of providing healthcare (Rosenstein, 1999). The idea of risk sharing evolved through a conglomerate mix of reimbursement mechanisms, such as, capitation (Shi &

Singh, 2001). In addition to these reimbursement mechanisms, managed care organizations established programs that promised to improve efficiency and reduce expenditures. Some of these control initiatives include provider profiling, gate keeping, and case management (Shi & Singh, 2001).

Evolution of Case Management

Case management has become one of the widely accepted approaches used to tackle current challenges facing the healthcare delivery system (Viau, Bulla, Gladden, Sanders, Perez, and Evans, 1995). Although CM efforts have increased in the last 30 years and have garnered extensive attention, CM is not a new concept. According to Tahan (1998), CM techniques were used in the areas of public health, mental health, and long-term care, to address both social and clinical needs of ill and healthy patients for over a century. During Europe's Crimean War in the mid 1850's, Florence Nightingale streamlined resources for patient care in a manner that mirrors CM practices today. In the 1860's, CM techniques were adopted by early settlement houses in an effort to coordinate and allocate health care to immigrants and the poor. Informational index cards were used to list family needs, to track, follow-up, and enhance care, and to identify available resources for each patient. In 1863, the first Board of Charities was responsible for orchestrating public human services and responsible for fiscal stewardship of funds used to manage the program. While the settlement houses focused on coordinating and allocating services, the Board of Charities focused on management and allocation of funds. (Tahan, 1998).

By the turn of the 20th century, CM efforts expanded to include community nursing. Comprehensive services were provided through the use of home care delivered by nurses. According to Tahan (1998), recruitment of nurses for these roles mirrored many of the same CM staff characteristics sought today:

> 1) knowledge and expertise; 2) communication skills; 3) cost containment; 4) collaboration with physicians; 5) appropriate allocation of resources; 6) responsibility for the overall care of the patient and family; 7) provision of emotional psychosocial support and assuring dignified and peaceful death; 8) coordination and management of care; 9) facilitation of the delivery of patient care activities; and 10) obtaining funding for special programs. (p.3)

While community nursing was unfolding, case coordination was developing through the social worker profession. Social workers focused on providing a link between community resources and patients and their families (Tahan, 1998).

By the end of World War II, CM initiatives were continuing to grow. Numerous veteran's were returning from the war with significant mental and emotional handicaps and community mental health nurses were sought to provide these veterans and their families with intensive and continuous services. Although there were significant post War CM efforts focusing on mental health issues, some veterans were returning from the war with complex injuries that required multidisciplinary interventions and little attention had been placed on these needs. Grau (1984), as cited in Tahan (1998), noted that in 1962 the President's Commission on Mental Retardation discussed the need to help patients stay in their communities and improve their access to healthcare services through a coordinator.

The next significant influence on the practice of CM occurred as a result of the implementation of Medicaid, Medicare, and other legislation. Medicaid and Medicare waivers funded demonstration projects that emphasized long-term care CM for the elderly, poor, and disabled (Tahan, 1998). As a result of excessive state spending on the elderly, the goal of these projects was to prevent unnecessary institutionalization particularly in nursing homes. Hoping to

divert some of the elderly population away from nursing homes into the community, the services in these projects were provided by a variety of healthcare professionals: physicians, nurses, social workers, dieticians, and both physical and occupational therapists (Quinn, 1995).

By the 1970s, legislation was developed to establish community health and social support services to improve access to federal programs for individuals (Quinn, 1995). Specifically, in 1973, the Older American's Act influenced the development of agencies, such as the Area Agencies on Aging. These agencies were responsible for the delivery and coordination of comprehensive community-based services for the elderly. The Area Agencies on Aging met their mission by identifying nurse-social worker teams who helped to meet their client's healthcare needs through a brokered service approach. By 1975, the second legislative influence on CM was enacted; its title was the Education for All Handicapped Children Act. This act introduced the concept of CM in the school system. By gaining access to handicapped children and their families through schools, nurses and social workers were able to enhance access to preventive and therapeutic healthcare services. The goal of these acts was to substitute medical services with less expensive non-medical services (Tahan, 1998).

By the 1980s and 1990s, the use of diagnosis-related groups for reimbursement in the prospective payment system and the development of healthcare insurance coverage and capitation by Managed Care Organizations placed significant pressure on healthcare professionals to pursue cost containment efforts. These significant changes to the healthcare delivery system prompted healthcare organizations to develop CM models that focus on assessing medical necessity, duplication and fragmentation of services. The ultimate goal of all of these assessments was to manage utilization and allocation of resources (Tahan, 1998).

According to Viau et al. (1995), in 1980 K. Zander developed the first CM model, focusing on the acute care setting in which care was rendered to catastrophically ill patients. There were three primary components of this model. First, nurses were responsible for coordinating and monitoring care based on case type. Second, critical pathways were implemented for specific diagnostic groups. Third, the model required thorough documentation of differences noted between expected and actual healthcare interventions to provide feedback to appropriate staff. The second CM model developed was the community-based CM model. The community-based model also had three strategies. The first strategy was to coordinate, develop, and upgrade the long-term care delivery system. The second strategy was to control access to nursing home and other institutional services. The third, and final strategy, was to combine into one single system all long-term care services (Quinn, 1995). Both the acute care and community-based CM models have been tailored to organizational needs based on the strategic goals and reimbursement structures of these organizations.

Tahan (1998) explained, "The structure of case management services is defined by the case management model applied by the healthcare organization and the aims of the model" (p.6). These models range from brokered (matching health services with the needs of a patient) to comprehensive and integration services, from targeting particular populations to unique patient needs, from non-profit to for-profit organizations and inpatient to outpatient care settings. Case Management models have evolved from a sole focus on the public sector to an expanded focus that includes both payer and provider private sector care (Zander, 2002). CM will survive because its use is both financially and clinically useful. Zander (2002) stated, "Because case managers negotiate and broker resources directly or through teaching patients self-care skills to

broker resources for themselves, case management in some form will continue to be at the center of the access and cost dilemma" (p. 62).

According to Wolfe (1995), since the early 1990s, there has been a shift from cost to care case management. He further explains that case managers who were primarily based in the insurance company setting are now shifting to numerous other healthcare settings. Although managed care organizations have had success in negotiating the price of care from providers, those same providers have not had the same success in managing their expenses. Providers of health care are now seeing the value of case managers in their efforts to manage care rendered to their patients. The current profession of CM is experiencing an expansion of duties varying from disease management to population-based services (Wolfe, 1995).

Day (1996) explained that CM effectiveness could be measured through an assessment of various quality based indicators. For example, CM efforts have improved the health status of patients, patient safety, increased patient compliance to treatment plans, and enhanced satisfaction for patients, their families, and healthcare professionals. Curtis et al. (2002) were interested in the effectiveness of a trauma CM program and developed a pilot study to assess patient outcomes at the St. George Hospital a teaching hospital of the University of New South Wales. The authors were particularly interested in changes in inpatient length of stay, hospital complications, and missed injury rates. In addition, the authors also assessed staff satisfaction and the use of allied health professionals. They created a database of 600 patients and commenced a five-month study that included 1.5 full-time trauma case manager positions. Results demonstrated that length of stay decreased by 25%, the missed injury detection rate increased from 0.6% to 5.4%, and use of allied health professionals increased from 22% to 58%. The authors explained that there were no changes in the level of hospital complications and

while a general sense of support for the CM initiative was felt throughout the organization, the number of survey respondents was inadequate to perform a valid analysis. The results of the St. George Hospital pilot study demonstrates that CM is effective and can bring value to a healthcare organization (Curtis et al., 2002).

Case management programs consist of a staff mix of nurses and social workers (Viau et al., 1995, & Bristow, 2002). Nurse case managers conduct clinical assessments, review charts to validate hospital admissions and prevent patient care problems, and serve as a coordinator and resource for their patients and an interdisciplinary team of healthcare professionals (Bristow, 2002). The social worker case manager assesses the psychosocial issues of a patient. These issues could include bereavement, substance abuse, and other forms of social counseling. They are also the primary resource to help with coordination of services with community resources. By assessing the psychosocial needs of each patient, the social worker helps each patient deal with emotional challenges. This approach contributes to a holistic care approach throughout the continuum of care. Together, social worker and nurse case manager strive to provide cost-effective and quality patient care that yields the best outcome for patients (Bristow, 2002).

Case Management in the MHS

The evolution of CM in the MHS has matured in similar fashion as CM practices throughout the healthcare industry. For example, the MHS also needs to increase access to care without increasing costs and the need to meet patient demands for the latest medical technology. However, in addition to common characteristics, the MHS also faces unique challenges with regard to the delivery of healthcare to service members and their family members because this population is dispersed throughout the world, from the most remote location to the most densely populated areas. Specific challenges include the worldwide portability of healthcare

information, standardization of the administration of healthcare, and the need to collaborate with non-MHS healthcare providers to ensure access (Reineck & Farris, 2003). These unique challenges of the MHS pose a great opportunity for case management intervention. Through case management, the MHS has begun to tackle the challenge of delivering care to its unique population of beneficiaries.

While there are numerous concepts of CM in practice throughout the healthcare industry, the MHS has two primary segments in their CM model: Individual Case Management (ICM) and Population-Based Case Management. The ICM model is adopted in cases where a patient has distinct, multiple, and costly needs. The case manager tailors a care plan based on the patients individual needs and monitors them accordingly. Patients requiring ICM include: a) patients who have chronic health conditions which have been complicated by a traumatic event, b) patients who have care needs that require close coordination and monitoring by a healthcare professional, and c) patients who have catastrophic care needs that incur a high usage of resources and are high costs (Department of Defense Medical Management Guidebook, draft, Section II p.6).

According to Bailey (2000), in 1992, the ICM model was expanded to address the needs of beneficiaries with Extraordinary Conditions. This revised program, the Individual Case Management Program for Persons with Extraordinary Conditions (ICMP-PEC), provides medically necessary custodial care for military beneficiaries who have extraordinary medical or psychological disorders that are not covered under TRICARE. The ICMP-PEC model is intended for catastrophically injured or ill beneficiaries who require one of two specific types of care. The first group of patients would be patients who are receiving care that is extraordinarily high in cost and/or are receiving prolonged inpatient care that would be limited or excluded from

coverage under the TRICARE benefit. In these situations, case managers remove the financial burden from the family members by seeking waivers to the health benefit restrictions and then seek to identify and place these patients in less intensive levels of care that do not impede the appropriate care. The second group of patients would be patients who are transitional healthcare services from their TRICARE benefit to alternate sources of healthcare coverage, such as Medicaid (Bailey, 2000).

The second model of CM in the MHS is the Population-based Case Management model. In this model, the case manager coordinates the delivery of healthcare and related services for a population group that have similar health characteristics. Case managers functioning under this model focus on preventive interventions for healthy populations and monitor and control population groups who possess common diseases. For example, the case manager may focus on diabetic patients who require minimal healthcare intervention. The population-based CM model is primarily a preventive approach while case managers practicing the ICM model are practicing tertiary intervention (Department of Defense Medical Management Guidebook, draft, Section II p.6).

The MHS' CM models are derived from the concept of a continuum of care from wellness to illness (Reineck & Farris, 2003). "Continuum is defined as an uninterrupted period, referring to the various stages of health and various applications of the CM process" (Department of Defense Medical Management Guidebook, draft, Section II p.6). The goal is to address medical needs of those patients with the least healthcare risks as well as those with complex healthcare needs. This objective is met through both population-based case management and individual case management.

These broad CM models enable the MHS to enhance existing clinical practices by appropriately monitoring and coordinating the care of not only catastrophic patients but also those who may have less complex medical needs. One percent of all cases are classified as catastrophic, nine percent are classified as chronically ill, and 90% of all cases are classified as having acute, minor illness, or preventive healthcare needs. Each patient group consumes one-third of the total healthcare expenditures. A shift from a narrow focus on catastrophic cases to a broad focus on the entire continuum of care has the potential to dramatically improve the efficiency and effectiveness of the healthcare delivered (Reineck & Farris, 2003).

Case Management Challenges

A review of the literature has demonstrated that CM is not without its own challenges. Rieve (2000) stated that in order to prove program success case managers must acquire skills to demonstrate quantitatively through measurement of verifiable data that CM demonstrates value to their organization (Rieve, 2000). Viau et al. (1995) further explained that organizations attempting to validate their CM programs cannot limit their focus to product and process factors but must be broad in their focus to include cost and consumer factors as well. McGettigan (2003) stated that an organization that has a poorly justified CM program tends to shift staff away from CM and, in many cases, burdens those staff with duties not associated with their cases. Tracking and monitoring each case is a means of assessing trends that contribute to the survival of a CM program. CM programs can be assessed thorough an analysis of the cost savings and cost avoidance over time (McGettigan, 2003).

Using a study of CM programs for a Philadelphia based network of hospitals as an example of assessing a program's cost savings, McGettigan (2003) describes cost savings as an additional significant measure of the effectiveness of a CM program. The hospital system

wanted to justify its CM staff members. Although the program contributed significantly to the hospital's program margin and quality of care, there was no quantitative data which could demonstrate the value of either the program or the number of employees. The CM supervisor obtained assistance from internal financial analysts to justify the program and identify the appropriate staffing levels. By demonstrating program value through quantitative analysis, rather than anecdotal evidence, the supervisor illustrated healthcare trends and demonstrated the value of CM in meeting the organizational goals. An assessment of both cost avoidance and savings can contribute to the stability of projections and targets of an organization's financial forecast (McGettigan, 2003).

A review of the literature demonstrates that a focus on length of stay (LOS) is an acceptable means of measuring CM for inpatient services (McGettigan 2003, Rosenstein 1999, and Mateo et al., 1998). By assessing LOS, utilization and hospitalization costs may be determined and will therefore contribute to resource allocation and budget development. A reduction in inpatient LOS may be attributed to improved process flow, timely treatment, and disposition. Hospitals which operate under a per case or capitation reimbursement arrangement attempt to adopt CM practices which reduce LOS visits (Rosenstein, 1999). By evaluating changes in the LOS and the related cost for that care, case managers can identify cost avoidance opportunities that may be used to assess the value of the program.

Bristow and Herrick (2002) explain that inpatient hospitalizations should be limited to patients who are acutely ill and practices that avoid costs are valuable tools in that endeavor. Furthermore, by avoiding unnecessary hospital stays an organization is taking proactive measures to improve its financial strength. Rosenstein (1999) and Bristow and Herrick (2002) explain that cost avoidance is the cost of care not provided to a patient because of some type of

intervention. It can be calculated by multiplying the number of inpatient days that are avoided by the average cost of care per day.

Bristow and Herrick (2002) described a retrospective chart review study of emergency department (ED) admissions for ten ED facilities. Analysis included assessment of financial charges, chief complaint, visit timing, testing, and treatment. There were 1,488 ED visits of which 42.4% patients were admitted. According to the report, physician visits to the nursing homes could have avoided many of the ED visits. In addition to the use of physician visits, the authors reported that ED visits and admissions could have been avoided with the use of nurse and physician assistants visits. Treating patients in the least costly setting is beneficial to the ED, the facility, and the patient (2002).

Huggins and Lehman (1997) measured cost savings through an assessment of a nurse case management model that focused on efficient healthcare delivery across a continuum for patients enrolled in CM. Cost savings was defined as the net difference between the cost of care prior to an intervention compared to the cost of care after the intervention. The authors explained the goal as an effort to reduce the incidence of illness, stabilize a patient's health status, and provide outpatient care rather than unnecessary inpatient care. These goals were met through medical staff collaboration, through assessments and patient education.

The authors developed a study that examined the changes to the cost of care and the changes in the services utilized six months before CM and six months after CM services were rendered. Fifty-three patients were included in the study due to the availability of complete cost data. An analysis of the data illustrated that there was a dramatic decline in the quantity of services utilized after CM practices were adopted. During the period of the study, there were 364 patient encounters, of which 236 encounters occurred prior to the implementation of the CM

program. In detail, inpatient visits declined by 59% from 102 visits pre-CM to 42 post-CM, outpatient visits declined 13% from 53 visits pre-CM to 46 post-CM, and ED visits declined 51% from 81 visits pre-CM to 40 post-CM. From the cost perspective, cost of services declined 69% from $32,511 pre-CM costs to $10,279 post-CM (Huggins & Lehman, 1997).

According to Rosenstein (1999), assessing the return on investment (ROI) of any healthcare related initiative is complex and contrasts traditional ROI methods. The primary reason for the difference between healthcare and traditional ROI analysis is that non-healthcare related businesses assess their programs solely by their ability to generate revenue. In the healthcare industry, ROI is measured by performing an assessment of cost reductions. This difference in technique occurs because, in general, the healthcare industry operates under fixed-dollar reimbursement incentives and economic benefits are determined by an institution's ability to control costs. Complex reimbursement structures and payer mixes pose significant challenges to any assessment of ROI. This is, in part, due to the financial implications when the healthcare delivery methods are modified. Reimbursement structures are not uniform and therefore these changes may have opposing consequences. For example, assuming expenses are standard across reimbursement structures, an increase in utilization would not be a concern in a fee-for-service structure, where as, the same increase could potentially pose financial constraints in a capitation reimbursement structure.

Though challenging, CM ROI can be determined through an assessment of cost savings and cost avoidance initiatives. For example, by expediting processes, treatment, and disposition, an organization can not only alleviate potential delays in service, but can also contribute to reductions in unnecessary care and expenses related to that care. It is rare to find cost avoidance practices that are well documented and that can be directly attributed to revenue generation and

cost reductions. The complexity occurs because health care organizations generally have multiple performance improvement initiatives occurring in tandem and it is difficult, if not impossible, to determine cause and effect relationships of each program (Rosenstein, 1999).

Rosenstein (1999) offers a five-year prospective example of ROI based on the establishment of a clinical pathway. He identified the costs related to the clinical pathway as: information technology (IT) software and hardware additions and labor. Labor included the developers of the pathway, staff used to execute the pathway, and IT support staff. Information technology costs included the costs of procuring and maintaining the necessary software and associated hardware equipment. Projected cost savings were based on an estimate of 10% of all hospital admissions for the top 25 diagnoses. Rosenstein reported first-year ROI as a negative $700,000 and fifth-year ROI as a positive $2.4M. The first-year ROI was computed by deducting cumulative total costs of $850,000 from the projected cumulative decision support and cumulative clinical pathway savings of $150,000. The process was repeated for each year through the fifth-year of the project. The ROI for year five was $2.4M a result of $2.3M cumulative total costs being deducted from $4.7M cumulative decision support and cumulative clinical pathway cost savings.

The Advisory Board (2000) recommends three prerequisites to optimize CM. The first prerequisite is to ensure support of the program from key stakeholders within the organization. The second prerequisite is to ensure that CM goals are in line with organizational goals and are targeting patients with the greatest cost savings potential. The third and final prerequisite is to ensure that CM staff members realize the importance of their role in documenting activities that are used to quantify cost savings of the program.

Purpose and Utility of Results

The purpose of this study was to conduct a descriptive analysis of the return on investment (ROI) of the Family Practice Case Management Program at Naval Hospital Jacksonville. The alternative hypothesis for this study was that the ROI of CM, from both the cost savings and cost avoidance perspective, would be positive dollar values. This will illustrate that the benefits of using CM in the Family Practice Clinic not only outweigh the costs of the program but also yield a positive ROI for the MTF. The null hypothesis is that the return on investment of CM, from the cost savings and cost avoidance perspectives, would be zero or a negative dollar value and therefore demonstrate that CM, from the financial perspective, is not a good investment for the MTF.

Illustrating the value of CM to facility leadership will provide quantitative validation of the value of CM as an integral management tool in the quest for effective and efficient healthcare delivery. The result will be an enhanced appreciation for the program and potentially support its future growth. Once recognition of the program's value is determined, it will foster increased collaboration amongst the organization's leadership, clinicians, and support personnel in an attempt to optimize cost efficiency strategies.

Methods

This was a retrospective cross-sectional study of case management efforts in the Family Practice Clinic (FP) at Naval Hospital Jacksonville, during the period October 2002 – June 2004. The study was cross-sectional in design due to the variations in the length of time each patient participated in the case management program and due to variations between the year of commencement and year of completion of the CM efforts for each case. To negate the

confounding effects of time a cross-sectional study was selected because it enabled the researcher to perform a descriptive analysis of a population at one point in time. Analysis was performed based on six months pre and post-CM care costs. Since this is an analysis of the success of the program and the viability to be self-sustaining, this was the most optimal method of analysis.

Population sample

The sample is a non-probability judgment sample of all Family Practice Clinic patients who were previously enrolled in CM and later disenrolled from the program. As of September 2004, the Family Practice clinic has managed 198 cases of which 127 cases are now closed. Case managers select patients requiring case management through a process called case finding. Case managers identify their cases through a number of resources. These resources include referrals from primary care providers, specialists, staff nurses and discharge planners, and through a review of utilization and census reports.

Patients enrolled in the program are categorized into one of four priority groups. These characteristics were developed as a management tool to ensure equitable caseload distribution to the organizations case managers. Caseload is defined as the number of cases a case manager is currently monitoring. The caseload is used to measure case manager productivity and workload. Without strict caseload scrutiny, health outcomes could be negatively impacted when a case manager becomes overwhelmed with the number and complexity of the cases that they are monitoring. By using prioritization groups, Naval Hospital Jacksonville is managing the case load mix of each of the case managers in an effort to monitor accountability and to ensure health outcomes are not negatively impacted (Theresa White, personal communication, April 26, 2005).

According to the Department of Defense Medical Management Guidebook (draft), case manager caseloads can range from eight to 50 cases.

Priority group I cases are catastrophic cases. Examples of these cases includes AIDS, premature infants, transplants, spinal cord injuries, neoplasm, and end stage renal disease patients. Priority group II cases are complex cases which include high cost or high-risk potential, patients who have obtained care in both intensive care and rehabilitative settings, patients who have deteriorating conditions, have high risk psychosocial behavior, or have complex discharge needs. Moderates cases are priority group III cases. They include cases that have an intermediate level of complexity and require critical follow-up on interventions. Cases in priority group IV are categorized as mild cases. These patients require minimal interventions and have a stable course of periodic follow-up. For priority IV patients, the case managers' focus is on wellness and continuation of interventions that will continue to contribute to prevention of admission (NHJAX, Case Management Program Standard Operating Procedure, 2002).

The sample was limited to FP due to CM staffing fluctuations in other areas of the facility. The FP Case Managers managed 127 of the 339 closed CM cases and were the sole case managers for FP since the CM program was established. There is one civil service nurse case manager and one contract social worker. Once the population sample was determined, their individual healthcare data was extracted from the Military Health System (MHS) Management Analysis and Reporting Tool (MART), also known as M2, unique identifiers were replaced with numerical values, and the original data file was deleted. These actions ensured integrity and ethical compliance of this study.

Variables

The variables of interest, or dependent variables, are the ROI of Case Management based on cost avoidance and the ROI of CM based on cost savings. These variables are continuous and operationally defined as positive or negative integers. A positive ROI demonstrates that the expenditures related to the establishment of the CM program are less than the cost savings and cost avoidance. A negative ROI demonstrates that the expenditures exceed the value of the benefit of the program. A zero ROI demonstrates that the program is neither negatively nor positively influencing the financial position of the organization.

Three independent variables, cost savings, cost avoidance, and salary expense were measured and are all continuous in nature. Cost savings was computed by subtracting the sum total of the cost variables post-CM from the sum total of pre-CM data. Cost avoidance was computed by assessing the pre and post-CM changes in the total length of stay and number of outpatient visits and multiplying the net change by the average cost for each cost variable based on pre-CM dollars. Pre and post-CM was limited to six months prior to and after the case management period of care.

There were four cost groups for pre and post-CM: the total cost of care delivered in the MTF, the total cost of care delivered in civilian healthcare facilities, the cost of durable medical equipment, and the cost of pharmaceuticals. All figures are reported in dollar values. The cost of care delivered within the MTF and in civilian healthcare facilities is further subdivided into outpatient, outpatient ED, inpatient, and inpatient ED costs. For the purpose of this study, civilian healthcare settings will be identified as network facilities. Pharmaceutical costs are the cost of all drug medications utilized by the patients. The cost of durable medical equipment includes costs such as nebulizers, crutches, and blood sugar home testing units.

The third dependent variable, salaries, is the expenses related to the implementation and execution of the program. Although the program is a new initiative, there were no financial burdens placed on NHJAX. Since there were no increases in overhead expenses, the salary expense of the case managers was the only financial expense of this program and those salaries were funded by BUMED. In order to forecast future ROI for NHJAX, the salaries expense will be treated as an expense of the facility.

Data Collection

The first step of the data collection process consisted of an M2 data extraction of the cost, utilization, and types of care rendered to the 127 patients pre and post-CM. This extraction resulted in 10 data sets: outpatient ER, outpatient non-ER, network ER, and network non-ER for both care received in the network and care received in the MTF, durable medical equipment, and one data set for pharmaceuticals.

The second step consisted of identifing the percentage of non-CM care rendered to these patients pre-CM. By removing non-CM care from these data sets, inaccurate summaries regarding the cost and frequency of care rendered were avoided. Using Microsoft Excel® random selection features, a random sample of 30 cases was selected to determine the cost and quantity of care included in the data set that was not related to each patient's case management characteristics. The sample size was selected based on standard sampling practices in the Navy MHS. In general, sampling of data is limited to 5% of a population but not greater than 30 data records (F. Nazareno, personal communication, 23 January 2004). Once these cases were selected, Inter-Qual® standards were used by each case manager to analyze the data to identify the non-CM care that was rendered during the period. InterQual® is a clinical decision support tool that provides clinicians with a tool to assess the appropriateness of care based on a patients

specific diagnosis. These standards are based on scientific knowledge and clinical expertise. Non-CM care was only evaluated for the direct patient-provider encounters. Specifically those variables are the eight provider contacts: outpatient ER, outpatient non-ER, network ER, and network non-ER for both care received in the network and care received in the MTF. An assumption was made that all pharmaceutical prescriptions and durable medical equipment expenses were related to the reason for case management. Once the non-CM care was identified, an aggregate percentage was computed for each care group. An assumption was then made that these percentages could be applied to the entire population of 127 closed cases.

The third step was to perform a cost savings analysis using Microsoft Excel®. The costs of pre-CM were computed by summing the total of the ten data sets, outpatient ER, outpatient non-ER, network ER, and network non-ER for both care received in the network and care received in the MTF, durable medical equipment, and pharmaceuticals. Then the costs of post-CM care were determined using the same methodology. Finally, the total cost of post-CM care was deducted from the total cost of pre-CM care. The net difference was identified as a cost savings.

The fourth step of the analysis consisted of compiling descriptive statistics as a means to conduct a cost avoidance analysis. Descriptive statistics were calculated for the pre-CM MTF and network outpatient non-ER, outpatient ER, inpatient non-ER, and inpatient ER cost data. Cost avoidance analysis not only included an analysis of pre-CM descriptive statistics, it included a tally of the number of outpatient, outpatient ER, inpatient, and inpatient ER visits post-CM. Pre-CM descriptive statistics included the minimum, maximum, standard deviation, number of visits, and average cost per visit/inpatient stay. The minimum, maximum, and standard deviation were provided to illustrate the dispersion of variability within each data set.

The cost avoidance analysis is based on an assessment of the net changes in the quantity of care delivered multiplied by the average cost of care for each of the eight patient-provider contact variables. Assessment of the quantity of care changes was limited to the net change in outpatient visits and the net change in length of inpatient stays, pre and post-CM.

The fifth step was an analysis of return on investment (ROI) for both cost savings and cost avoidance. A retrospective assessment of the ROI of CM based on costs savings was determined by deducting the total cost savings from the financial investment into the program. As previously stated, there was only one financial investment related to the establishment of the MTFs CM program, the salaries of the two case managers. Implementation of the CM program did not create any additional expenses. Since the case managers managed 198 cases, both closed and open cases, the salary expense was proportionally attributed to the cases analyzed in this study.

Reliability and Validity

The data was retrieved from Canopy CM® and M2. Canopy CM® is the authorized CM tool utilized in the MHS. This web-based software program serves as a means for Case Managers to track and monitor their cases. The cases were selected from Canopy CM® and their related quantitative information extracted from M2. M2 is the primary executive decision management software tool for the MHS,' it enables oversight of MHS productivity. M2 may be queried for clinical, financial, productivity, and beneficiary demographic information and is recognized as the primary source for quantitative analysis of MTF operations. The data in M2 is extracted from the MHS Data Repository, which retrieves its data from the Composite Health Care System (CHCS) at the point of care, the Medical Expense and Performance Reporting System (MEPRS), the Expense Accounting System (EAS) and TRICARE Management Activity-

Aurora system (TRICARE Management Activity Management Analysis and Reporting Tool training guide, August, 2002).

CHCS is the MHS computerized provider order entry system. It provides clinicians and support staff with a consolidated means of ordering and documenting outpatient and inpatient care and related ancillary procedures provided in the MTF. Using cost-center allocations of historical expenses and personnel assets, MEPRS consolidates expense and personnel data. The Expense Accounting System uses data elements of MEPRS and CHCS to consolidate expense data. The TMA-Aurora system feeds financial data of network care provided to TRICARE eligible beneficiaries to the MHS Data Repository. The reliability of the study is based on the use of Canopy CM® and M2. Both systems are official resources available for use throughout the MHS as decision support tools and use of these systems enables duplication of this study (TRICARE Management Activity Management Analysis and Reporting Tool training guide, August, 2002).

The quality of the data from any of these systems is contingent upon both the accuracy and timeliness of staff documentation. In February 2001, BUMED implemented a Data Quality Management Control (DQMC) Program. The policies within the program were established to create internal management controls that would ensure the integrity of MEPRS, clinical information systems such as CHCS, and outpatient medical records. Using the DQMC directives, all MTFs are required to complete monthly data quality assessments of their facilities assets and report findings to BUMED (BUMED Memorandum, Data Quality Managed Control Program, dated Feb 2, 2001).

At NHJAX, a Data Quality team performs the monthly data quality assessments. Amongst other data quality checks, the team samples inpatient and outpatient records verifying

the accuracy of information entered into CHCS. To date, NHJAX has had favorable data quality assessments that did not indicate any significant discrepancies in data quality. Although the team takes a sample of all MTF data and does not focus on care delivered to CM patients, for the purpose of this study, the CM data are assumed valid. Previously defined Cost Saving and Cost Avoidance operational definitions and the facilities use of DQ management controls illustrates the content validity of this study. Content validity illustrates the extent that a measure includes all of the possible ranges within a concept.

Results

Demographics

Figure 1 provides a summary of the beneficiary category information. The most dominate beneficiary category in the CM case load was 32 retirees who were 65 years of age or younger. Slightly more than 50% of the cases were retirees of all ages, and spouses 65 years of age or older. This included the 17 retirees younger than 65, 27 retirees older than 65, and 29 spouses who were older than 65 years old. There were three active duty service members and seven patients enrolled in the Exceptional Family Member Program (EFMP). Patients enrolled in the EFMP for healthcare reasons are generally higher users of healthcare resources and require significant case monitoring.

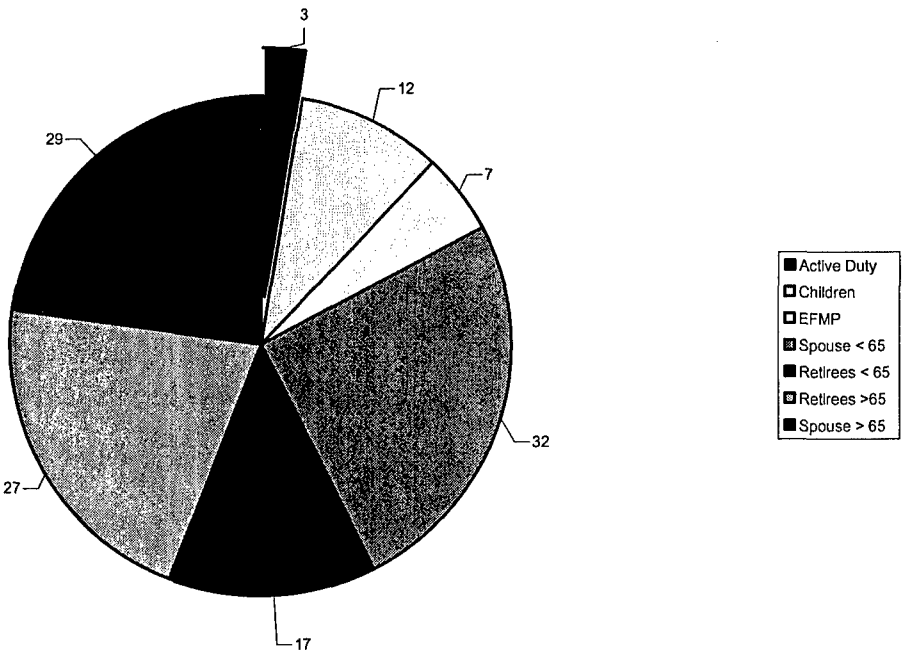

Figure 1. Identification of cases by beneficiary category.

As illustrated in figure 2, 65 of the closed CM cases were enrolled in the program between 11 and 30 weeks. There were eight patients enrolled in the program for 51 weeks or

more and the average number of weeks a patient was enrolled in case management was 24 weeks.

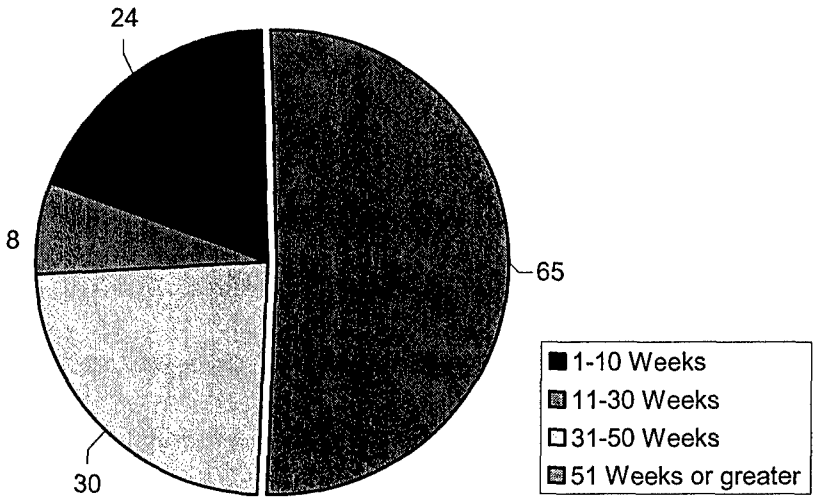

Figure 2. Number of weeks patients were enrolled in the CM program.

Figure 3 provides a graphical illustration of the reasons patients were disenrolled from the program. Eighty-six cases were closed because the patient had met their case management goals. Two patients were referred to other healthcare treatment facilities, five patients chose to discontinue their enrollment in the program, and 17 patients died.

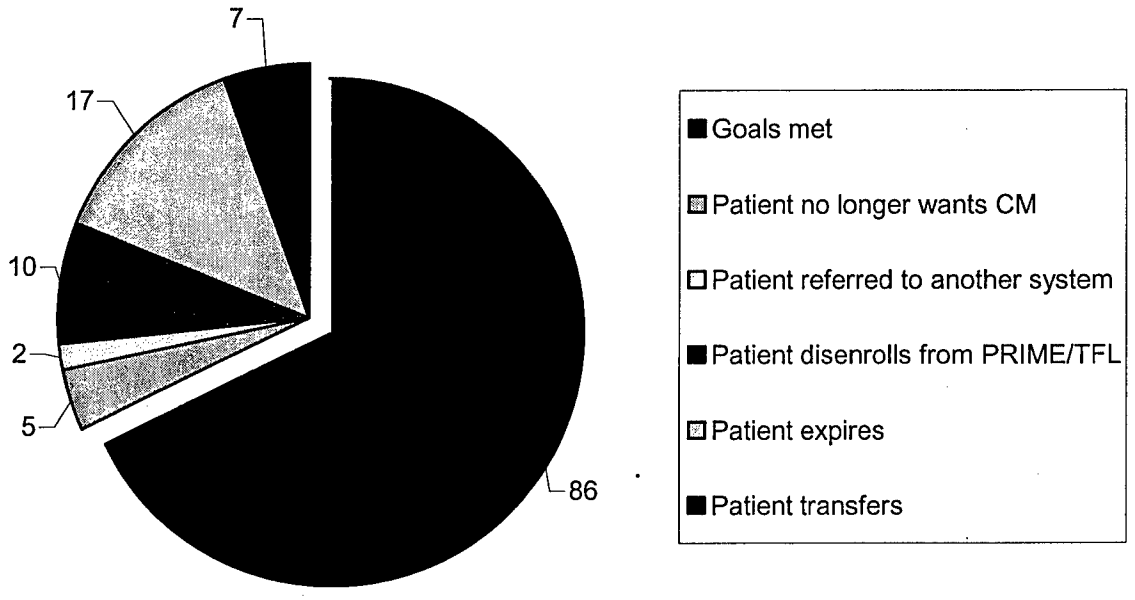

Figure 3. Reason patient disenrolled from CM program.

Figure 4 provides a summary of the criteria for selection. Seventy-one percent of the population met the criteria for CM based on priority group IV. As described earlier, patients in priority group IV require minimal intervention and are monitored to ensure continued wellness and prevention of admissions.

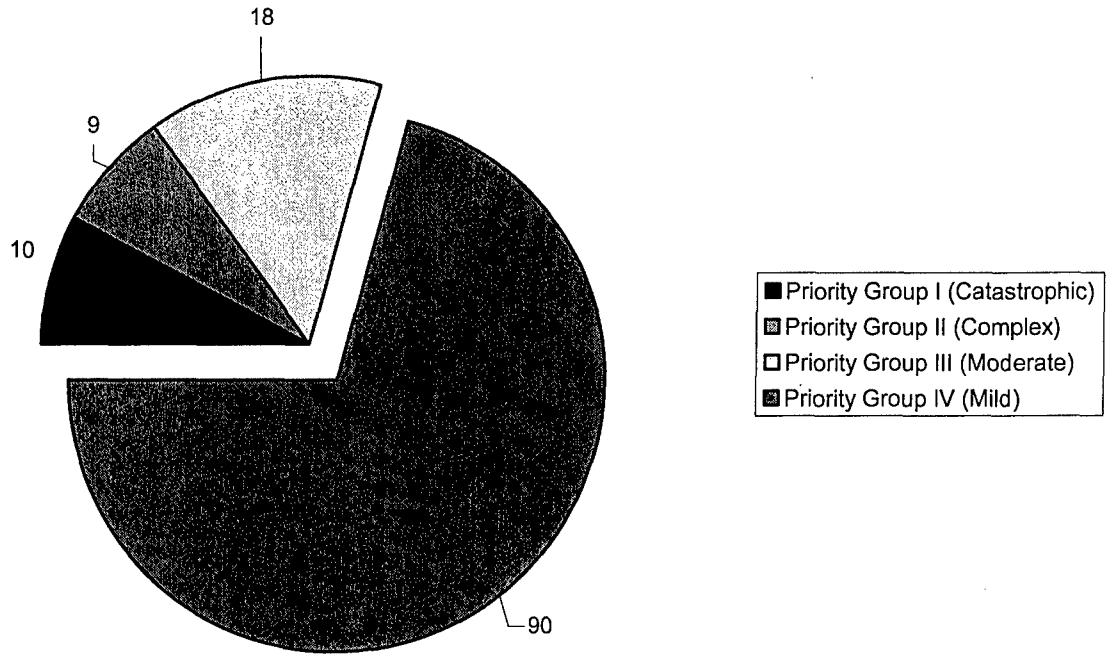

Figure 4. Complexity of cases managed.

Non-CM Care

The assessment of non-CM care was based on a pre-CM data analysis of patient-provider encounters for 30 cases. The percentage of non-CM care rendered varied based on location and type of care provided. The analysis found that most of the non-CM care was delivered in the MTF; 23.32% of outpatient visits, 21.73% of outpatient ER visits, and 15.72% of inpatient stays (Table 1). Analysis of network care demonstrated that all network care was related to the patient's CM reason with the exception of 6.42% of the network outpatient care (Table 2).

Table 1. Non-Case Management Care and Pre-CM Costs (Outpatient)

	Total Costs	Non-CM Care	Net Costs
MTF Outpatient	$252,373	$58,853	$193,520
MTF Outpatient ER	$32,947	$7,159	$25,787
Network Outpatient	$156,813	$10,067	$146,746
Network Outpatient ER	$3,277	$0	$3,277

Table 2. Non-Case Management Care and Pre-CM Costs (Inpatient)

	Total Costs	Non-CM Care	Net Costs
MTF Inpatient	$192,095	$30,197	$136,614
MTF Inpatient ER	$169,281	$0	$169,281
Network Inpatient	$134,307	$0	$134,307
Network Inpatient ER	$222,477	$0	$222,477

Cost Savings

Tables 3 and 4 illustrate that post-CM outpatient, inpatient, durable medical equipment, and pharmaceutical costs all decreased compared to pre-CM costs. A review of the analysis of outpatient and inpatient costs demonstrated that the most significant cost savings occurred in the outpatient care setting. Outpatient cost savings were 91.9% of pre-CM costs while inpatient cost savings were 85.94% of pre-CM costs. The most substantial outpatient savings occurred during non-ER MTF care, 97.92% savings of pre-CM costs.

Total inpatient cost savings were $569,496 while outpatient savings were $339,396. The most significant dollar savings was realized in the network inpatient setting, a total of $216,391.

A review of the table illustrates that the most inpatient savings was realized in the cost of care rendered through network ER care, a total of $216,391.

Table 3. Outpatient Costs

	MTF		Network		
	Outpatient	Outpatient ER	Outpatient	Outpatient ER	Total Costs
Pre-CM	$193,520	$25,787	$146,746	$3,277	$369,330
Post-CM	$4,026	$104	$25,174	$630	$29,934
Cost Savings	$189,494	$25,683	$121,572	$2,647	$339,396
Percent Cost Savings	97.92%	99.60%	82.85%	80.78%	91.90%

Table 4. Inpatient Costs

	MTF		Network		
	Inpatient	Inpatient ER	Inpatient	Inpatient ER	Total Costs
Pre-CM	$136,614	$169,281	$134,307	$222,477	$662,679
Post-CM	$35,187	$31,585	$20,325	$6,086	$93,183
Cost Savings	$101,427	$137,696	$113,982	$216,391	$569,496
Percent Cost Savings	74.24%	81.34%	84.87%	97.26%	85.94%

Durable medical equipment cost savings were $57,348 and pharmaceutical cost savings were $27,218 (Table 5). Pharmacy expenditures had the least cost savings as a percentage of pre-CM, 18.24%. Total cost savings was $993,458, a 77.97% decrease in health care costs (Table 6).

Table 5. Other Care Costs

	Durable Medical Equipment	Pharmacy	Total Costs
Pre-CM	$92,857	$149,237	$242,094
Post-CM	$35,509	$122,019	$157,528
Cost Savings	$57,348	$27,218	$84,566
Percentage Cost Savings	61.76%	18.24%	34.93%

Table 6. Total Costs

	Outpatient	Inpatient	Other Care Costs	Total
Pre-CM	$369,330	$662,679	$242,094	$1,274,103
Post-CM	$29,934	$93,183	$157,528	$280,645
Cost Savings	$339,396	$569,496	$84,566	$993,458
Percentage Cost Savings	91.90%	85.94%	34.93%	77.97%

Cost Avoidance

A review of the pre-CM outpatient descriptive statistics illustrated that the least costly outpatient visit occurred during a non-ER network visit at zero dollars. Without further analysis, an assumption was made that outpatient and inpatient costs that were identified as zero dollars were due to denied claims or lack of reimbursement cost data at the time the data was extracted from M2. The most expensive outpatient visit was provided in a network healthcare facility at $6,172.26. The most expensive and the cheapest average cost per outpatient visit occurred in the MTF ER and network ER, $192 and $82, respectively. The MTF had the most number of

outpatient visits while network emergency rooms had the least, 1,413 and 40 respectively. The variance in the data was as little as 56.287 for network outpatient ER and as high as 418.70 for network outpatient care (Table 7).

Table 7. Descriptive Statistics Pre-Case Management (Outpatient)

	Total Costs	# Of Visits	MIN	MAX	STD DEV	Avg Cost Per Visit
MTF Outpatient	$193,520	1,413	$6.21	$2,772.36	211.79	$137
MTF Outpatient ER	$25,683	134	$943.00	$1,109.50	158.94	$192
Network Outpatient	$146,746	921	$0.00	$6,172.26	418.70	$159
Network Outpatient ER	$3,277	40	$1.77	$314.73	56.29	$82

Inpatient descriptive statistics analysis also found zero dollar network costs for both non-ER and ER costs. The assumption remains the same, zero dollar costs are a result of denied claims or lack of reimbursement cost data at the time the data was extracted from M2. The most expensive inpatient care was provided as a result of network ER care, a total of $106,127. Excluding network zero costs, the least expensive inpatient stay of $203 occurred during a network non-ER inpatient stay. Inpatient data for the MTF had the highest variance, 11,553.2972 standard deviations (Table 8).

The MTF had the most expensive average costs per bed day, $1,380 and $2,351 for non-ER and ER inpatient stays, respectively. Network average costs per bed day were $457 and $1,107 for non-ER and ER inpatient stays respectively. Although the total costs of inpatient stays for MTF and network care were similar, the number of bed days were significantly different and therefore demonstrated that MTF average costs per bed day were higher than network costs. Total costs for MTF care for non-ER and ER was $136,614 and $169,281 while

network care non-ER and ER costs were $134,307 and $222,477, respectively. Length of stay for non-ER and ER MTF care was 99 and 72, respectively while network non-ER and ER length of stays were 294 and 201, more than twice the MTF care (Table 8).

Table 8. Descriptive Statistics Pre-Case Management (Inpatient)

	Total Costs	LOS (Pre-CM)	MIN	MAX	STD DEV	AVG Cost Per Bed Day (Pre-CM $)
MTF Inpatient	$136,614	99	$1429.79	$60,158.62	11553.2972	$1,380
MTF Inpatient ER	$169,281	72	$1,687.04	$15,920.44	3368.6047	$2,351
Network Inpatient	$134,307	294	$0.00	$27,668.08	6704.8591	$457
Network Inpatient ER	$222,477	201	$0.00	$106,127.72	23988.1775	$1,107

Cost avoidance outpatient analysis demonstrated that there was a total outpatient cost avoidance of $143,882. Specifically, MTF visits declined 599 and 92, had average costs per visits of $137 and $192, and yielded a cost avoidance of $82,037 and $17,705, respectively for outpatient non-ER and outpatient ER care. At an average cost of $457 per visit, the decline in network outpatient non-ER utilization from 921 to 650 resulted in a cost avoidance of $43,179. Network outpatient ER utilization declined from 40 to 11 visits and with an average cost visit of $82 the cost avoidance was $901 (Table 9).

Table 9. Cost Avoidance Analysis (Outpatient Visits)

	Visits Pre-CM	Visits Post-CM	Net Visits	Net Avg Cost Per Visit (Pre CM $)	Cost Avoidance
MTF Outpatient	1413	814	599	$137	$82,037
MTF Outpatient ER	134	42	92	$192	$17,705
Network Outpatient	921	650	271	$159	$43,179
Network Outpatient ER	40	29	11	$82	$901
Total Outpatient Cost Avoidance					$143,822

Note: Net Visits = Vists Pre-CM minus Visits Post-CM

Table 10 illustrates that the aggregate cost avoidance for inpatient care was $436,289. Inpatient non-ER care rendered in the MTF declined by 28 bed days while inpatient ER care declined by 55 bed days. This decline yielded a cost avoidance of $38,638 in inpatient non-ER care and $129,312 in inpatient ER care, based on average costs of $1,380 and $2,351 respectively. Network non-ER inpatient care declined by 207 bed days and resulted in a cost avoidance of $94,563 at an average cost of $457 per bed day. Network inpatient ER care declined by 157 days and resulted in a cost avoidance of $173,776 based on an average cost per day of $1,107. Aggregate cost avoidance of both outpatient and inpatient care was $580,011 (Table 11).

Table 10. Cost Avoidance Analysis (Inpatient Stays)

	Bed Days Pre-CM	Bed Days Post-CM	Net Bed Days	Average Cost Per Bed Day (Pre CM $)	Cost Avoidance
MTF Inpatient	99	71	28	$1,380	$38,638
MTF Inpatient ER	72	17	55	$2,351	$129,312
Network Inpatient	294	87	207	$457	$94,563
Network Inpatient ER	201	44	157	$1,107	$173,776
Total Inpatient Cost Avoidance					$436,289

Note: Net Bed Days = Bed Days Pre-CM minus Bed Days Post-CM

Table 11. Total Cost Avoidance

	Outpatient Visits	Inpatient Stays	Total
MTF Inpatient	$82,037	$38,638	$120,675
MTF Inpatient ER	$17,705	$129,312	$147,017
Network Inpatient	$43,179	$94,563	$137,742
Network Inpatient ER	$901	$173,776	$174,677
Total Cost Avoidance	$143,822	$436,289	$580,111

Return on Investment

Return on Investment was determined for both cost savings and cost avoidance. As previously stated, the salary expenses are the only facility cost of the CM program. There were no additional overhead expenditures incurred due to the implementation of this program. The salary expense of the CM staff varies due to the differences in their pay structure. One position is a governmental civil service position whereas the other position is a contract services position.

The compensation package for the civil service employee was $191,121 and the contract cost was $199,677, a total of $390,798. The case managers managed 198 cases during the period under study; therefore, a percentage of the salary expense was applied to the 127 closed cases. Since the closed cases represent 64.14% of the cases managed for the case managers, 64.14% of the salaries expense was applied as the cost for this study, a total of $250,663.

Table 12 illustrates the ROI of both cost savings and cost avoidance. The ROI of CM based on the cost savings is the net difference between the realized savings and the total compensation packages, which is $250,663 subtracted from $951,318. Therefore the cost savings ROI is $742,795 a positive value. The cost avoidance ROI of CM is derived by deducting the cost of the compensation packages from the total cost avoidance, in this case $250,663 subtracted from $580,011. The cost avoidance ROI is $329,448 a positive value. Both alternate hypotheses, ROI of CM from Cost Savings and Cost Savings perspectives, are positive dollar values and therefore were supported.

Table 12. Return on Investment

	Cost Savings	Cost Avoidance
Salaries Expense	($250,663)	($250,663)
Cost Savings	$993,458	$580,111
Return on Investment	$742,795	$329,448

Discussion

ROI based on Cost Savings was determined through a dollar-for-dollar comparison of pre and post-CM costs. Pre-CM cost was identified as the cost of all CM related care rendered for six-months prior to a patient's enrollment in CM. Post-CM cost was identified as the cost of all care rendered for the first six-months after a patient was disenrolled from CM. Both pre and post care costs included outpatient visits, inpatient stays, the cost of durable medical equipment, and pharmaceutical expenditures. ROI was determined by subtracting the salary expense from the Cost Savings. Cost savings analysis demonstrated that there was $700,655 ROI when comparing the pre and post-CM total costs of care. A focus on cost savings enabled the researcher to assess the program's utility based on dollar comparisons between pre and post-CM care and therefore the program contribution to controlling costs.

ROI based on Cost Avoidance was determined through an analysis of pre and post utilization of healthcare resources based on pre-CM average costs. The sum of outpatient, outpatient ED, inpatient, and inpatient ED were tallied to determine the change in the number of outpatient visits and inpatient stays. An analysis of cost avoidance did not include expenses involving durable medical equipment or pharmaceuticals. The reason this approach was taken was two-fold. First, there was no means available to identify non-CM durable medical equipment or pharmaceuticals. Second, a review of the literature indicated that in many cases, the cost of pharmaceuticals increased during and post-CM once a patient was identified as needing CM services. The net change in utilization was multiplied by respective pre-CM average costs to determine the CA. Once the CA was determined, that sum was deducted from the salary expense to determine the ROI. Cost avoidance analysis demonstrated that there was $329,348 ROI when comparing the pre and post-CM utilization of healthcare resources. A focus

on cost avoidance enables an assessment of the programs' utility based on changes in utilization of healthcare resources pre and post-CM care and therefore the programs contribution to the organization's goals of increased access to care.

While assessing the return on investment of CM has not been a common industry practice, this study offers an assessment of return on investment from both the cost and access perspectives. The purpose of this study was to determine the ROI of CM based on Cost Savings and Cost Avoidance for the Family Practice Clinic at Naval Hospital Jacksonville. After a compilation and analysis of the CM data, it was determined that there was a positive return on investment from both the CS and CA perspective for closed cases and therefore the alternate hypothesis was supported.

Recommendations

In the short tenure of the CM program at Naval Hospital Jacksonville, no attempt had been made to assess the ROI of the program. The Bureau of Medicine and Surgery funded the hiring of numerous case managers and introduced the concept of CM as a means of optimizing healthcare resources within the MHS. There was no formal requirement to report or measure the ROI of individual MTFs CM programs. The results of this study have demonstrated that the ROI of CM can be calculated, offered a standardized format to meet that need of measuring ROI, and demonstrated that one program, NHJAX Family Practice Clinic, is self-sustaining.

Although the duration of the study was limited to six-months pre and post CM, it is expected that future studies of longer duration will only further validate the results of this study. Future studies attempting to expand the results of this study should consider several factors. First, consideration should be given to CM cases that are currently opened. In order to conduct a precise assessment, the cost of all cases managed by the case managers should be considered.

This could be accomplished through an analysis of time spent on each case. This would require the maintenance of extensive time allocation logs by each case manager. Second, future studies should consider analysis on a per-year basis. The cost of health care is constantly changing through the use of varying reimbursement structures. Limiting analysis to a focus on individual year data would positively influence the accuracy of the results. Third, it may be beneficial to separate the population into diagnosis groups to measure the differences in ROI for various groups of patients. This may offer an organization a unique opportunity to target patients by diagnosis that may have a greater benefit of CM services. Fourth, future studies may need to consider the influence of extraneous factors that can positively or negatively affect the results of a ROI study. For example, the introduction of a clinical practice guideline during the execution of a CM program may influence the results of the study and this would need to be taken into account. As noted in the literature, in general, one percent of case managed cases utilize 30% of the healthcare resources (Reineck & Farris, 2003). By categorizing the groups into care categories, or even beneficiary groups, the results of future ROI studies can serve as a proactive tool to channel CM efforts.

Fifth, although it appears as though network costs were less expensive than the cost of MTF care, this was not a consideration in this study. Future studies attempting to address CM ROI may want to standardize the costs into similar cost structures. In the MHS, the cost of healthcare is based on MEPRS data that includes all aspects of military labor, particularly readiness factors. Network healthcare facilities do not have military readiness expenditures and therefore may appear to be cheaper than the cost of care in the MHS. To correct for the differences in accounting, future researchers may want to consider standardizing costs based on CHAMPUS allowable charge and Diagnostic Related Group rates.

Regardless of the selected ROI approach, caution must be taken not to over analyze the data to a point that the time invested in the study exceeds the value it brings to an organization. Any analysis of CM ROI must be precise, manageable, easily replicated, and understood for the benefit of all stakeholders involved in the CM process. The formulas offered in this study meet all of these objectives and offer a basic assessment of CM ROI. Naval Hospital Jacksonville's Family Practice CM program contributes to the organization's goals of improving access and controlling costs. Whether or not BUMED decides to continue funding CM, financially it is in the best interest of NHJAX to invest in continuing its CM program.

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