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GRADUATE PROGRAM IN HEALTH CARE ADMINISTRATION

PRIMARY CARE PROVIDER UTILIZATION:
A DESCRIPTIVE ANALYSIS OF FAMILY PRACTICE REFERRAL RATES
BEFORE AND AFTER THE FAMILY PRACTICE SERVICE
REORGANIZATION AT REYNOLDS ARMY COMMUNITY HOSPITAL,
FORT SILL, OK

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The Department of Defense (DoD) has directed the service's medical departments to operate under managed care precepts. These precepts have brought an increased emphasis on primary care and the primary care providers. This retrospective study examined the referrals initiated by the family practice physicians of a 116-bed Army medical treatment facility (MTF). This study examined whether after the family practice service reorganization there were any efficiencies in FP provider utilization base on a decline in referral rates. This study also performed a descriptive analysis of the actual referrals generated and their independent variables in both the pre- and post-reorganization data. The results demonstrate that family practice physician utilization increased based on a 22.6 percent increase in patient visits and a 31.1 percent decrease in referrals. Five study variables were taken from the Standard Form 513 "Consultation sheet" and further subcategorized into a total of 23 study variables. The groups were compared, variable by variable, using a student's t-test to measure the magnitude and direction of any change. A total of 12 sub-category variables were statistically significant at $p < .05$. The study results indicate that the family practice service reorganization had a positive effect on physician utilization.

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I am forever grateful for three things that have made the last two years possible: family, friends and faith.

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Finally, to the Lord and my faith, which sustained me through the highs and lows of this experience, I give eternal thanks.

"Now for this very reason also, applying all
diligence, in your faith supply moral excellence, and
in your moral excellence, knowledge: and in your
knowledge, self-control, and in your self-control,
perseverance, and in your perseverance, godliness,
and in your godliness, brotherly kindness, and in
your brotherly kindness, love."

2 Peter 1:5-7

ABSTRACT

The Department of Defense (DoD) has directed the service's medical departments to operate under managed care precepts. These precepts have brought an increased emphasis on primary care and the primary care providers. This retrospective study examined the referrals initiated by the family practice physicians of a 116-bed Army medical treatment facility (MTF). This study examined whether after the family practice service reorganization there were any efficiencies in FP provider utilization based on a decline in referral rates. This study also performed a descriptive analysis of the actual referrals generated and their independent variables in both the pre- and post-reorganization data. Two samples of referrals collected through the TRICARE Service center were examined. One sample, the pre-reorganization group (n = 1129), consisted of all referrals initiated by family practice physicians during the months of August - October 1996. While the second sample, the post-reorganization (n = 829), consisted all referrals initiated during the three month period November 1996 - January 1997. The results demonstrate that family practice physician utilization increased based on a 22.6 percent increase in patient visits and a 31.1 percent decrease in referrals.

Five study variables were taken from the Standard Form 513 "Consultation sheet" and further subcategorized into a total of 23 study variables. The groups were compared, variable by variable, using a student's t-test to measure the magnitude and direction of any change. A total of 12 sub-category variables were statistically significant at $p < .05$.

The study results indicate that the family practice service reorganization had a positive effect on physician utilization.

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INTRODUCTION

Background

Today's changing health care environment of rising costs has forced all areas of the health care field to look for alternative methods of providing quality medical care. The Department of Defense (DoD) has been one of the forerunners in responding to the changing environment. In an effort to increase access, control rising costs and increase the quality of health care for its beneficiaries, DoD has directed the service's medical departments to operate under managed care precepts. The response to this directive has been the implementation of TRICARE. TRICARE is a DoD health care reform initiative initiated at the Office of the Assistant Secretary of Defense for Health Affairs (OASD/HA). It was created to ensure the effective execution of the military health care mission while assuring increased access and quality of care, and controlling the costs associated with health care.

The challenge to each medical facility commander is to manage their resources as a business. This means that facilities must deliver quality care in an efficient and effective manner. Under managed care, the primary care manager (PCM), typically a family practice physician has become the focal point. This is in part because of their role as the gatekeeper for the entry of beneficiaries into the health care delivery system. The PCM is

actively involved in the three base precepts of managed care, cost, quality and access to health care.

The cost containment imperatives of managed care have focused on inpatient services and have driven the need to better manage the utilization of primary care providers (PCP) and the ambulatory patient sector.

One area of concern directly related to PCP utilization is the number of referrals and consultations initiated by the providers. This includes referrals and consultations written to specialists, sub-specialists and ancillary services. Referrals are defined as the process of one physician transferring some or all responsibility for a patient's health care either temporarily or permanently to another physician for the receipt of actual hands on care (Ludke 1982, Penchanski and Fox 1970, Froom, Feinbloom and Rosen 1984). Consultations occur when patient care is shared for a specific diagnostic or therapeutic task, but the responsibility remains with the primary physician (Nutting, Franks, and Clancy 1992, Froom, Feinbloom and Rosen 1984, Penchanski and Fox 1970). This is an area of great significance to the management of both the primary care providers and the referral specialty areas. In the managed care sector, the costs associated with the specialty care provider are often substantially higher than those associated with the primary care providers. This is partially due to the increased fees associated with the intensive nature of hospital services (Glenn, Lawler, Hoerl 1987, Nutting, Franks, and Clancy 1992).

Conditions which Prompted the Study

Reynolds Army Community Hospital (RACH) is no stranger to managed care, having been a Catchment Area Management (CAM) demonstration site beginning in 1988 and fully participating in the Army's managed care program, Gateway to Care, from 1992 to 1994. The valuable insight and experience gained during these programs have served the organization well in responding to the changes in health care and health care management brought on by TRICARE.

Under the TRICARE program, RACH has become a staff model health maintenance organization (HMO) and seeks to enroll eligible beneficiaries into the facility under the TRICARE Prime option. An eligible beneficiary is any individual who is authorized to receive medical care at a military facility. This includes all Federal Service individuals on active duty, their family members, and Federal Service retirees and their families. The initiatives associated with the implementation of TRICARE are expected to increase access to primary care for TRICARE Prime members.

Utilization Management (UM) and Utilization Review (UR) are two of these initiatives which are playing an increasing role in the management of costs, quality of care and access, especially in the ambulatory sector.

Utilization management is the planning, organizing and controlling of health care production in a cost-effective manner while maintaining high quality care and contributing to the overall goals of the institution. The focus of utilization management is to focus on

providing care at the most appropriate level "the right patient in the right place at the right

time for the right amount of care at the right cost" (Sandel 1996).

There are three components to utilization management: utilization review, case

management and discharge planning. There are three types of utilization review;

prospective, concurrent, and retrospective. Utilization management is the primary means

of monitoring outpatient services. Prospective review is also know as pre-admission. It is

a review of the case before any medical care is initiated. In the ambulatory arena,

prospective review asks if outpatient services would be as efficient and more cost effective

than hospitalization. Concurrent review involves managing utilization during the course of

hospitalization. Retrospective review occurs after the case is complete, and the patient

has been discharged. This involves reviewing the case for improprieties and or mistakes.

There are two levels of review. The first level is a screening process, using approved

criteria, to render decisions as to the medical necessity and appropriateness of the level of

care. A second level review is conducted to render medical necessity determinations

based on the medical expertise of the reviewer (physician.)

InterQual is the primary utilization management criteria used by Foundation Health

Federal Services. They have been approved to supplement it with the Milliman &

Robertson Criteria sets for use in the ambulatory (outpatient) sector. These criteria sets

are used to determine the appropriateness of care. They are designed for review by a non-

physician and are not intended as the final decision maker for receiving care.

Milliman & Robertson's Health care Management Guidelines ™ were developed with

the intent of describing resource efficient plans for care and treatment which would reduce some of the major costs of health care. There are six volumes of information ranging from Inpatient and Surgical Care vol 1, to Skilled Nursing vol 6. Volume three, Ambulatory Care Management, is used in evaluating the referrals that are generated out of Family Practice.

The ambulatory care guidelines are divided into three major section; Primary Care guidelines which define performance standards for comprehensive primary care, Imaging guidelines, which present the clinical indications that should guide the level of technology applied to obtaining a diagnostic image, and the ambulatory surgery center management guidelines. This is also known as the Measur Index™. It is a cost analysis of freestanding ambulatory surgery centers and allows the definition of costs required to operate a facility productively and efficiently.

The United States Army Medical Command expresses their access issues/standards in the form of a goal. The access goal for outpatient care is expressed in the TRICARE contract as:

> "TRICARE Prime enrollees shall have access to their PCM services on a same-day basis. Access shall be available by telephone or appointment twenty-four (24) hours per day, seven (7) days per week, to ensure enrollees receive evaluation of initial illness in a timely manner. If the PCM is not available, adequate coverage must be arranged."

> "Participating providers shall ....adhere to the following standards: (a) office wait times for non-emergencies shall not exceed 30 minutes; (b) wait times for appointments for well visits shall not exceed 4 weeks, 1 week for routine visits, nor 1 day for acute illness."

The National Committee on Quality Assurance (NCQA) tracks utilization management indicators for HMOs in the Health Plan Employer Data and Information Set (HEDIS). HEDIS is a standardized set of health-plan performance measurements (Corrigan and Nielsen 1993). The primary metric used to monitor physician referrals is to measure referrals per 100 encounters: Total number of referrals made by a PCP for every 100 encounters. An alternate metric is to measure the rate per 1000 members per year: an annualized referral rate for every 1000 members. To get the best picture on how physicians are handling cases it is best to monitor both rates (Kongstvedt 1995).

The idea is to decrease the number of patient visits per year allowing for the enrollment to increase. It also shifts the same day health care needs to the patient's primary care provider.

Utilization management duties were purchased as part of the TRICARE contract. Currently there is no readily available historical data on referral rates at RACH. Different parts of the pertinent information are collected by different services. It was not until August 1996 that the Family Practice Service (FPS) became active in tracking family practice physician referrals. The TRICARE contractor, Foundation Health Federal Services, does have access to all of the historical information concerning referrals that were processed through the TRICARE office. However, release of this information in the form of a comprehensive report addressing the specifics of the referral origin, specific service referred to or exact diagnosis of referral is not in the TRICARE contract. The contractor does provide a quarterly report to the command addressing the numbers of

referrals, pre-authorizations and non-availability statements issued by RACH and the network providers.

The FPS was split between four separate family practice (FP) clinics. Each of these clinics services a set population of assigned units. Pediatrics and Internal Medicine services have always been and remain separate from FPS, even though under managed care precepts they are also considered primary care providers. The reorganization of the FPS included the consolidation of the four clinics into two clinics. The hours of operation were also extended. Currently, sick call is seen from 0700 - 0900 Monday - Friday, with appointments starting at 0900 and running until 1700. Under the FPS reorganization, the sick-call hours remain the same, however, the hours of operation have been extended. Appointments begin at 0800 and same day appointments are available until 1900 each evening. The primary reason for this is to allow greater and more convenient access to the active duty beneficiaries. There are four points to the rationale behind the family practice reorganization. The first is to allow greater family practice physician utilization. Under the four clinic set-up, the organization did not allow the family practice physicians the time to perform the evaluation and procedures they could perform given their training. With the reorganization and extended hours it is hypothesized that the family practice physicians should have the time to perform more of those procedures. The second point is that there should be increased access to the family practice physicians. As stated earlier, the evening hours clinic times were intended to increase access for the active duty soldiers. The third point is that there should be an increase in the continuity of care. Impaneled beneficiaries

are assigned to a primary care team within their assigned family practice clinic. The intent is for the beneficiaries to be seen and treated by their assigned team. This allows for a more familiar and personal interaction between the patient and health care team. The fourth point is that there should be increased patient satisfaction. The previous three points are all aimed at providing more accessible and convenient health care services while maintaining the highest quality of care.

Statement of the Problem or Question

The staff at Reynolds Army Community Hospital (RACH) is attempting to respond to the Assistant Secretary of Defense for Health Affairs (HA) and the Department of Defense (DoD) challenge to operate in a managed care environment while coping with the fiscal reality of a limited core budget. One initiative of RACH has been to focus attention on utilization management (UM). One aspect of the UM monitoring is the number of referrals generated by the Family Practice Physicians (FPP), specifically related to the total numbers going to specialty services. This focus is the basis for the study and asks the question: Based on referral rates, will the reorganization of the FPS facilitate an increase in primary care provider utilization?

Literature Review

There are numerous current references in the literature that address the issue of referral patterns and rates in the primary care arena. While the sources reviewed herein cover a wide spectrum of referral issues, the focus of this review will be on primary care physician referral patterns and their impact on the managed care environment.

The patient referral system is an important element in achieving the objectives of managed care and the Primary Care System (Kordy et al., 1992, Froom, Feinbloom, Rosen 1984). Patients presenting to their primary care providers expect basic medical care and appropriate follow-up services. A patient's right to a specialty referral is enshrined in the primary care contract, an issue that is rarely debated in discussion on the gatekeeper role of the primary care physician (Hutchinson 1993). Thus, patients requiring further evaluation and treatment are referred to a secondary health care provider. Family physicians receive broad-based training and an important component of their domain is the diagnosis and management of frequently occurring illnesses in their patients within the context of the family and community (Froom, Feinbloom, Rosen 1984). Family physicians provide definitive care for over 95 percent of patient encounters. The remainder require consultation, referral or both (Froom, Feinbloom, Rosen 1984). Typically a referred patient is more likely to represent a diagnostic puzzle and have intermediate probabilities of disease. These patients are a subset of the primary care practice who have not responded to the initial interventions or who require a more specific diagnostic evaluation (Sox 1996). The patient's health status is the driving force behind a referral (Elwyn and Stott 1994, Penchansky and Fox 1970). An appropriate referral may lead to prompt diagnosis and treatment of conditions that were beyond the knowledge or expertise of the primary care physician. An inappropriate referral, however, may lead to unnecessary testing and expensive, invasive and risky procedures in an often fruitless search for diagnostic certainty (Nutting, Franks, and Clancy 1992).

Elwyn and Stott (1994) ask the question, "What is appropriate health care?" and "What is an appropriate referral?" These are complex questions and the answer will vary depending on who is asked. The views differ based largely on the perspectives of the health care professionals, the patients and society as a whole. There is a difference between appropriateness at the population level, which is always constrained by resources, and at an individual level, which is modified by the patient's characteristics and preferences or values (Elwyn and Stott, 1994). The interaction between the doctor, patient, and illness is part of the foundation of primary care medicine.

The referral of a primary care patient to a specialist is a common decision of a primary care physician. A patient referral can confer major benefits to patient and physician. These benefits include access to expert knowledge and experience, and advanced technical skills otherwise not available (Froom, Feinbloom, Rosen 1984, de Marco et.al.). The main objective of a test referral is to insure that the benefits of a diagnostic strategy outweigh the potential risks and have the greatest net benefits. However, there is also the need to minimize the risks of additional costs and discomfort to the patient if there is no expectation of additional benefit from the referral (Froom, Feinbloom, Rosen 1984).

There are two types of referral; diagnostic referrals, which include special diagnostic procedures and emergency evaluations and therapeutic referrals, which are written to initiate therapy or determine a disposition (Cortazzo, Guertler, and Rice 1993).

Referral rates and reasons for referral vary greatly between providers (Zvieli and

Steinherz 1992, Elwyn and Stott 1994, Froom, Feinbloom, Rosen 1984). Many

explanations exist for this variability: differences in diagnostic case mix, office workload,

access to specialist services, physicians' low referral thresholds and increasing rates of

litigation (Zvieli and Steinherz 1992, Elwyn and Stott 1994). Referral rates are influenced

by patient factors such as age, marital status, parental pressure and race; physician

variables such as age and length of training and medical experience; and community

variables such as payment sources, location of practice, and even the season of the year

(Cortazzo, Guertler, and Rice 1993, Nutting, Franks and Clancy 1992, Brock 1977,

Penchansky and Fox 1970, and Biberman et.al. 1996). Lack of resources, inadequate

hospital information about earlier contacts with the patient and poor communication

between the primary care physician and the specialist are also causes of referrals

(Penchansky and Fox 1970, Elwyn and Stott 1994, Froom, Feinbloom, Rosen 1984).

Elwyn and Stott (1994), in their research on avoidable referrals found that referral rates

for primary care physicians varied widely even among doctors working in the same

environment. Their study also indicated that access to specialist care was perceived to be

the major determinant of referral behavior, the skill of individual general practitioners was

the next most commonly described influence on referral behavior. It was also determined

that some physicians found it quicker to write a referral letter rather than look for missing

information, particularly if the doctor thought that the referral might be necessary anyway.

Shortell and Vahovich (1975), found that physician-related variables were the most

important predictors of referral rates. The main variables that they identified were board

certification, organization of practice, caseload severity, and office workload. They also determined that the perceived status of the referring physician in the medical hierarchy contributed significantly to the variance. In today's uncertain world of primary care, it may be difficult for physicians to acknowledge their anxieties about decision making. It may well be in their patients' best interests for doctors to use the "when in doubt, refer" motto (Hutchinson 1993).

Patient demand for a referral was found to be most common in affluent areas, where privately insured patients were more likely to request specialty care, and in economically deprived areas, where patient were more likely to demand a second opinion (Elwyn and Stott 1994).

Fertig et al, 1993, in their study found that there was a wide and unexplained variation in primary care physicians referral rates to hospitals. They found that the variation is often interpreted to mean that resources are being used inefficiently and many referrals are unnecessary.

In a closed health care system, such as military medicine, the ability to identify the frequency, urgency and destination of referrals and consultations can affect resource allocation as facilities seek to meet patient care demands (Cortazzo, Guertler, and Rice 1993, Sox 1996). Hospitals can use this data to estimate hospital service capabilities, such as special procedure and equipment availability, on-call rosters, number and type of beds and capability to see referred patients in a timely manner (Cortazzo, Guertler, and Rice 1993).

In a study of the Israeli military medical system and the diagnostic characteristics of patients referred to a secondary military medical facility of the Israel Defense Forces-Medical Corps, Zviety and Steinherz (1992) found that many of the diagnoses were simple and straightforward in nature and could easily be resolved by the primary care military physicians. It was theorized that the referring doctors were uncertain of their diagnoses, or at least uncertain about aspects of their investigation and management.

It is probable that these findings may prove unique to a closed health care system. It is speculated that military physicians probably refer many patients simply because they rarely have readily accessible continuity of care or routine clinical follow-up opportunities (Cortazzo, Guertler, and Rice 1993). From these studies it is evident that additional studies are needed to evaluate the adequacy and timeliness of referrals, how to optimize the process and to assess the economics of primary care referrals.

In Army medicine, the Standard Form 513 (SF 513, Consultation Sheet) is used for all requests for consultation or referral. The urgency of a referral is marked on the SF 513 as today, 72 hours, or routine. In most civilian primary care services, referral patterns usually are not bound by such standardized forms and vary widely, depending on local traditions and physician availability (Brock 1977, Cortazzo, Guertler, and Rice 1993). Under managed care and TRICARE, military hospitals typically have few clinics with open appointment systems. Typically only primary care clinics, general pediatric clinics, and general gynecology clinics have appointments easily available without formal referral (Cortazzo, Guertler, and Rice 1993).

Referrals are initiated by completing the SF 513 and requesting a follow-appointment with the appropriate clinic. Routine referrals do not require approval of the service or clinic to which the patient is referred. However, all referrals must be routed through and approved/validated by the TRICARE service center for appropriateness, following the guidelines established by InterQual and Milliman and Robertson. The TRICARE service center also schedules the appointment. The service center first attempts to appoint the patient to the RACH specialty clinic, if access standards can not be met, they schedule the patient with a network provider.

The most important variable contributing to patient risk from the referral process is impaired communication between the primary care physician and the consultant or referred physician (Froom, Feinbloom, Rosen 1984). The consultant often receives an insufficient medical history from the referring physician and the feedback from the consultant to referring physicians is at times inadequate. The trust between the primary care physician and the patient is easily damaged if referred specialists' plans for that patient bypass the primary care physician. Unnecessary referrals or admissions are easily precipitated by such lack of professional manners and etiquette (Elwyn and Stott 1994).

Physicians with more experience have been found to have higher referral rates. While this at first seems counterintuitive, this trend may be explained because an experienced physician may perform a better assessment of the patient. It may also be a reflection of a greater interest or curiosity that a physician has developed through their increased knowledge and skills which makes them more aware of serious or rare diseases and more

likely to refer (Nutting, Franks and Clancy 1992, Elwyn and Stott 1994). Zviety and Steinherz (1992), found that physicians with low self-confidence or those with dependent personalities were more likely to refer their patients. Biberman et.al., (1996), found that professional development is associated with an increased willingness to assume responsibility. They also found increased education made it more likely for them to change their referral practices.

De Marco et.al., (1993) found that in the early 1990s several studies were conducted and published which found no clear relationship between physician referral rates and the standard of their clinical care. To date, a conclusive explanation for the wide variations in primary care referrals remains elusive, even when controlled for medical education, sociodemographic features, morbidity, and deprivation indices (Elwyn and Stott 1994, Glenn, Lawler and Hoerl 1987).

Physician training has been found to be an indicator of physician referral patterns (Zvieli and Steinherz 1992, Nutting, Franks and Clancy 1992, and Elwyn and Stott 1994). Skills in performing complex procedures receive major emphasis in postgraduate training. Physicians who acquire these skills value them and fear that they might atrophy if they are not applied with moderate frequency, thus resulting in lower referral rates (Zvieli and Steinherz 1992). The emphasis on new technology and procedures during the training period may lead to higher referral rates. This is because the emphasis on technology tends to blunt considerations of alternative approaches that involve knowledge of the natural history of disease process without intervention (Zvieli and Steinherz 1992).

Management of the utilization of referral physicians is an area of great importance. In most managed health care plans, the costs associated with non-primary care professional services are substantially greater than the cost of primary care services (Konstvedt 1995). Consultation and referral are the major avenues through which family physicians bring to bear the considerable capacity of the health care system on the care of their patients. A better understanding of, and more effective strategies for, consultation and referral, therefore, will have an important beneficial impact on the cost and quality of care that patients receive (Nutting, Franks and Clancy 1992).

The wide variation in rates of hospital referral among primary care physicians is potentially of clinical and economic importance. Referral decisions by primary care physicians have an enormous impact on the cost and quality of care that patients receive. Studies suggest that for each dollar generated by a family physician, two dollars are generated by the consultant physician, and four dollars by the associated hospital (Nutting, Franks, and Clancy 1992). The referring physician controls the flow of substantial economic consequences.

Referral of patients from one physician to another is essential to providing quality health care. However, the care of an individual is not the only consequence. The primary care physician's decision to refer a patient is inevitably followed by other events. A referral results in professional fees for the specialist to whom referred, and additional costs such as; specialty office visits, hospitalization, medical or surgical procedures, and additional consultations. Each of these actions have their own economic consequence for

the patient and the larger medical care system (Glenn, Lawler, and Hoerl 1987, Nutting, Franks, and Clancy 1992). For the system to remain financially viable, primary care physicians must become involved in controlling referral rates, the destination of referrals, or both (Nutting, Franks, and Clancy 1992, Sox 1996). Under the managed care gatekeeper strategy, primary care physicians are now placed at financial risk for the costs of referral and hospitalization (Glenn, Lawler, and Hoerl 1987). To any entity with the potential to alter where and in what volume physicians' referrals are made, control over referrals has strategic business implications as well (Nutting, Franks, and Clancy 1992). Every physician should stay continually aware of the extent to which his or her practice is economically influenced by physician referred patients and, particularly, that portion requiring hospitalization (Glenn, Lawler, and Hoerl 1987).

A very important question today is whether care by subspecialist physicians is more costly than care by primary care physicians, and if so whether differences in the spectrum of patients justify differences in expenditures (Sox 1996). In theory events initiated by referral are easily countable because they often correspond with a charge or fee. In practice, assessing the economic impact of referral is difficult. In the current military management systems it is very hard to derive the exact cost of an individual medical procedure. General types of medical procedures are given a cost determined by the Diagnostic Related Group (DRG) that it is categorized under.

Glenn, Lawler, and Hoerl (1987) found that general and family practitioners, general internists, pediatricians and obstetrician-gynecologists provide 63% of all patient-physician

encounters and account for half to two-thirds of all physician referrals. They also found that the cost of a referral does not seem to be prohibitive as long as it does not result in a hospital admission (Glenn, Lawler, and Hoerl 1987).

If referral rates or practices are found to be inappropriate or to exceed the utilization review standards, there are a number of ways in which to try to modify or alter the current rates. Two of the most discussed in the literature were data feedback and referral guidelines.

Feedback on rates of referral could be used to facilitate practices in auditing their own referral behavior (de Marco et al., 1993, Fertig et al., 1993). In order for data feedback to be effective, there must be a reliable information system present in which the physicians have confidence. There are several different types of data sets that can be used as criteria for data feedback. These include; details of referrals from primary care physicians to hospitals collected from hospital computers, referrals to specialty care; appropriateness of referrals as judged by the consultant who saw the patient, appropriateness of referrals as judged by an independent general practitioner against a set of referral guidelines, or the effect of the referral guidelines on referral rates as judged by general practitioners who used the guidelines (Fertig et al., 1993, de Marco et al., 1993). From the physicians point of view, any audit needs to be based on clinical cases that examine outcomes in terms of measurable changes in health and functions status rather than on rates of referral (de Marco et al., 1993, Kordy et al., 1992). In attempting to implement any type of physician practice modification it is necessary to understand that the perspectives of the primary care

physician, the specialist, and the patient will probably differ on appropriateness of the care (Fertig et al., 1993).

The most serious draw back to data feedback is that there is often wide spread skepticism among the concerned physicians about the accuracy of the data in their own and other practices (de Marco et al., 1993, Fertig et al., 1993). This skepticism produces very limited interest in audit reports. It is often very difficult to engage the doctors in discussion about differences in clinical behavior on the basis of data which they may regard as seriously inaccurate. de Marco et al. (1993), found that doctors from high referring practices were defensive about their clinical practices, and there was a general feeling that to be a low referrer was a good thing, if only because a low referral rate was likely to protect their practice against unwelcome attention from utilization review committees.

Referral guidelines are criteria sets designed to assist a physician in deciding when it is medically appropriate to refer a patient. The use of referral guidelines to establish when a referral should take place, often fails to include the patient's perspective. This is an important consideration because a patients' expectations of a referral often differ from the objectives of the doctor (de Marco et al., 1993). There is data to suggest that strict application of the referral guidelines would have been unlikely to change rates of referral significantly (Fertig et al., 1993).

Although there are examples when feedback has produced alterations in doctors' behavior, continuing education and staying current in the skills of their training are two of

the best mechanisms to help control primary care physician referrals today (Elwyn and Stott 1994, Hutchinson 1993, de Marco et al., 1993). The ability of primary care physicians to carry out specific procedures in practice--for example, sigmoidoscopy, joint injection, minor surgery, or spinal manipulation--was judged to have a major effect in reducing referrals for these procedures (Fertig et al., 1993).

Open and free communication is also essential to avoiding unnecessary referral and modifying inappropriate referral behavior. In addition to the technical considerations, appropriate diagnostic and therapeutic decisions require information about illness behavior, family factors, patients' expectations, and a host of other variables. The family physician may have some of this information but is often not consulted or included in the decision-making process (Froom, Feinbloom and Rosen 1984). Many avoidable referrals that were due to limitations of knowledge, attitude, or skills could have been pre-empted by referrals within a group practice (Elwyn and Stott 1994).

Purpose

The purpose of this study is two fold: first, to determine if utilization of the family practice physicians, as indicated by referral rates, is increased after the FPS reorganization. Second, this study will conduct a descriptive analysis of the actual referrals generated and their independent variables in both the pre- and post- FPS reorganization data.

The analysis will focus on referrals originating from the family practice clinics and directed toward four specific specialties and their subspecialties, Gynecology, Medicine, Pediatrics and Surgery.

The first alternate hypothesis (H_a) is: utilization of the primary care providers, based on referral rates, will increase as a result of the primary care service reorganization. This will be seen as an overall decline in FP referrals after the Family Practice Clinics reorganization. The first null hypothesis (H_o) is: there will be no effect on primary care provider utilization, based on referral rates, after the FP reorganization.

METHOD AND PROCEDURES

Changes to Original Design

In the process of working the issues of this project, it was determined that the data set collected for the study was not adequate to perform the desired statistical analysis. During the study, only the data from the actual referrals (SF 513) were collected. It was not until after the data collection was completed and all of the variables were coded, that the researcher found that the data set was incomplete for the desired purposes.

In order to use the actual referral as the dependent variable it would have been necessary to have all of the demographic data from every patient visit (50,148) during the study period. Unfortunately, the data systems in use did not have the ability to allow the researcher to retrospectively pull the required information from a data base. Because of the missing data, the actual referral could not be used as the dependent variable. This also prevented any attempt to analyze the independent variables for any potentially strong associations or predictive relationships with the dependent variable, actual referrals.

The original intent of the study was aimed at family practice physician referral rates specifically related to the independent variables. The study was to examine family practice

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physician referral rates as a function of five independent variables: patient age, patient gender, patient beneficiary status, physician experience (# of years) and diagnosis category (referral specialty). The analysis that could not be completed was the determination if any of the variables were potential predictors of a referral being initiated.

The original study would have utilized a multiple regression analysis using stepwise regression. The purpose of the regression model would have been to determine which if any of the independant variables remaining in the model provided the best prediction of a referral being generated.

Through consultation with the researcher's preceptor and the Chief, FPS, it was determined that there was adequate data collected to still perform a value added study. The focus was shifted from looking for potential independent variable predictors of a referral to a descriptive analysis of the actual referrals.

Revised Design

The population of this study is composed of all beneficiaries eligible to receive health care in a military facility within the 40 mile radius catchment area of RACH. There are currently 28,586 enrolled in TRICARE Prime. This population is composed of 9,581 active duty (AD) soldiers, 16,226 AD family members, 2,749 retirees and their family members. There are also 5,218 military students who are not eligible to enroll in TRICARE Prime due to the short length of time they are stationed at Fort Sill. They are, however, treated as if they are enrolled. There are also 1,380 Medicare eligible individuals enrolled in Silver Care. This segment of the population has the highest utilization of the

Family Practice Clinics. RACH, is required by law to treat all eligible beneficiaries. Those individuals who have not enrolled in TRICARE Prime or Silver Care may make appointments to be seen by the FPS on a space available basis (space A).

The first phase of this study consisted of a three month collection of all referrals generated from the Family Practice clinics, prior to the FPS reorganization. The time frame for the first sampling was from 1 August 1996 to 31 October 1996. This sample is the initial TRICARE referral population and serves as the control group. The second phase of the study consisted of a three month collection of all referrals generated from the family practice clinics following the FPS reorganization. The time frame for this sampling was from 1 November 1996 to 31 January 1997. This sample is the study group.

The analysis focuses on the referrals originating from the family practice clinics and directed to the four largest specialty departments at RACH: Obstetrics/Gynecology, Medicine, Pediatrics and Surgery. These four specialty departments were chosen as the focus of this study partially because they are the largest specialty departments at Reynolds. Per discussion with the Chief, Family Practice Service and Community Health Services, it was clarified that he wished to know the overall referral rates to these four services rather than the specific subspecialty referral rates of each department. He was more interested in what the overall service trends were, as opposed to specific subspecialty rates (Ellis 1996).

Mayer (1982), in his study on referral patterns in HMOs found that the four most frequently referred to specialties were general surgery, otolaryngology, orthopedics, and obstetrics-gynecology. Other studies site the specialty departments which receive the

largest numbers of referrals as Medicine, Ophthalmology, Otolaryngology, Surgical and OB\GYN (Kordy et.al., 1992, Zvieli 1992, Glenn, Lawler and Hoerl 1987, and Fertig, et.al., 1993). Most of the studies included pediatric patient referrals within one of the previous listed specialties. Kordy et.al. (1992), stated that individuals 15 years and younger represented 19.8% of the overall referral cases in their study. For this study otolaryngology is included as part of medicine while ophthalmology and orthopedics are combined under surgery. These four specialty categories were used as the diagnosis category variable for the purpose of this study. A fifth category labeled "other" was used as a catch-all for the referrals that did not fit one of the four primary categories. During the coding phase, the variable is input into one of five sub-categories, coded 1 if present and 0 if not. For this reason the variable is considered a mutually exclusive, categorically exhaustive variable (Norusis 1990 and Motulsky 1995).

This study employs a non-experimental research design using the data held in copies of the Standard Form 513 (SF 513, "Consultation Sheet") to investigate relationships between the study variables. The sole source of data for this study are the actual referral forms (SF 513). A total screening of all referrals written during pre- and post-family practice reorganization the time periods was conducted to collect the required data.

Age, as a primary variable, has been validated by numerous studies (Kordy et.al. 1992, Dale et. al. 1995, Cortazzo, Guertler, and Rice 1993, Nutting, Franks and Clancy 1992, Brock 1977, Boling et.al. 1992, Glenn, Lawler, and Hoerl 1987, and Penchansky and Fox 1970). The main consideration here is to determine how best to break out the

age groups. Textbooks such as *Community Health Analysis* by G.E. Alan Dever (1991) commonly separate a population's age break out in five year increments. Dale et. al., (1995) used an initial age break out of six years (0-5), then moved to a ten year increment (6-16), then back to five year increments until the age of sixty (i.e., 17-20, 21-25, 26-30, 31-50,51-60, >60). Kordy et.al. (1992), in their study found the majority of referrals were issued to individuals in the age group 25-44. They had an age break out of: <15, 15-24, 25-40, 40+. Based on these results and previous studies, the age breakout for this study was: 0-5, 6-15, 16-24, 25-44, 45-54, 55-64, and 65 and over. It was felt that this gave the best break out by population size. The over 65 population was of special interest because the facility receives no funding to treat these individuals. Because age was subdivided into seven different groupings, it is considered a mutually exclusive, categorically exhaustive variable. This is because during the coding phase when the age variable is being input the subcategory is coded 1 if present and 0 if not (Munro and Page 1993).

While the literature review did not reveal any studies on relationship between referrals and military beneficiary status, there were several studies on the relationship between referrals and insurance status (Penchansky and Fox 1970, Chao et. al. 1993, Briggs et.al. 1995). Chao et. al., (1993) did not find a significant relationship between the disposition of a referral and the insurance status. They did however, find that patients with multiple consultation requests did vary significantly from single consultation requests in the area of insurance status. Patients with prepaid health plans (20%) or Medicaid or Medicare had a statistically significant greater number of multiple referral requests than those with private

insurance (4%). Penchansky and Fox (1970) found that pre-paid patients seeing pediatricians were referred more often than fee patients. They also found that Medicare and Medicaid patients had very low referral rates. The primary goal of using beneficiary status as a variable was to determine if there was any significant relationships between the referrals and the beneficiary categories. For this study, the four most commonly seen beneficiary statuses were used. They are: active duty soldiers, active duty family members, retirees and their family members. During the coding phase, the variable was separated into one of four sub-categories, coded 1 if present and 0 if not. This then enabled beneficiary status to be considered a mutually exclusive, categorically exhaustive variable.

Numerous studies have cited physician experience as a variable related to referrals (Biberman et.al., 1996, Nutting, Franks, and Clancy 1992, Brock 1977, Boling et.al. 1992). Brock (1977) distinguished the experience differences as first-year residents, second year residents and staff physicians. Boling et.al., (1992) distinguished experience on the basis of being board certified or not. None of the reviewed literature specifically broke out experience by years of post-residency training. RACH has a large number of family practice physicians (n=24). All have completed a family practice residency program. There are both medical doctors (MD) (n=19) and doctors of osteopathy (DO) (n=5). The experience of these physicians ranges from residency graduates with six months of post-residency experience to a physician with twenty-seven years of post-residency experience. However, roughly half of the RACH family practice physicians

(n=12) have one year or less of post-residency experience. Ellis (1996), felt this lack of experience might be a contributing factor to potentially higher referrals being generated by this group of physicians. Due to the large number of relatively inexperienced physicians the experience break out was: <1 yr (n=5), 1 yr (n=7), 2 yrs (n=5), 3-10 yrs (n=4) and 10+yrs (n=4). This gave each group as even a distribution as possible. Physician experience is considered a mutually exclusive, categorically exhaustive variable. This was again due to dividing physician experience into one of five sub-categories and coding 1 if present and 0 if not.

There were a number of studies in which gender was cited as a potential determining variable for a referral (Kordy et.al. 1992, Zvieli, 1992, Chao et.al. 1993, Mayer 1982, Penchansky and Fox 1970). Only Chao et.al., (1993) and Penchansky and Fox (1970), specifically stated that they found no significant relationship between gender and referral rates. Kordy et.al., (1992) found a statistically significant difference in the gender category (p<0.001, 59.9% female, 40.1% male). Zvieli (1992), found females were associated positively with a high rate of patient initiated referrals, (odds ratio 3.4, 95% confidence interval). Mayer (1982) did not state if the percentages were statistically significant. Even though there was no conclusive data stating that gender was a valid determining variable of a referral, it was felt that it could be a potentially valid statistic for the population of this study. Gender is a binary variable and in this study males were coded 1 and female were coded 0.

The most commonly cited method of measuring referral rates is referrals per 100 patient visits (Brook 1977, Bailey, King and Newton 1994, Chao et.al. 1993, and Mayer 1982). This study will use this measure when discussing the collective family practice physician referral rates. It will not attempt to determine each individual provider's referral rate. The referrals per 100 patient visits were determined by taking the total number of referrals generated in each study period (RG) and dividing by the total number of clinic visits (CV). This number was then multiplied by 100 to get a rate per hundred. The formula looks like this: referral rate (RR) = (RG/CV)*100.

When studying systematic relationships between variables without requiring the active control of those variables, Soeken (1985) recommends non-experimental designs. The non-experimental design in this study was the use of descriptive statistical analysis to ascertain any causal relationships between the independent variables of a family practice referral. A comparative analysis of the pre- and post-family practice reorganization implementation will determine the effect that the implementation may have had on the referrals generated. A number of studies have used correlation analysis in an attempt to determine if there are any significant relationships between the study's independent variables and the dependent variable(s) (Biderman et.al. 1996, Briggs et.al. 1995, Chao et.al. 1993, Boling et.al. 1992, Ludke 1982, Zvieli 1992). Motulsky (1995), recommends the use of correlation analysis to determine which independent variables may have a statistically significant association with the dependent variable. In this case, a zero-order partial correlation analysis was used to ascertain if there were any significant relationships

between independent variables and the generation of a family practice referral. In comparing two groups, Motulsky (1995), states the student's t-test is an appropriate test when groups are compared variable by variable for any differences.

Microsoft Excel version 5.0 was used in construction of the data sets. No identifying features about patients were used in the course of the study. Names, social security numbers and other potentially identifying patient characteristics were not incorporated into the data sets. Also, by using retrospective data collection no direct contact is necessary between the researcher and the referred patients, thus ensuring patient anonymity. Collectively, these steps eliminated any potential ethical dilemmas associated with research involving patient data and medical records.

The concerns of validity, reliability, and practicality were concerns that this study considered in the construction and interpretation of the data set. By abstracting data that was already recorded, the content validity of the Standard Form 513 reports were adopted as accepted instruments. For those referral/consults with missing variable data, the composite health care system (CHCS) was accessed to locate the missing data. By serving as the sole researcher and using a strict abstracting process, intra-rater reliability was ensured. The last measurement consideration was practicality. Kerlinger (1986) notes that a tool should be evaluated in practical terms of convenience, economy, and interpretability. The Standard Form 513 reports were readily available, free, and understandable (example at appendix A).

Five study variables were taken from the SF 513. These variables were subdivided to further stratify the sample, yielding a total of 23 variables. The dependent variable being the referral itself. The independent variables were a combination of binary and mutually exclusive, categorically exhaustive variables that are coded 1 if present, 0 if not. The binary variable was gender, and the four mutually exclusive, categorically exhaustive variables were age, beneficiary status, diagnostic category and physician experience.

After entering the raw data into the Excel spreadsheet, each variable both binary and mutually exclusive was coded. The descriptive statistics were then calculated for each group. In comparing the two groups, a student's t-test was the statistical measure used to determine the magnitude and direction of any differences is the group means. This was accomplished using the Data Analysis Package of the Excel v.5 software package, specifically the "t-test: two-sample assuming unequal variance" from the pull down menu. After testing the mean of each group, the inferential statistics were compiled. Next, a zero-order correlation matrix was computed (Kleinbaum, Kupper and Muller 1988, Norusis 1990), using a second software package, Statistical Package for Social Sciences (SPSS). The resulting correlation coefficients were reviewed to determine those meeting or exceeding the critical value.

RESULTS

The SF513 consult/referral forms originating from RACH were collected after they were processed through the TRICARE service center. All of the SF513s originating from the FPS were separated, counted and the data input into a Microsoft Excel 5.0

spreadsheet. These numbers were then cross-checked against the monthly Family Practice Service Consult tracking report. The total number of clinic visits and total number of consults/referrals generated each month were the items of interest pulled from this report.

Overall, there was a discrepancy of 270 consults from what was reported on the monthly Family Practice Service Consult tracking report and what was obtained from the TRICARE Service Center. In examining the potential causes of the difference, there were thirty-two consults which were inadequate. An inadequate referral had insufficient data to fully identify the needed data fields. This was typically when one or more parts of the needed data were missing or indecipherable. This data was needed in order to conduct a search on CHCS. The other 238 missing consult\referrals may be attributable in part to patients not taking the consult\referral to the TRICARE service center to book the appointment. There is also the manner of the 72 hour consult. These consults are handled physician to physician at RACH due to the time constraints imposed. This completely bypasses the TRICARE Service Center. It is also possible that some of the consult\ referrals may have been "lost" in the system.

There was a readily apparent differences between the number of consult/referrals reported by FP clinics 3 and 4 in the control phase and FP team 2 (FP clinics 3 and 4 were combined into FP team 2 in the FP reorganization) in the experimental phase and the actual number of consult/referrals collected through the TRICARE Service Center for those same clinics. It was in these clinics that the largest discrepancies were found. There was an average monthly difference of 45 consults/referrals between the FPS consult

tracking form and collected consult/ referral totals from the TRICARE service center. Overall the study achieved a 89.17 percent accuracy rate with respect to the numbers reported on the monthly Family Practice Service Consult tracking report. Statistical analysis yielded the following results: mean monthly referrals reported on FPS Consult tracking form n = 386, and mean monthly collected referrals n = 326. The student's t-test reveals that this difference is not statistically significant, with $t(10) = 0.633$, $p< 0.541$.

In comparing the two data sets, the first obvious difference is in the total number of patient visits to the FPS. For the control group, there were 24 FP physicians who saw a total of 21,885 clinic visits and generated a total of 1,129 referrals. For the study group, there were 24 FP physicians who saw a total of 28,263 clinic visits and generated a total of 829 referrals. Each sample represents a three month collection period.

As can be seen in Table 1, the monthly mean between the two groups, 7,295 pre-reorganization and 9,421 post-reorganization, increased by an average of 2,126 visits per month, or +22.6 percent. The second obvious difference is in the total number of referrals generated by the FPS during the study. The pre-reorganization group had an n = 1,129 while the post-reorganization group had an n = 829. As can be seen in Table 1, the monthly mean between the two groups, 415 and 286 respectively, decreased by an average of 129 visits per month, or -31.1 percent. A comparison of each group by variable is depicted in Table 2. Presented in this manner, it allows for easy contrast of the two groups. Differences in each variable reveal much about the workload of the FPS. Table 3 provides the results of the inferential statistics for those variables found to be statistically

significant (p<.05) after all were tested using the student's t-test measure. Variables not listed in Table 3 were not statistically significant.

The mean age for patients receiving referrals during the pre-reorganization and post-reorganization was 31.9 and 31.3 years, respectively. The mean difference of 0.6 years was not statistically significant. When stratified by the five age categories, it was determined that the percentage change in four of the seven categories was statistically significant. The first age category was 0-5 years old, which experienced a 52.3 percent decrease in the total number of referrals generated and a 2.2 percent decrease in the overall proportion of referrals. It was statistically significant at t (1937) = 2.26, p < .025. The second category, ages 25-44, experienced a 19.4 percent decrease in the total number of referrals generated. The age group also experienced a 4.8 percent increase in the overall proportion of referrals written and was statistically significant at t (1788) = -2.13, p < .033. The third age group was the 55-64 year group. It experienced a 58.2 percent decrease in the overall proportion of referrals, a 2.1 percent decrease in the overall proportion of referrals written and was statistically significant at t (1953) = 2.44, p < .015. The last group was the 65 and over age group. It experienced a 53.8 percent decrease in the total number of referrals, a 2.2 percent decrease in the overall proportion of referrals written and was statistically significant at t (1941) = 2.25, p < .024.

When stratified by beneficiary status, total referrals among the four groupings varied significantly between all of the groups except for the active duty. Active duty referrals declined by 45 referrals, yet the overall percentage increased after the

TABLE 1. AVERAGE MONTHLY NUMBER OF CONSULT/REFERRALS FROM THE FAMILY PRACTICE SERVICE

Pre-Reorganization Sample

Month Sampled	# Consult/ Referrals Reported	# Consult/ Referrals Collected	Difference	% Difference	df	t	p
August	248	203					
September	583	414					
October	414	511					
Total	1245	1128	-117.00				
Monthly Mean	415.00	376.00	-39.00	-9.4%			
Std Dev	167.50	157.48					

Post-Reorganization Sample

Month Sampled	# Consult/ Referrals Reported	# Consult/ Referrals Collected	Difference	% Difference	df	t	p
November	282	242					
December	296	227					
January	404	360					
Total	982	829	-153.00				
Monthly Mean	327.33	276.33	-51.00	-15.6%			
Std Dev	66.76	72.84					

Combined for Entire Test Period

		Difference	% Difference	df	t	p
Total Reported	2227					
Monthly Mean	386					
		-270				
Total collected	1957	-60.00	-15.5%	10	0.633	0.541
Monthly Mean	326					

Patient Visits

Pre-reorganization		Post-Reorganization			
August	7831	November	8578		
September	8213	December	9655		
October	5841	January	10030		
Total	21885	Total	28263		
Monthly Mean	7295	Monthly Mean	9421	2126	29.1%
Std Dev	1273.60	Std Dev	753.75		

Source: Consult/Referrals collected from the TRICARE Service Center
(SF 513s & FPS Consult Tracking Form) examined during study

reorganization (58.3 percent to 73.94 percent). This increase was statistically significant t (1887) = 15.36, p < .000. Active duty family member referrals dropped by 126. This was a 45.5 percent decrease in the total number of referrals, a 6.36 percent decrease in the overall proportion of referrals written and was statistically significant at t (1880) = 3.39, p < .000. Total retiree referrals declined by 54. This 62.1 percent decrease in the total number of referrals written and 3.02 percent decline in the overall proportion of referrals written was statistically significant at t (1956) = 3.65, p < .000. Retiree family members experienced a decrease of 76 referrals between the two periods. This was a 69.7 percent decline in the total number of referrals written and a 5.67 percent decrease in the overall proportion of referrals. This was statistically significant at t (1937) = 5.11, p < .000.

Males received more referrals than females in both periods. Male referrals comprised 64.7 percent and 69.2 percent for the pre- and post- reorganization groups. The 4.5 percent increase in the overall proportion of male referrals and subsequent corresponding decrease in female referrals was statistically significant at t (1817) = -2.18, p < .030 for males and t (1817) = 2.18, p < .030 for females.

The mean post-residency experience of referring physicians during the pre-reorganization and post-reorganization was 3.14 and 3.04 years, respectively. The mean difference of 0.1 years was not statistically significant. When stratified by the five experience categories, it was determined that the percentage change in referrals written in two of the five categories was statistically significant. Referrals from physicians with less than 1 year of post-residency experience declined by 14, yet the overall percentage

TABLE 2. DESCRIPTIVE STATISTICS FOR DEPENDENT AND INDEPENDENT VARIABLES

Pre-FP Reorganization (Aug - Oct 96)   Post-FP Reorganization (Nov 96 - Jan 97)

Sample n = 1129   Sample n = 829

Variable	n	% of Sample		Variable	n	% of Sample
AGE				**AGE**		
0-5	70	6.2%		0-5	33	4.0%
6-15	43	3.8%		6-15	21	2.5%
16-24	265	23.5%		16-24	212	25.6%
25-44	562	49.8%		25-44	453	54.6%
45-54	69	6.1%		45-54	57	6.9%
55-64	55	4.9%		55-64	23	2.8%
65+	65	5.8%		65+	30	3.6%
GENDER				**GENDER**		
Male	730	64.7%		Male	574	69.2%
Female	399	35.3%		Female	255	30.8%
BENEFICIARY STATUS				**BENEFICIARY STATUS**		
Active Duty	658	58.28%		Active Duty	613	73.94%
AD Family Member	275	24.36%		AD Family Member	150	18.09%
Retiree	87	7.71%		Retiree	33	3.98%
Retiree Family Member	109	9.65%		Retiree Family Member	33	3.98%
TOTAL CLINIC VISITS				**TOTAL CLINIC VISITS**		
FP#1	6229	28.5%		FP#1	14483	51.2%
FP#2	5153	23.5%		FP#2	13780	48.8%
FP#3	5528	25.3%			28263	
FP#4	4975	22.7%				
	21885					

COMBINED

(for comparison to post- reorganization clinics)

	n	% of Sample
FP#1	11382	52.0%
FP#2	10503	48.0%

REFERRALS PER CLINIC	n	% total referrals	clinic ref rate	combined clinic rt	REFERRALS PER CLINIC	n	% total referrals	clinic ref rate
FP#1	144	12.8%	2.31	3.47	FP#1	338	40.77%	2.33
FP#2	251	22.2%	4.87		FP#2	491	59.23%	3.56
FP#3	262	23.2%	4.74	6.99				
FP#4	472	41.8%	9.49					

CLINIC REFERRED TO	n	%		CLINIC REFERRED TO	n	%
OB/GYN	61	5.40%		OB/GYN	46	5.55%
Medicine	219	19.40%		Medicine	155	18.70%
Pediatrics	21	1.86%		Pediatrics	11	1.33%
Surgery	286	25.42%		Surgery	235	28.35%
Other	542	48.10%		Other	382	46.08%

Yrs Experience in FP	n	%	Tot. #	% Tot.	Yrs Experience in FP	n	%	Tot. #	% Tot.
<1	5	20.83%	212	18.8%	<1	5	20.83%	198	23.9%
1	6	25.00%	307	27.2%	1	7	29.17%	234	28.2%
2	5	20.83%	297	26.3%	2	5	20.83%	186	22.4%
3-10	4	16.67%	228	20.2%	3-10	4	16.67%	140	16.9%
11+	4	16.67%	85	7.5%	11+	3	12.50%	71	8.6%
	24					24			

Family Practice Physician referral rate per 100   5.16   Family Practice Physician referral rate per 100   2.93

increased after the reorganization (18.78 percent to 23.88 percent). This increase was statistically significant at $\underline{t}$ (1691) = -2.71, p < .007. The second group involved physicians with 2 years of post-residency experience. Referrals from this group declined by 111 and the overall proportion decreased by 3.87 percent. This group just meet the criteria for statistical significance at $\underline{t}$ (1835) = 1.98, p < .048.

The percentage of referrals to each of the five different diagnostic categories varied very little between the pre-reorganization and the post-reorganization groups. None of the differences were found statistically significant based on the Student's t-test. The "other" category was the largest category of referrals in both groups. This would be expected because the three largest services categorized under "other" are Physical Therapy, Occupational Therapy and Nutrition/Dietary Counseling. These areas are

Table 3.   INFERENTIAL STATISTICS FOR ALL SIGNIFICANT* FINDINGS

	Pre-Reorganization	Post-Reorganization				
Variable	Mean	Mean	Difference	df	t	p
Active Duty (AD)	0.583	0.258	-0.33	1887	15.36	.000
AD Family Member	0.244	0.037	-0.21	1880	3.39	.000
Retiree (RET)	0.077	0.040	-0.04	1956	3.56	.000
RET Family Member	0.097	0.040	-0.06	1937	5.11	.000
Gender: Male	0.064	0.069	0.01	1817	-2.18	.030
Gender: Female	0.353	0.307	-0.05	1817	2.18	.030
Age 0-5	0.062	0.040	-0.02	1937	2.25	.025
Age 25-44	0.497	0.546	0.05	1788	-2.13	.033
Age 55-64	0.049	0.028	-0.02	1953	2.44	.015
Age 65+	0.058	0.036	-0.02	1941	2.25	.024
Experience <1 yr	0.187	0.239	0.05	1691	-2.71	.006
Experience 2 yrs	0.263	0.224	-0.04	1835	1.98	.048

* Significant at the p<.05 level (two-tail)

considered ancillary services. While the family practice physicians are quite capable of dealing with these types of patients, much of these services treatments consist of therapy, rehabilitation and counseling which on the whole is not proper utilization of a physician's time. Of the four categories of interest, Surgery received the largest number of referrals followed by Medicine. This may be due to the more specialized nature of these two categories.

A zero-order correlation analysis was conducted on both the pre- and post-reorganization referral samples using the Statistical Package for Social Sciences (SPSS/PC+). All of the independent variables were included in the analysis and the resulting correlation matrixes were analyzed for any significant associations between the variables. The significant associations were indicated by the correlation coefficient and the P value. A correlation coefficient is used to measure the direction and magnitude of the linear correlation between variables. The P value answers the question: If there is no correlation overall, what is the chance that randomly chosen subjects will correlate as well (or better) than observed? (Motulsky 1995, Munro and Page 1993).

The purpose of using the correlation analysis was to attempt to identify significant relationships between the independent variables. There is the possibility that these relationships may be associated with a higher chance of a referral being generated. However, a more significant purpose lies in the additional questions that the relationships may raise, i.e., Why is a certain physician experience category significantly associated with a certain age or diagnostic category?, or Why is a certain beneficiary category significantly

associated with a certain diagnostic category? While not answerable in this study, these questions raise the awareness of potential relationships and present additional for future studies. It is also possible that if certain independent variables/characteristics are identified as being strongly associated, then some type of patient preventive health care educational process may be considered to better managed the patients that are included within that particular variable. It may also be possible to identify potential educational needs of the family practice physicians. If there are more referrals from a certain physician experience category significantly associated with a specific diagnostic category, then there may be the need to look closer at the potential causes for the higher referral rates.

In analyzing the correlation matrix of the independent variables from both the pre- and post-reorganization samples, it was noted that there were very few moderate or stronger variable associations/correlations. Munro and Page (1993) define moderate as a correlation coefficient of 0.50-0.69. The complete correlation scaling break-out includes: little if any correlation 0.00-0.25, high is 0.70-0.89, and very high is 0.90-1.00. There were several correlations which while they met the criteria for significance, were disregarded. This was due to them being autocorrelated, this occurs when sub-categories of the same main grouping were compared to each other, i.e., the 0-5 year age grouping and the 16-24 year age group or the active duty and the active duty family member groupings. There were several correlations that did not meet the correlation significance of 0.1 or greater yet had P values that were statistically significant, $p<.05$. Motulsky (1995), stated that this implies that even though there is not a significant correlation, the

chance that randomly chosen subjects would correlate as well (or better) than the observed subjects was extremely low.

In analyzing the correlation matrix of the independent variables from the pre-reorganization, there were 60 correlations that met or exceeded the correlation significance of 0.1 or greater. In the correlation matrix of the independent variables from the post-reorganization, there were 48 correlations that met or exceeded the correlation significance of 0.1 or greater. Those associations believed to be potentially significant are shown in Table 4. All of the correlation coefficients had a p value of .000.

DISCUSSION

There are several interesting results from this study that are worthy of in-depth elaboration. Among the more compelling findings are the increase in patient visits, overall decrease in number of referrals from the pre-reorganization to the post-reorganization, and discrepancies between the referral data reported on the FPS Consult Tracking Form and the SF 513s collected from the service center. The results of the correlation analysis and absence of literature on referral rates also deserve comment and discussion. The limitations of the study cannot be overlooked and finishes the discussion portion of this study.

An overall increase of 6,378 visits in the post-reorganization period averages out to a mean monthly increase of 2,126 patient visits per month. This 29.1 percent increase is not completely unexpected. A large part of the FPS reorganization involved extending clinic hours to 1900 hours Monday thru Friday and the closure of the Minor Care Clinic. The

Table 4. Significant Correlations Pre- and Post-Reorganization
variable: pre / post

	Male	Female	Active Duty	AD Family Mem	Retiree	RET Fam Mem	Exp <1	Exp 1	Exp 2 yrs	Exp 3-10yrs	Exp 11+ yrs
Male		-1.00	.4943	-.5042	.1580	-.2351	.1420			-.2096	
		-1.00	.4738	-.4404		-.2921	.1956	-.1279			
Female	-1.00		-.4943	.5042	-.1580	.2351	-.1420			.2096	
	-1.00		-.4738	.4404		.2921	-.1956	.1279			
AD	.4943	-.4943		-.6707	-.3415	-.3864	.1308	.1012		-.2903	
	.4738	-.4738		-.7918	-.3430	-.3430	.2036			-.1505	
AD Fam member	-.5042	.5042	-.6707		-.1640	-.1855	-.1355			.2748	
	-.4404	.4404	-.7918				-.1824				
0-5			-.1996	.3247						.1634	
			-.3430	.4332							
6-15			-.2352	.3183							
			-.2716	.3430							
16-24			.2015	-.1049	-.1287						
			.1779	-.1194	-.1194						
25-44			.2891		-.2080	-.1515				-.1257	
			.3038	-.1508	-.1987	-.1863					
45-54					.1204					.1019	
					.1154						
55-64			-.2508								.1226
	.1420	-.1420	-.2678		.3037	.3788					
65+			-.2690	-.1225	.3421	.3183					
			-.2970		.4561	.3900					
OB/GYN	-.3233	.3233	-.1553	.2477							
	-.3522	.3522	-.2283	.2967				-.1111			
Medicine			-.1301	.1026							
Pediatrics			-.1361	.1815						.1104	
			-.1954	.2467							
Other	.1949	-.1949	.2269	-.2355			.1054			-.1919	
	.1547	-.1547	.2014	-.2082			.1122				

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appointment templates were also adjusted to maximize the number of patient visits each physician could see.

The impact of the patient visit increase was very significant to the providers and staff who saw these additional patients. The FPS's ability to see this number of additional patients with the same size of staff is reflective of a significant increase in FP physician utilization.

The significant decrease in the total number of referrals generated by the FPS during the study again is statistically significant. The FPS experienced a 43.22 percent decrease in referrals as seen in Table 2. The mean monthly decrease in referrals between the two groups came out to 60 referrals per month. There are two predominate factors which contributed to the decline in referrals. In August 1996, FP clinic OICs (officers in charge) were directed to start reviewing all specialty referrals for the appropriateness of referral. The intent is for the OICs to review each of the referrals before they are sent to the TRICARE Service Center. The clinic OICs use the Milliman & Robertson's Health care Management Guidelines™. When they find an inappropriate referral they contact the referring physician and discuss the reasons behind the referral. The discussion is non-attributional and is used as an educational experience. Foundation Health Federal Services also performs an audit of each referral as they receive them. They also use the Milliman & Robertson Criteria sets. They typically call the referring physician and also discuss the rationale behind the referral. These findings are consistent with the findings of Benninger, King, and Nichols (1995). In their study on management guidelines for improvement of

otolaryngology referrals from primary care physicians, they found that management and referral guidelines were effective in improving patient access and the ratio of appropriate to unnecessary referrals. Their study saw a 43 percent decrease in referrals through the use of management guidelines.

The decrease in the FPS physician referral rate is statistically significant. The FPS reduced its referrals from 5.16 referrals per 100 visits for the pre-reorganization sample period, to 2.93 referrals per 100 visits for the post-reorganization sample period. This 43.2 percent referral rate decrease is especially noteworthy.

No where in the literature were there found published standards for physician referral rates. This may be due in part to the multitude of different factors involved in physician practices. As mentioned in the literature review earlier, there is a plethora of variables that may impact on the decision to refer a patient. Whether they are in private practice or part of a staff model HMO, the constraints imposed vary as widely as the practice set-ups.

Numerous reviewed articles mention physician referral rates varying from 1.1 to 6.0 referrals per 100 office visits (Ludke 1982, Chao et.al. 1993, Brook 1977, Bailey et.al. 1994, and Mayer 1982). However, none of them cited a nationally accepted or established benchmark for physician referrals. The fact that the referral rates within this study are at the lower end of the quoted referral rates and show a downward trend is very positive.

We must accept the first alternate hypothesis "Utilization of primary care providers, based on referral rates," will increase as a result of the primary care service reorganization, it is evident that there were utilization efficiencies gained within the FPS.

The correlation coefficients produced in the zero-order correlation matrixes did not provide any individually significant information reference variable relationships. However, when combined they did show some correlations between variables that might possibly be looked into for addressing certain demographics and their relationships with a referral. The results from the correlation analysis when looked at by beneficiary status and then by physician experience revealed significant associations that may be related to a referral being generated. The potential associations are as follows:

the independent variable active duty had significant positive associations in both study samples with male, age categories 16-24 and 25-44, physician experience less than one year and diagnostic category "other". There was a significant negative association with physician experience of 3-10 years.

The relationship between active duty, male and the age groups 16-24 and 25-44 is simply a reflection of the demographics of active duty soldiers in the Army. The questions raised from this aspect of the analysis are: Why is there an significant positive relationship between the beneficiary status "active duty" and physicians with less than one year of experience? and Why is there a significant relationship between active duty and diagnostic category "Other". The second question may in part be related to the basic training mission on post and the stresses of basic training. This also leads in to another question: What preventive medicine or educational training could be implemented to limit the number of "other" referrals?

The independent variable active duty family member had significant positive associations in both study samples with, female, age categories 0-5 and 6-15 and diagnostic categories OB/GYN and pediatrics. There was a significant negative association with physician experience of less than one year.

Except for the significant negative association with physician experience of less than one year, the relationships between the variables are merely a reflection of the demographics of active duty family members. The question raised here is: What is the cause of the negative association with physicians with less than one year of experience?

The independent variable retiree had significant positive associations in both study samples with age categories 45-54 and 65+. The independent variable retiree family member had significant positive associations in both study samples with female and age category 65+. In both of the retiree sample populations there were no significant associations with any of the diagnostic categories or physician experience categories. The only inferences that can be drawn are along demographic lines, e.g., of the retirees receiving referrals are males between the age of 45 and 65+, retiree family members are females over the age of 65. This is again simply reflective of the overall population demographics.

The independent variable, physician experience less than one year, had significant positive associations in both study samples with active duty and diagnostic category "other". There were significant negative associations with female and active duty family member. The inference here would be that the family practice physicians with less than

one year of experience refer mostly active duty males for diagnostic category "other". This may be attributable to who pulls sick call in the mornings.

The independent variable physician experience 3-10 years had significant negative association in both study samples with active duty. This association would seem to infer that for some reason physicians in this experience category do not see or refer active duty soldiers.

Weaknesses of the Study

The potential for methodology or construction weaknesses exist in any study. One such weakness in this study was the possibility of seasonal variation affecting the number of referrals generated. Typically, it is felt the late fall/early winter months see an increase in referrals. Zvieli (1992) attempted to reduce the effect of seasonal variation, by conducting his study on referrals among military primary care physicians in two different periods of the year (Dec 85 - Jan 86 and Jul - Aug 96). Geyman et. al., (1976), in their study of referrals in family practice found a decrease in referral rates from February to May but not many differences in the other areas. While this study is conducted in two phases similar to the time periods of the Zvieli study, there remains the possibility of seasonal variation. The potential for seasonal variability is due to the control phase taking place during the summer fall transition, while the experimental phase was conducted during the fall winter transition. There is also an absence of institutional historical data for comparison.

Resource sharing physicians can only see CHAMPUS eligible beneficiaries. This would possibly bias the population that the active duty and contract physicians were seeing. Potentially the active duty and contract physicians could be seeing more active duty and retiree categories of patients due to workload guarantees in the TRICARE contract. Resource sharing physicians were not included in this study. Their absence was due to Foundation Federal Health Services not filling two provider vacancies. Any future studies may wish to include physician relationships with the organization as a variable.

The inability to measure the number of visits by appointment type to the FPS was a second study weakness. It is very hard to make any valid assumptions about the decrease/increase in referrals to a specific diagnostic category, if the total number of patient visits directly related to that category are not known. (A decrease/increase of X referrals may or may not be significant depending on the actual number of visits for that particular diagnostic category.) The Ambulatory Data System (ADS) will be able to provide significant diagnostic information once it is fully implemented and running smoothly. ADS will be able to provide patient visit numbers as well as detailed information on the type of appointment and any referrals generated. It will also be able to report this information by individual provider as well as clinic roll-ups. This will greatly enhance the ability of any future studies to provide specific information on each type of specialty referral. In light of the potential for study weaknesses, due care must be exercised when estimating long term effects of this study.

Conclusions and Recommendations

Conclusions

This study had two primary objectives: First, based on referral rates, was family practice physician utilization increased after the FPS reorganization? The second objective was to conduct a descriptive analysis of the actual referrals generated and their independent variables in both the pre- and post- FPS reorganization data and present the findings.

Few of the independent variables had more than moderately significant correlations and show little evidence of even moderately significant relationships with a referral. The increases in patient visits and decline in referrals indicate that there are efficiencies being gained.

The study provides conclusive evidence that physician utilization based on referral rates was significantly increased as a result of the Family Practice Service reorganization. The study should provide the organization and managers of the FPS with additional information concerning the referral practices within the FPS. The more data and information that is collected concerning the referral practices of the FPS allows the FPS managers to make better and well-reasoned decisions regarding the FPS. With the full implementation of the ADS system, more conclusive data will be available. Additionally, empirical data concerning the effect of the reorganization of the FPS is available to other MTFs who are considering restructuring their family practice services.

The study supports the majority of literature reviewed, indicating that there are no conclusive variables which are strongly associated with a referral. The zero-order correlation matrix results did provide a limited demographics profile of an individual receiving a referral.

At this time, no published standards for physician referral rates could be found in the literature or from outside sources. There are various rates stated in the literature, however, none of them cited a nationally accepted or established benchmark for physician referrals. The fact that patient visits increased and referral rates were lowered after the reorganization of the FPS is significant and warrants continued monitoring.

Recommendations

The FPS should continue to monitor and collect referral data based on the five independent variables set in this study. This will allow for observations of trends over time, a practice essential to any management improvement initiative. Future studies may also want to look at the type of referral; today, 72 hour, and routine when looking at utilization. The use of ADS will allow the study to become detailed enough to look at referral rates of specific diagnosises based on the CPT-9 codes or diagnostic related groups (DRG). ADS will also allow the specific comparison of different referral variables based on total visits of that variable. This will allow more detailed analysis of referral rates, trends and associations. The study design used in this research is simple enough to replicate in any setting and could effectively serve as a template for on-going analysis efforts. Care must be taken to include all patient visits in the data sets.

The current initiatives in place in the FPS should be continued. Referral reviews by FP clinic team leaders for appropriateness based of referral guidelines established by the organization or taken from Milliman & Robertson are effective in improving both patient access. An additional tool for monitoring FPS referrals would be to monitor the ratio of appropriate to unnecessary referrals.

A prudent review of the FPS staffing level and panel sizes should be made no later than the one year anniversary of the FPS reorganization. This will become increasingly important as military medicine transitions to enrollment based capitation (EBC) as its budgeting mechanism on 1 October 1997. At that point it will be essential to effectively maximize the FPS panel sizes and physician utilization.

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