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The preadmission unit at Walter Reed Army Medical Center was expanded in late 1994 to become the Ambulatory Processing and Procedure Center (APPC). A performance assessment based on the projections and benefits outlined in the APPC Business Plan was conducted after the first full year of operation. Collection of administrative data and conducting a patient satisfaction survey form the basis of the measures used to assess performance under two categories: customer satisfaction and cost effectiveness. The results of the study validate management decisions to expand preadmission services and can serve as baseline measurements for future assessments.

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GRADUATE PROGRAM IN HEALTHCARE ADMINISTRATION

A FIRST YEAR PERFORMANCE ASSESSMENT OF THE AMBULATORY PROCESSING AND PROCEDURE CENTER AT WALTER REED ARMY MEDICAL CENTER

A GRADUATE MANAGEMENT PROJECT SUBMITTED TO

THE FACULTY OF U.S. ARMY - BAYLOR UNIVERSITY

IN CANDIDACY FOR THE DEGREE OF

MASTERS IN HEALTHCARE ADMINISTRATION

BY

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ABSTRACT

Preadmission units are a process innovation that stems from the shift in medicine away from an inpatient focus to largely outpatient and ambulatory care. At Walter Reed Army Medical Center, the preadmission unit started in 1991 and expanded to become the Ambulatory Processing and Procedure Center (APPC) in late 1994. The center has been in operation for over a year and senior management is calling for an assessment of the performance in the APPC based on goals and benefits listed in the Business Plan. Defining appropriate performance measures from largely qualitative goals presents an additional challenge. Collection of administrative data and conducting a patient satisfaction survey form the basis of the measures used to assess performance under two categories: customer satisfaction and cost effectiveness. Analyzing linear trends in average length of stay (ALOS) and third party collections (TPC) for the top clinical services using the APPC infer that preadmission services are functioning in consort with cost effectiveness claims. For the areas of operating room (OR) cancellations and utilization, cost benefits cannot be shown. In the patient satisfaction survey, the response was overwhelmingly favorable suggesting that quality of care in the APPC is outstanding. A representative sample of 215 patients (n=215) gave the center an overall satisfaction score of $4.86 \pm .34$ based on a five-point Likert scale where 5.0 equaled very satisfied. All domains investigated in the survey exceeded the minimum level of .60 for scale reliability. Multiple regression models supported the hypothesis that overall satisfaction depended on patient encounters with the physicians, the nurses and the nonnursing staff. Satisfaction with the physical environment, patient demographics and the identity of the referring clinical service were judged not to be determinants of overall patient satisfaction at an alpha level of .05. Mean scores for each domain were used to assess performance in the APPC and support the claim that the center enhances patient service and satisfaction. The APPC has met several performance objectives in its first full year of operations. The results of the study validate management decisions to expand preadmission services and can serve as baseline measurements for future assessments. Several recommendations are offered to improve preadmission services on an organizational level and to simplify the measurement and assessment process in the future.

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INTRODUCTION

The volume of ambulatory procedures is expanding rapidly in response to economic forces that reduce the incentives for prolonged inpatient care and reward institutions that shift care to outpatient facilities. Constant technologic advances and improved anesthetic techniques are opening new areas in every surgical subspecialty for outpatient use (Davis 1993; Griffith 1994). Simultaneously, the tenets of continuous quality improvement are being embraced by healthcare organizations and concentrating the focus of management on delivery systems that are patient centered. These developments are fostering the rise of preadmission programs in hospitals and freestanding clinics. Known by a variety of names, Ambulatory Care Center (ACC), Ambulatory Processing Unit (APU), Ambulatory Treatment Unit (ATU), Pre-Bed Care (PBC), Patient Education and Registration Program (PREP) and Early Morning Admission (EMA), the programs coordinate the admission process and are hailed as a service that meets the needs of patients (Business Plan-Ambulatory Processing and Procedure Center 1994; Noon and Paul 1992). Collateral benefits associated with the programs are; reductions in the overall length of stay, reduced operating room cancellations, improved insurance reimbursement and enhanced patient satisfaction (Noon and Paul 1992; Macarthur 1991).

Conditions That Prompted the Study

The idea of a preadmission unit was introduced at Walter Reed Army Medical Center (WRAMC) in 1991. The unit expanded late in 1994 to become the Ambulatory Processing and Procedure Center (APPC). Presently, the APPC has been in operation for approximately a year and a half. In fiscal year 1995 (FY95), the service recorded more than 12,000 patient visits and accounted for 24 percent of all hospital admissions (Monthly Activity Report, 1995). The facility has a mix of administrative and healthcare personnel joined in a matrix-type organizational format.[1] Staffing is outlined in Table 1.

Table 1. -- Staffing in the Ambulatory Processing and Procedure Center

Job Position/Title	Number of FTEs*
Head Nurse (Major, AN)	1.0
Wardmaster (E-6, 91C)	1.0
RNs (military, AN)	2.0
RNs (civilian, GS)	3.0
RNs (civilian, Contract)	1.0
LPNs (civilian)	2.0
91Cs	2.0
91Bs	2.0
Anesthesiologist	1.0
Chaplain	0.5
Administrative Clerk	2.0
Third Party Collections Clerk	1.0
Medical Records Technician	1.0
Total	19.5

*Full Time Equivalents

The current total of FTEs in the APPC is 19.5. This is roughly one half the projected need of 36.0 based on a workload of 1900 patient visits/admissions per month (Business Plan 1994). Staffing at the time of this research was in transition. The lone contract civilian RN will be replaced by two contracted civilian LPNs. The Third Party Collection clerk has been reassigned to the main collection office, leaving the APPC without a TPC representative.

The APPC is on the seventh floor of WRAMC's Heaton Pavilion on Ward 76. The functional area consists of the reception desk, the admissions and third party collection work stations, office of the Head Nurse and Wardmaster, one anesthesia interview room and dedicated waiting room, a laboratory and testing room, a formal patient waiting room, a recovery room and seven interview rooms that duplicate as exam rooms, treatment rooms and administrative areas. In total, the service occupies 15 rooms and approximately 60 percent of the work space on the ward. A schematic representation of the physical plant is provided in Appendix B.

Preadmission services at WRAMC have increasingly become a focal point of management interest as the institution slowly transitions from its traditional mode of inpatient and, consequently, expensive delivery systems to outpatient and more cost effective systems. The service, however, is not fully utilized. In sanctioning the development of the APPC, management elected to pursue a course of action that reflected an industry trend and was supported by a comprehensive and sound

business plan. Concern, now, is for some opinion on the efficacy of that decision, and a broad assessment of the preadmission service at WRAMC since its inception in 1991 (Brown 1995). Viewed from a financial perspective, hospital executives are requesting a report on their investment in the APPC that addresses specific proposals set out in the business plan (Brown 1995). Through retrospective analysis of existing administrative data and performance assessment of the APPC vis a´vis the business plan, management hopes to garner the necessary information to evaluate levels of utilization, establish baseline measurements, validate past decisions and to plan future actions in promoting the use of preadmission services. Keeping the evaluation process transparent and minimizing disruption to the staff and users of preadmission services poses a challenge, but reflects the intentions of senior management (Brown 1995).

The business plan for the APPC outlines the purpose, functions and benefits provided by the center (Business Plan 1994). Clearly expressed in the purpose statement are the goals of improving patient satisfaction, lowering organizational costs, and enhanced revenue collections. The mission statement delineates the processing functions and procedures of the APPC, and includes a workload projection. Table 2 lists the Processing Functions, Procedures, and Workload Projection.

Table 2. -- Mission of the Ambulatory Processing and Procedure Center

Processing Functions

1. Preadmission of all elective surgeries and admissions.
2. Precertification of all elective admissions and ambulatory procedures.
3. Admission of all Department of Surgery main operating room cases and ambulatory procedures
4. Discharge of all ambulatory procedures.
5. Anesthesia counseling.
6. "One Stop Shopping" for preadmission testing.
7. Preoperative courtesy call.
8. All Same Day Surgery (ASC) patients will continue admission through PAD central.

Procedures

1. Conscious sedation recovery, Phase II recovery of Same Day Surgery and ambulatory procedure recovery.
2. Monitoring of patients who have undergone minor invasive procedures.
3. Postoperative courtesy call

Workload Projections

1. Preadmission (all elective)	=	36/day
2. Inpatient admission	=	30/day
3. Same day procedures	=	29/day
4. Total admissions:		
Total/day	=	95
Total/week	=	475
Total/month	=	1900
Total/annual	=	22,800

The business plan includes an ambitious list of projected benefits, many of which are associated with preadmission services in the industry literature. Unfortunately, the proposed benefits are qualitative rather than quantitative, and do

not readily lend themselves to measurement, comparison and assessment. Table 3 lists the expected benefits as they appear in the plan.

Table 3. --Expected Benefits from Implementation of the APPC Program

1. High patient satisfaction
2. Reduced length of stay
3. Cost avoidance - reduction in cancellations.
4. Better third party collection through precertification initiative.
5. Reduced exposure to hospital infections.
6. Less disruptive to family life.
7. Reduced CHAMPUS costs - increased bed availability for CHAMPUS recapture of high cost admissions
8. Enhanced convenience
9. Increased access to care.
10. Emphasis on patient focused care; service oriented.
11. Standardization of nursing practice of conscious sedation patients.
12. Enhanced scheduling using an appointment template via CHCS.
13. Cost effective.
14. Enhanced patient education.
15. Potential setting for multi-disciplinary research.

Distilling these largely qualitative goals into quantifiable indices of successful performance is a challenge. Ideally, valid quantifiable metrics should be established before implementing business plans and proposals. Retrospectively creating performance measures has limitations, but is feasible within operationally defined parameters. The benefits list includes elements of both process and outcome measurement systems and covers several major indicators of performance such as, customer satisfaction, clinical outcomes and cost effectiveness. Defining, measuring and assessing aspects of these indicators is fundamental to this research.

Research Questions

The predominant research questions in this study are: (1) Has the APPC preformed satisfactorily in its first year of operation when measured using metrics designed from the projections and proposed benefits of the business plan?; (2) Does an analysis of historical administrative data provide meaningful information that can be used to substantiate the performance assessment, validate past management decisions and suggest future courses of actions in preadmission services?

Theoretical Framework

A commitment to the process of quality improvement is required if healthcare professionals hope to eliminate waste, improve customer service, and increase healthcare's value. Many resources document general theories of monitoring, evaluating and improving quality in the healthcare field, however, starting programs for systems review and improvement are not easy (Ellison 1990; Benson and Townes 1990). On the one hand, the organizational culture may stymie the attempts to measure, analyze and resolve problems (Deming 1986). On the other, there continues to be a lack of a consensus on exactly which measures of healthcare quality are reliable and valid (Eddy 1995). The Joint Commission on the Accreditation of Healthcare Organizations (JCAHO), in its Agenda for Change, has developed a program intended to help healthcare organizations and health professionals realize their measurement and improvement objectives (Joint

Commission on Accreditation of Healthcare Organizations 1993). Two key assumptions of the program are; 1) measurement forms the basis for judgements and decisions, and 2) the act of measurement has as its goal future improvement (Joint Commission 1993, vi-vii). Many organizations are seeking objective measures that will not only confirm their belief that they performed well, but will also give them insights about how to improve (Lansky 1993). Measurement in the healthcare field is not a new idea. Since the era of Florence Nightingale, successive generations of critics have demanded fundamental changes in how health care providers document their actions and take responsibility for the effects. (Lansky 1993). What is new is the social mandate for performance measurement (O'Leary 1993). This explains the current interest in the so-called 'report card' phenomena, and reflects the desire of the purchasers of healthcare to know what they are getting for their money.

The measurement process starts with knowing what to measure. According to Donabedian, healthcare organizations can choose three major approaches in resolving this issue (Donabedian 1992). One is to measure structure, or the physical and organizational properties of the settings in which care is delivered. Another approach is to assess the process in the delivery of care, or what is done for patients. Finally, it is possible to monitor and evaluate the outcomes of care, or what is accomplished for patients. Presently, clinical outcomes measurement in healthcare is still evolving. Final deployment of an acceptable platform for measuring clinical

outcomes is years away (Eddy 1995; Jennings 1993; Reinertsen 1993; Benson and Townes 1990). The subsequent collection of useful outcomes data that is both reliable and valid may take decades (Reinertsen 1993; Greenfield 1989). Contrary to outcomes measurement, monitoring and evaluating the structure and process of healthcare delivery has been in existence for some time. Under the principles of continuous quality improvement, these measurements are steering medicine toward providing quality healthcare for patients. Process measurements focus on the manner in which care is provided and includes evaluations of the patient's involvement in acquiring care, the provider/patient interaction, and sundry administrative aspects of service delivery (Williams and Torrens 1993, 388-9). Within the context of process and performance assessment, indicators such as, customer satisfaction and cost effectiveness, are critical markers of an organization's philosophy on quality. That patient satisfaction is a valid measure of quality is indisputable (Ware 1987; Donabedian 1988; Tarlov, Ware and Greenfield 1989; Weisman and Koch 1989; Petersen 1989; Steiber and Krowinski 1990, 5; Nelson 1990; Dull, Lansky and Davis 1994). The relationship of costs to quality, on the other hand, is a source of emotional upheaval in the healthcare industry (Fuchs 1993). It is best viewed as a unit measure of value, where the value of a service is equal to the desired quality at a reasonable cost (Joint Commission 1993, 61). Linking both customer satisfaction and costs to quality requires reliable performance data. Only with good performance data are users and managers able to

understand the multiple dimensions of customer satisfaction and cost effectiveness, and render critical judgements about the process and quality of the services provided (Joint Commission 1993, 61). The recognized importance of financial and perceptual components in process measurement and performance assessment is the chief reason they are pillars in the ongoing development of outcomes measures (Heyvvary 1991).

Preadmission programs are a specific example of process improvements in healthcare delivery. As recently as a few years ago, fragmented activities, rather inconsistently delivered, constituted whatever preparations patients experienced before they were admitted for inpatient or ambulatory procedures (Noon and Paul 1992). In effect, preadmission programs have substituted a single outpatient visit for what previously required one or two inpatient days, namely, laboratory testing, history and physical, counseling and education. The initiative was motivated primarily by the need to reduce costly inpatient days, and in response to the general industry trend toward outpatient delivery of care (Finegan 1992). Since then other cost benefits have been associated with the programs such as, decreasing surgery cancellations and the corresponding amount of unproductive time, and selectively balancing testing requirements to prevent unnecessary or duplicate testing (Bruce 1993; Macpherson, Snow and Lofgren 1990; Worley 1986). Currently the precertification requirements of third party payers and managed care organizations, and the awareness that a satisfied patient is a loyal consumer of healthcare are

fostering an expansion of preadmission services (Noon and Paul 1992).

Preadmission programs focus their activities where they belong - on the needs, interests, and convenience of the patients and the providers (Noon and Paul 1992; Haines and Viellion 1990; Barron 1987; Rost 1991; Prescott 1990; Bruce 1993). Healthcare providers benefit from the service when patients arrive for treatment properly screened and with records in order. Completed assessments, referrals, history and physicals, consults, test results, and consent forms preclude the possibility of last minute troubleshooting, expensive stat testing, unplanned delays, and that general feeling of confusion and frustration (Bruce 1993; Noon and Paul 1992). Eliminated is the need for the patient to walk their way through uncoordinated systems to obtain the necessary pretreatment work-up. In addition, if during the preadmission process patients are well informed about their conditions and their personal anxieties are obtunded, they report greater satisfaction with the service (Worley 1986; Bruce 1993). Relieving fear and anxiety, and providing in-depth education to patients and family members, enhances the psychologic well being of the patient and improves clinical outcomes (Goulart 1987; Moss 1986; Orr 1986; Raab 1985; Simms 1988). There is also measurable economic benefit to the organization when patient satisfaction is high. Research has shown that these patients bear strong allegiance to the facility and are likely to return for future medical care and recommend the services to others (Weiss 1988).

Evaluating customer satisfaction and analyzing cost effectiveness are

appropriate methods to measure the performance of preadmission services at WRAMC. Because all true measurement implies some type of comparison (Bradford Hill 1971), the process of quantifying performance is undertaken with the objectives of comparing the findings of this study to projected benefits found in the business plan and establishing baselines for future comparisons. The assumption is that a comparison to standards and qualitative statements in the business plan allows for valid reporting of the APPC's performance in the first year. This performance assessment serves as a surrogate for the quality of care rendered by the APPC and provides meaningful adjunctive information for hospital decision makers.

With respect to the health care setting, the patient satisfaction survey is the primary means of assessing how patients feel about the care they receive (Steiber and Krowinski 1990, 7). Often, satisfaction surveys are the only channel through which patients can alert providers and management to their concerns, needs and perception of treatment (Weisman and Koch 1989). This practical and consumer-oriented perspective results in feedback useful to identify areas for improvement and to monitor performance at macro and micro levels of patient care delivery (Dull, Lansky and Davis 1994). When used in conjunction with specific medical encounters, patient satisfaction surveys are even more useful in evaluating facilities, providers and services (Ware and Hays 1988). Patient satisfaction measures must be methodologically sound for the data to be meaningful and useful to managers.

Therefore, the patient survey should involve consideration of the representativeness of the patient sample surveyed, the appropriateness of the dimensions covered in the survey, the validity and reliability of the measures used to collect feedback, and the usefulness of the data generated by the system (Nelson, Hays, Larson and Batalden 1989; Weisman and Koch 1989). Meeting these objectives requires the development of a survey instrument based on theoretical and empirical work in the health services literature, previous studies, input from area supervisors and workers, and information generated by a pilot survey (Cleary, Keroy, Karapanos and McMullen 1989).

The best use of patient satisfaction ratings is in conjunction with other performance data that permits managers to examine trends and variations within the organization (Health Services Research Group 1992). This type of analysis offers meaningful information to help senior managers in health service planning, evaluation and improvement. Without measurements targeting sentinel events or activities, aggregate data from administrative sources may be the only basis for assessing performance. When using these data, it must determine what are acceptable levels and, conversely, the patterns that will trigger further evaluation and action (Joint Commission on Accreditation of Healthcare Organization 1993a). Because measurement techniques are inherently imperfect and only partially describe the underlying truth, the concept of validity must be safeguarded in analyzing administrative data (Romano 1993).

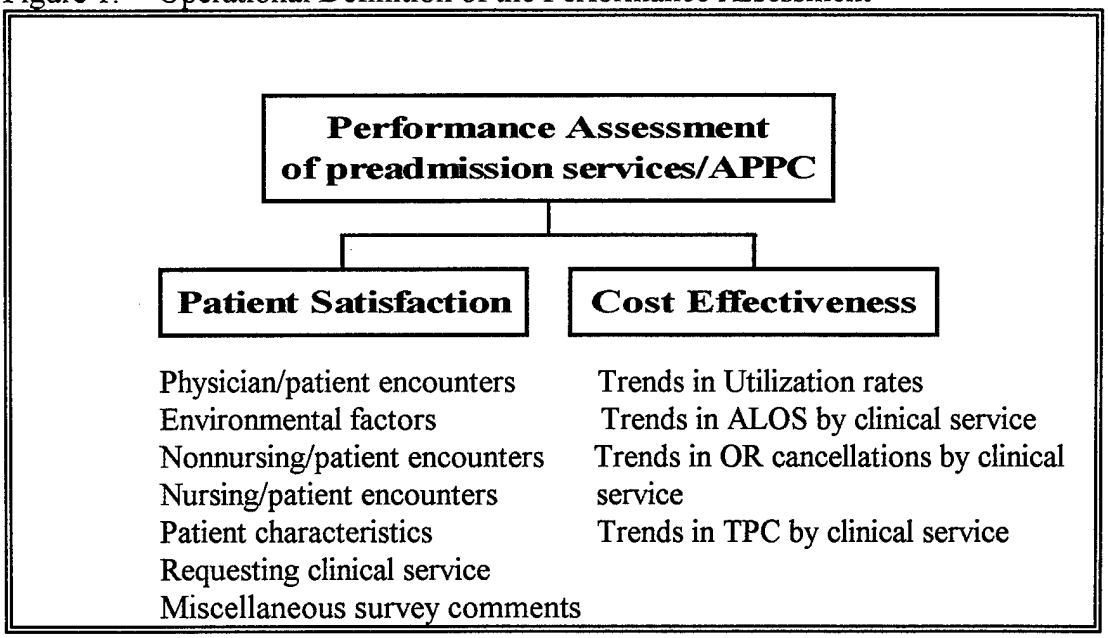
The purpose of this study is threefold: 1) assess the performance of the APPC after one year of operation using measures of customer satisfaction and cost effectiveness; 2) through the analysis of existing administrative data, provide senior management a broad assessment of preadmission services in the hospital; and (3) recommend future courses of action. It is hypothesized that operations within the APPC enhance patient service and satisfaction and that the level of overall satisfaction is a function of several dimensions in the delivery of services including; physician/patient encounters, nurse/patient encounters, nonnursing staff/patient encounters, environmental factors, patient characteristics and the requesting clinical service. It is further suggested that an examination of specific indicators of cost effectiveness, such as Utilization rates, average length of stay (ALOS), operating room (OR) cancellations and third party collections (TPC), will infer that the APPC, and, overall, preadmission services are working towards meeting performance goals outlined in the business plan.

METHODS AND PROCEDURES

Operational Definition

The first step in the research design was to declare the operational boundaries of the performance assessment. From the literature review, the projections and qualitative goals in the business plan, and the intentions of senior management, a model was created operationally defining the performance assessment process (see Figure 1). The model assumes that through accurate measurement and analysis of component parts, valid assessment of preadmission services, specifically the APPC, is possible.

Figure 1. -- Operational Definition of the Performance Assessment



The two major categories under assessment are Patient Satisfaction and Cost Effectiveness. Because valid measures of Clinical Outcomes are still in development, this category is not included in the performance assessment. Under Patient Satisfaction, measures of performance were tabulated for the elements listed in the model using standard survey techniques. Physician/patient encounters are defined as those events where the patient interacts specifically with a physician. Similarly, Nursing/patient encounters are episodes where a patient interacts with a member of the nursing staff. Nonnursing/patient encounters refers to patient interactions with administrative personnel. Environmental factors relates to aspects of the physical plant and the methods of operation within the APPC. Patient characteristics are specific demographic attributes suspected to influence satisfaction. The requesting clinical service is defined as the service in the hospital referring the patient to the APPC for preadmission screening. Miscellaneous comments are random items written on the survey instrument by the patients.

There are four elements listed under the major category of Cost Effectiveness. In all four, analyzing the linear trends constitutes the measurement process and contribution to cost effectiveness. Utilization rates are defined as patient visits and admissions processed through the APPC. The expectation is that these rates should be increasing over time. Trends in ALOS, on the other hand, are expected to decrease over time, and the decrement should be more pronounced for services using the APPC versus the hospital average. Similarly, the trends in

percent of scheduled OR cases that are canceled should be decreasing for services using the APPC. Finally the trends in TPC per admission are anticipated to be increasing on a hospital-wide level and, specifically, for those services using the APPC. Admissions are used in the analysis as a marker for workload. The computed rate of TPC per admission is only valid for measurement and comparison within a given clinical service using the APPC or for the hospital-wide average over the prescribed period.

Administrative Data Collection and Analysis

Data for the study came from several existing administrative databases at WRAMC and from the on-site patient satisfaction survey conducted from late February 1996 to late March 1996 in the APPC. The chief sources of historical information were the Composite Health Care System (CHCS), the Patient Activity Statistical Based A, version 2 (PASBA2), the Medical Expense Performance Reporting System (MEPRS), the monthly activity report of the Preadmission Unit, the Operating Room (OR) workload reporting system, the Surgi-Service 2000 database[2], and the Third Party Collection (TPC) database. Aggregate data was collected for ALOS, TPC, OR cancellations, admissions, and visits to the preadmission service for the fiscal years 1992 through 1995 and sorted by clinical service. The only exceptions were OR cancellation data which had historically been tallied by calendar year, and ALOS data which were analyzed for fiscal years 1987 through 1995. Because the retrieval process called for only raw summary

information, ethical issues, such as patient confidentiality, were not a factor. The validity and reliability of the data within these administrative databases have been questioned. (Forensic Medical Advisory Service 1994). A high incidence of data input error, approaching 15 percent, has been reported in at least one instance (Forensic Medical Advisory Service 1994). Nevertheless, these sources provide data in countless research projects and administrative studies, and are generally assumed to be valid and reliable. In actuality, the standards of validity are low for summary administrative data. When applied in the measurement of a construct such as performance, however, the standards are stricter and must be weighed in the interpretation of the results.

Using run charts, administrative data was analyzed for linear trends that might infer a measure of performance in the preadmission service. The analysis focused on the top twelve clinical services using the APPC in 1995 (see Table 4). This group accounted for 92 percent of the patient visits recorded in the APPC for that year. Furthermore, these services account for 83 percent of the patient visits to the preadmission unit during the periods of FY92 to FY95. Only for OR cancellations was the methodology different because of the nature and time frame of data collection in that service area. Run charts plotted by clinical service depict the trends in the areas of Utilization, ALOS, OR cancellations and TPC. Patterns were judged to be inferentially supportive of APPC goals, not supportive, or inconclusive. In those areas were trends suggested that preadmission services might be meeting

goals, a star (★) was used on the report card to symbolize satisfactory performance. Conversely, the areas where trends suggested the unit was not meeting its goals were left blank (_). Patterns that were inconclusive were labeled with a question mark (?).

Table 4. --Top 12 Clinical Services Using the APPC in FY95

Gastroenterology	Otorhinolaryngology	General Surgery	Urology
Gynecology	Ophthalmology	Plastic Surgery	Orthopedics
Cardiology	Periph Vascular	Oral Surgery	Cardiothoracic Surg

Survey Data Collection and Analysis

The survey population included patients receiving care in the APPC during a thirty-six-day period from 22 February 1996 to 28 March 1996. Excluded from the sample were patients presenting only for admission and routine cases from the Gastroenterology service. The survey instrument consisted of a twenty-one-item questionnaire and was designed to be completed on-site, as close to the patient/service encounter as possible. Administrative personnel in the service were instructed to distribute the survey to 100 percent of the patients presenting for care with a request that the form be returned before departing the APPC. If a patient made multiple visits to the APPC, administrative personnel asked if they had previously completed the survey in order prevent duplication of responses. During the survey period the service recorded 725 eligible patient visits and a total of 215 questionnaires were completed. This represented an overall response rate of 29.6 percent.

The domains, or scales, covered in the survey instrument were selected and formulated into questions based a review of the literature and the opinions of area supervisors. The five specific scales included in the survey tool were: physician/patient encounters (Clinic Visit), environmental factors (Physical Environment), nonnursing staff/patient encounters (Nonnursing), nurse/patient encounters (Nurse), and overall satisfaction (Overall). The survey also included a separate section on patient demographics, identity of the requesting clinical service, and two questions polling issues of administrative interest. The recommendations of Steiber and Krowinski were followed in developing the specific format of the instrument (Steiber and Krowinski 1990). A precise introduction that explained the purpose of the survey was written on the instrument, cordially requesting the patient's participation, assuring patient confidentiality and anonymity, and providing clear instructions on how to complete the form. All questions were closed end and responses were based on a modified 5-point Likert scale that substituted numeric values for semantic labels (Likert 1932). Patients could evaluate their care using a numerical score ranging from 1 to 5, where "5" equals "very satisfied," and "1" equals "very dissatisfied." Respondents with no opinion on a particular question had the option of selecting a neutral midpoint (a score of "3"). To create summated scores and compute scale means, questions were grouped according to the five domains. Questions related to patient demographics or the referring clinical service used nominal scales to assign responses to distinct categories based on

characteristics of the respondent or identity of the clinical service. A final section on the questionnaire offered space for patients to write comments or suggestions. A copy of the survey instrument is in Appendix C.

Throughout development of the survey tool, issues of face validity, clarity of content and ease of completion were taken into consideration. A pilot test was conducted for two days in January 1996 in which feedback was solicited from staff and patients on the questions and style of the instrument. The survey instrument was also evaluated and critiqued by an independent research department at the hospital.[3] Many of the recommended changes were incorporated in the final survey. The construction of a survey instrument based on multi-item scales inherently improves reliability (Steiber and Krowinski 1990, 30). In assessing the overall internal reliability of the multi-scale pilot test, a Cronbach coefficient alpha of .86 was recorded. This exceeds the acceptable criterion (Cronbach $\alpha \geq .80$) for high internal reliability (Cronbach, 1951). Representativeness in the sample population and a high response rate also improve the survey's reliability and reduce the influence of response bias. With respect to validity, many studies have shown that these questionnaires can relate in theoretically expected ways and, therefore, the construct validity of patient satisfaction surveys is not questioned (Fitzpatrick 1991; Health Services Research Group 1992). While a pure measure of the construct of patient satisfaction does not exist, correlation between the findings of this study and the research literature suggests criterion validity.

Collected survey data was entered into SPSS® version 6.1.3, a proprietary statistical software package, and the file reviewed for correctness and missing data. Missing data were replaced using the series mean. Descriptive statistics, consisting of means and standard deviations, were generated for all continuous variables (see Appendix D). Reliability of the individual domains was assessed using Cronbach's coefficient alpha. As a minimum measure of internal inconsistency, the alpha level was set at .60 (Cleary, Keroy, Karapanos and McMullen 1989). Once the reliability was established, mean scores were calculated for each domain. Correlations were established between the mean scores and patients' responses to a single item question that asked about overall satisfaction. In addition, the correlations of overall satisfaction with patient demographics and the requesting clinical service were listed. To determine each domain's independent contribution to overall satisfaction, multiple regression models were calculated in which the overall satisfaction rating was the dependent variable and the individual mean scores were the independent variables. Scales that served as significant predictor variables of overall satisfaction were selected using stepwise regression. Similar regression analysis on the effects of patient demographics and the requesting service could be performed if warranted. The alpha level of .05 was set for the regression analyses. The mean score of each domain, including the single-item score for overall satisfaction, form the basis for the performance measurement of customer satisfaction in the APPC. Marketing literature suggests that only the highest end of

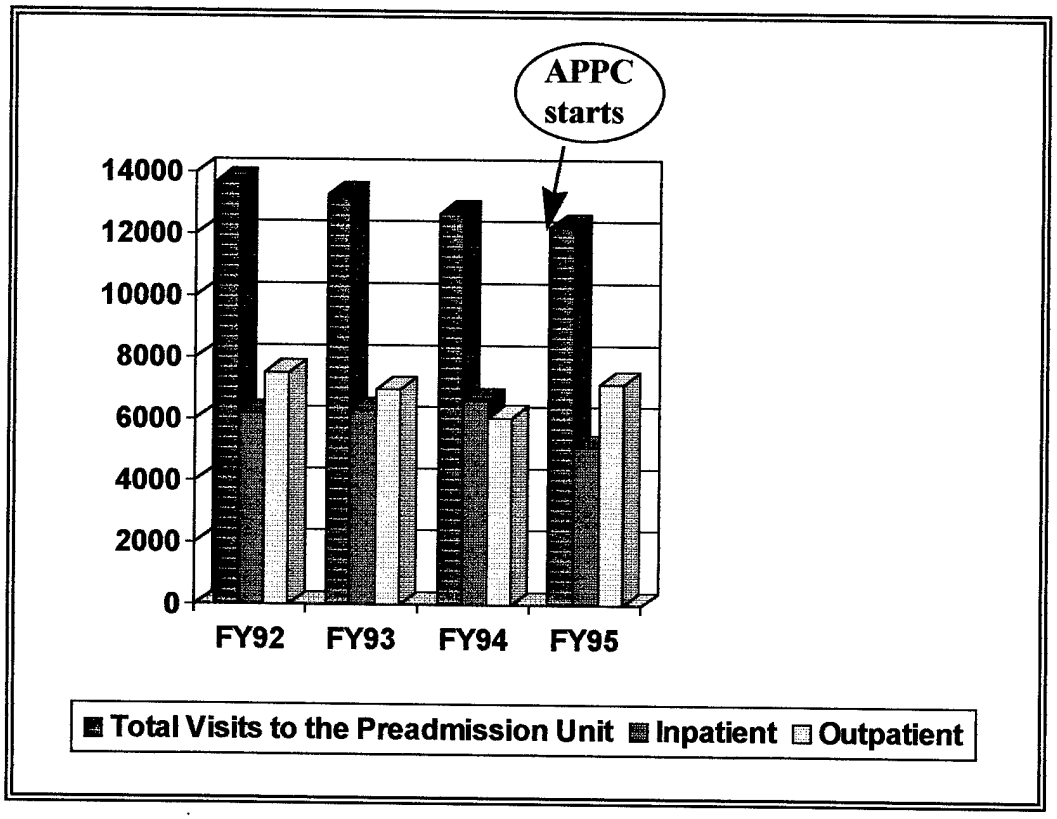
a scale validly measures customer satisfaction with a product or a service. For the purpose of this research, scores exceeding 4.0 were judged to have met the goal of patient satisfaction and were coded with a star (★) on the report card. Any scale score below 4.0 was left blank (_).

RESULTS

Utilization

The bar graph in Figure 2 depicts the total number of visits to the preadmission unit from its inception in FY92 up through the first year of operation of the APPC (FY95). Also depicted are the inpatient and outpatient components that comprise the total number of visits. The overall pattern is distinctively downward and is mirrored in the declining inpatient numbers. Outpatient visits have risen since the inception of the APPC reversing the decline between FY92 and FY94.

Figure 2. --Historical Use of Preadmission Services from FY92-FY95



The number of admissions processed through the preadmission unit compared with all hospital admissions for FY92 through FY95 is shown in Figure 3. Total admissions in the preadmission unit are declining, reflecting the hospital-wide trend. However, as a percentage of all hospital admissions, the amount processed through the preadmission unit has been steady at approximately 24 percent over the four-year period. The precise percentages by fiscal year are shown in the figure.

Figure 3. -- Total Hospital Admissions vs. Admissions Processed through Preadmission Services from FY92-FY95

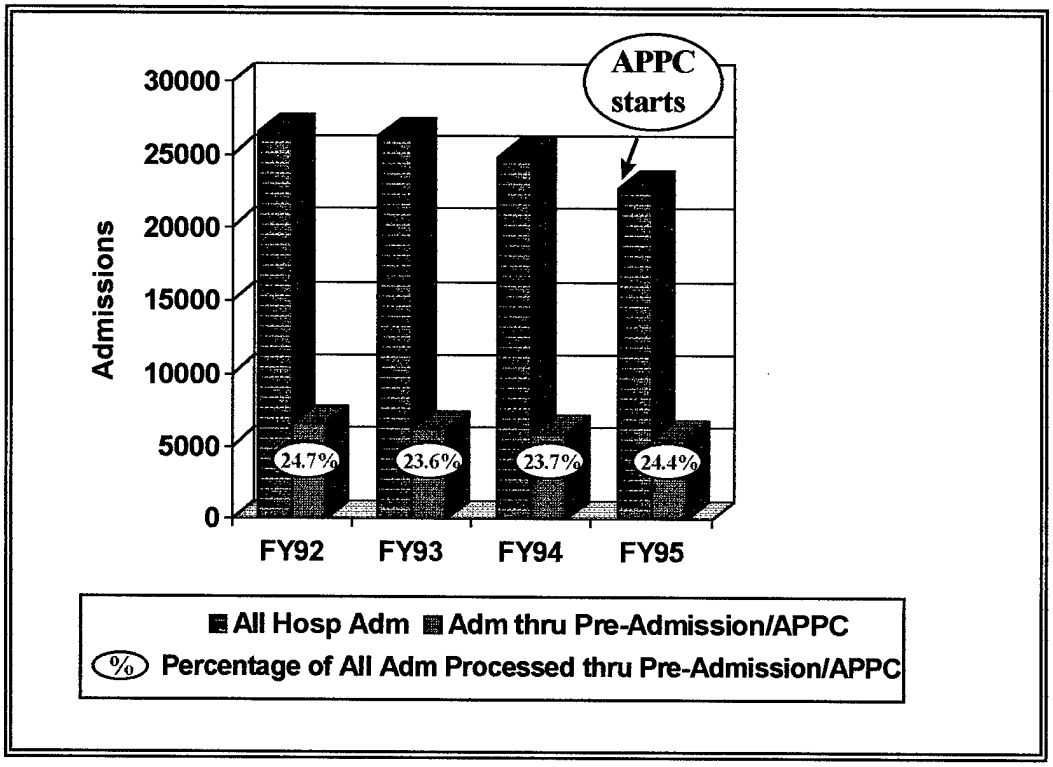


Table 5 describes the historical use of preadmission services as measured in the number of patient visits for the top twelve clinical services referring patients to

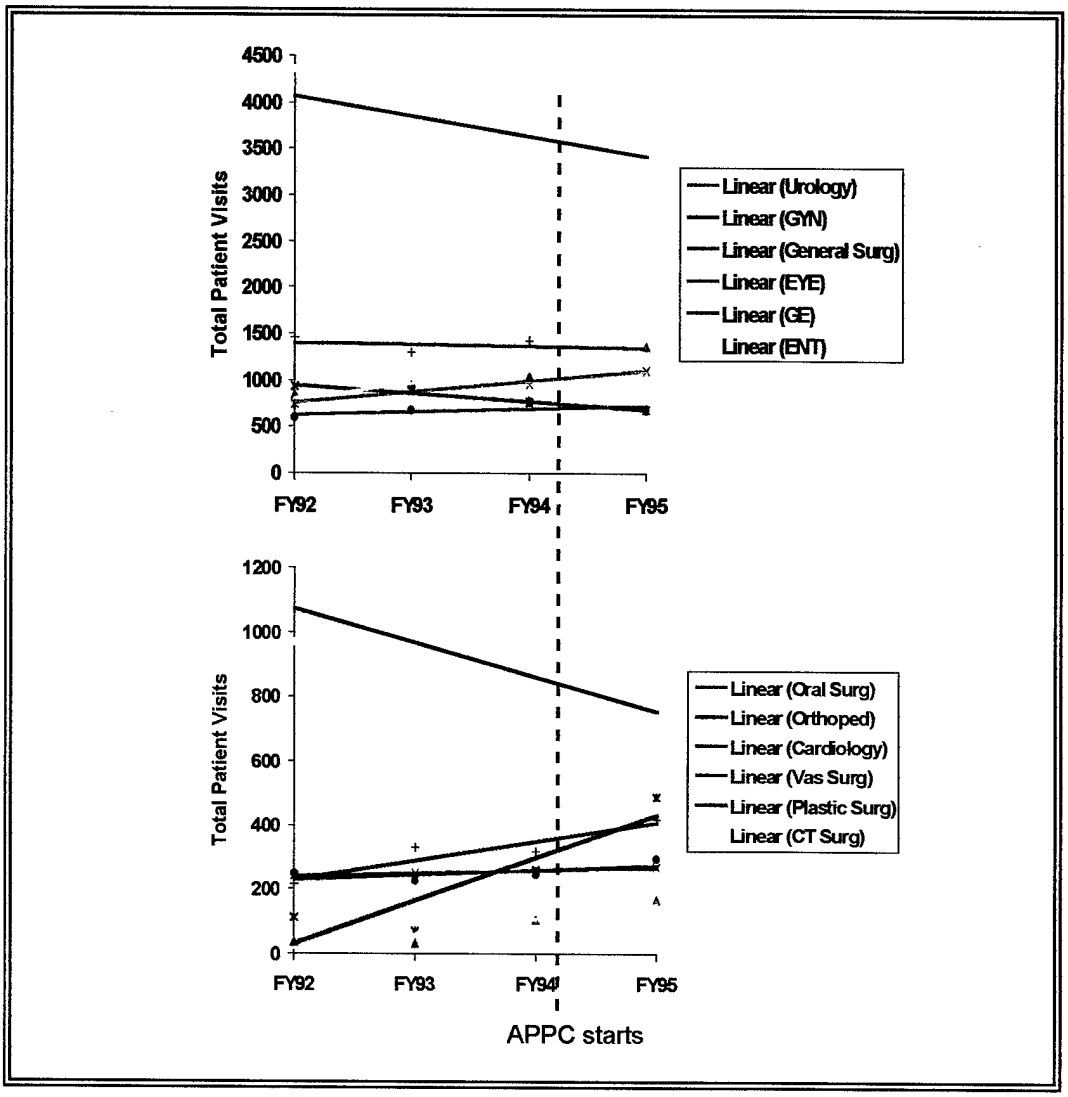
the APPC in FY95. A complete list containing all clinical services using preadmission since FY92 is in Appendix E. Clearly, Gastroenterology is a significant user of preadmission services, followed by Otorhinolaryngology, General Surgery, and Urology.

Table 5. -- Historical Use of Preadmission/APPC as Measured in the Number of Patient Visits by Clinical Services

Clinical Service	**FY95**	**FY94**	**FY93**	**FY92**
Gastroenterology	3774	3224	3632	4354
Otorhinolaryngology	1367	1053	950	852
General Surgery	1345	1422	1292	1454
Urology	1106	970	910	747
Gynecology	695	770	891	937
Ophthalmology	681	775	678	608
Plastic Surgery	661	948	1087	969
Orthopedics	490	259	71	113
Cardiology	416	318	331	215
Periph Vascular Surg	297	245	227	252
Oral Surgery	270	261	252	242
Cardiothoracic Surg	166	108	33	39
TOTALS	11268	10353	10354	10782

Trends in utilization patterns for the top twelve clinical services using the APPC in FY95 are shown on two graphs, each showing six of the services (see Figure 4).

Figure 4. --Trends in the Historical Use of Preadmission Services for FY92-FY95 for the Top 12 Clinical Services



The trends cover the gamut of possibilities, with some services exhibiting an obvious decrease pattern (Plastic Surgery, Gynecology, Cardiology, Gastroenterology), while other are clearly increasing their referrals (Otorhinolaryngology, Urology, Cardiothoracic, Orthopedics). Still other services are virtually unchanged in the four-year period (General Surgery, Ophthalmology, Oral Surgery, Vascular). The most disturbing finding in analyzing utilization trends is the fact that the historical pattern of using preadmission

services at WRAMC has not been significantly altered despite the creation of the APPC. A level of increased utilization is measurable in the area of outpatient visits, however this is not the case for inpatient stays which has remained stagnant at the historical average of 24 percent. While recognizing that this is largely a systemic problem in the organization, the results indicate that a key performance goal as outlined in the workload projections of the Business Plan (see Table 2) is not being met.

Average Length of Stay

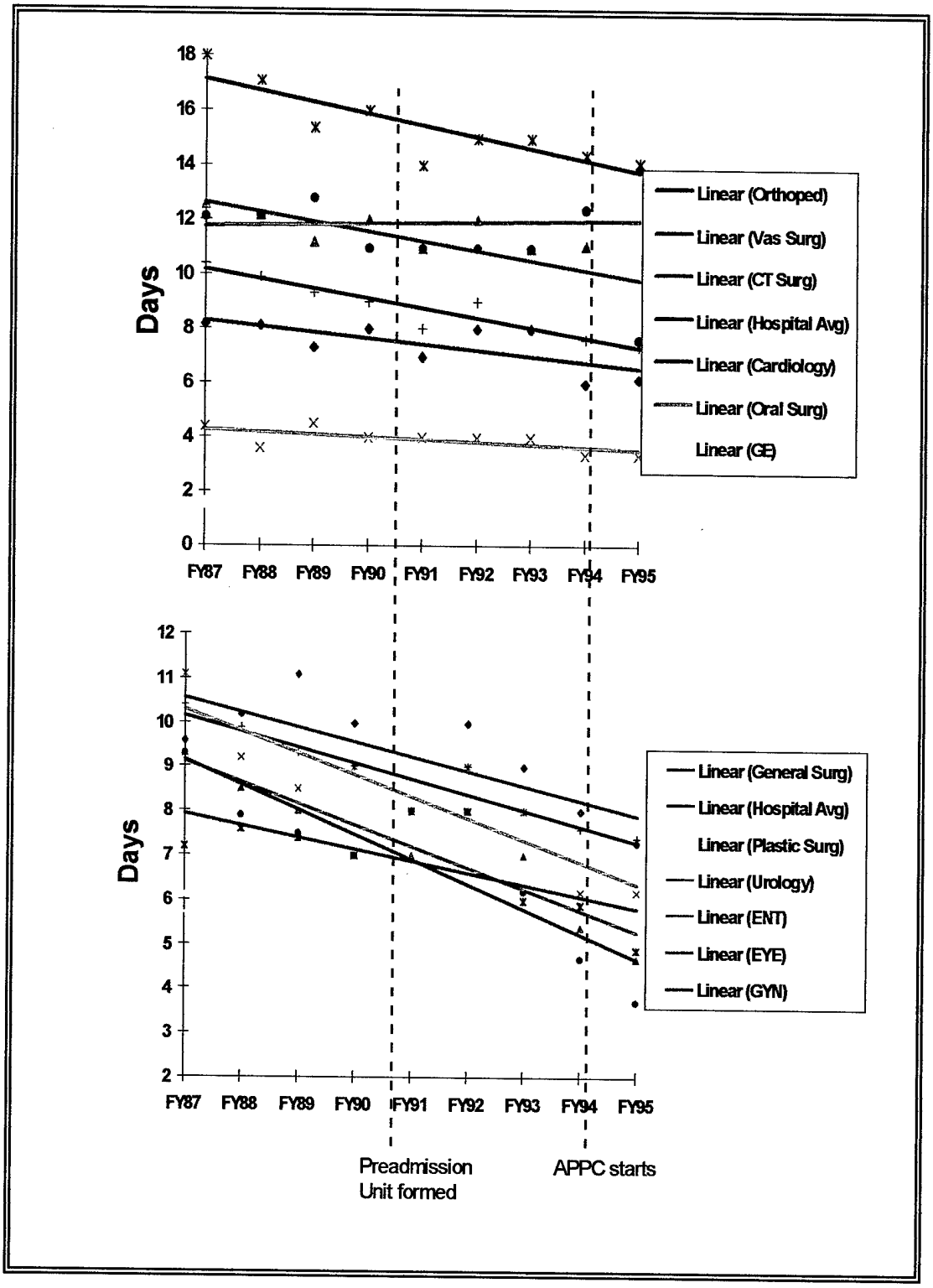
Trends in the average length of stay (ALOS) for patients admitted by the top twelve clinical services are entirely predictable based on the shift from a singularly inpatient focus to one that strives to meet the needs of patients in an ambulatory setting. Except for Cardiothoracic Surgery, the pattern is unmistakably in the direction of shorter stays, and, presumably, lower costs (see Figure 5). From FY87 through FY95 the hospital-wide ALOS has fallen 26 percent from 10.4 days per admission to 7.7 days per admission (see Table 6). In comparison, the ALOS for the top 12 clinical services using preadmission services and the APPC has fallen 15.3 percent, from 9.12 days to 6.5 days. Prior to the formation of the preadmission unit in 1991, the hospital ALOS was showing signs of decreasing. During the period of FY87 through FY90, the ALOS fell from 10.4 days to 9.0 days, approximately a 13.4 percent change. Similiarly, the ALOS for the top 12 clinical services fell 11.3 percent during the period. Since the creation of the preadmission unit in 1991, the hospital ALOS has fallen another 14.4 percent from 9.0 days to 7.7 days at the end of FY95. At the same time, the top 12 clinical services have shown a more dramatic decrease in ALOS. Since 1991, the ALOS for those services that

frequently use the preadmission unit or APPC has fallen 19.5 percent from 8.08 days to 6.5 days. Between FY94 and FY95, the first full year of the APPC, a modest decrease of 2.5 percent occurred in the hospital-wide ALOS (7.9 days in FY94 to 7.7 days in FY95). For the top 12 clinical services, the decrease was slightly more substantial at 6.2 percent. The trends suggest that processes such as preadmission services, which seek to reduce avoidable days in the hospital, may be contributing to continuous and measurable decrements in the hospital-wide ALOS. It can not be categorically stated from this analysis that preadmission services are reaping substantial cost savings for the organization based on their plausible contribution to falling ALOS. Nevertheless, there is an indication that preadmission services and the APPC are working in support of an important marker of cost effectiveness, that is, decreasing ALOS.

Table 6. --Comparison of Falling ALOS for the Hospital versus the Top 12 Clinical Services for the Periods FY87-FY90, FY90-FY95 and FY94-FY95.

Fiscal Year	**Hospital-Wide** ALOS (days)	**Top 12 Clinical Svcs** ALOS (days)
FY87	10.4	9.12
FY90	9.0	8.08
FY94	7.9	6.93
FY95	7.7	6.50
	% Change in ALOS	% Change in ALOS
FY87 to FY95	25.9%	28.7%
FY87 to FY 90	13.4%	11.4%
FY90 to FY95	14.4%	19.5%
FY94 to FY95	2.5%	6.2%

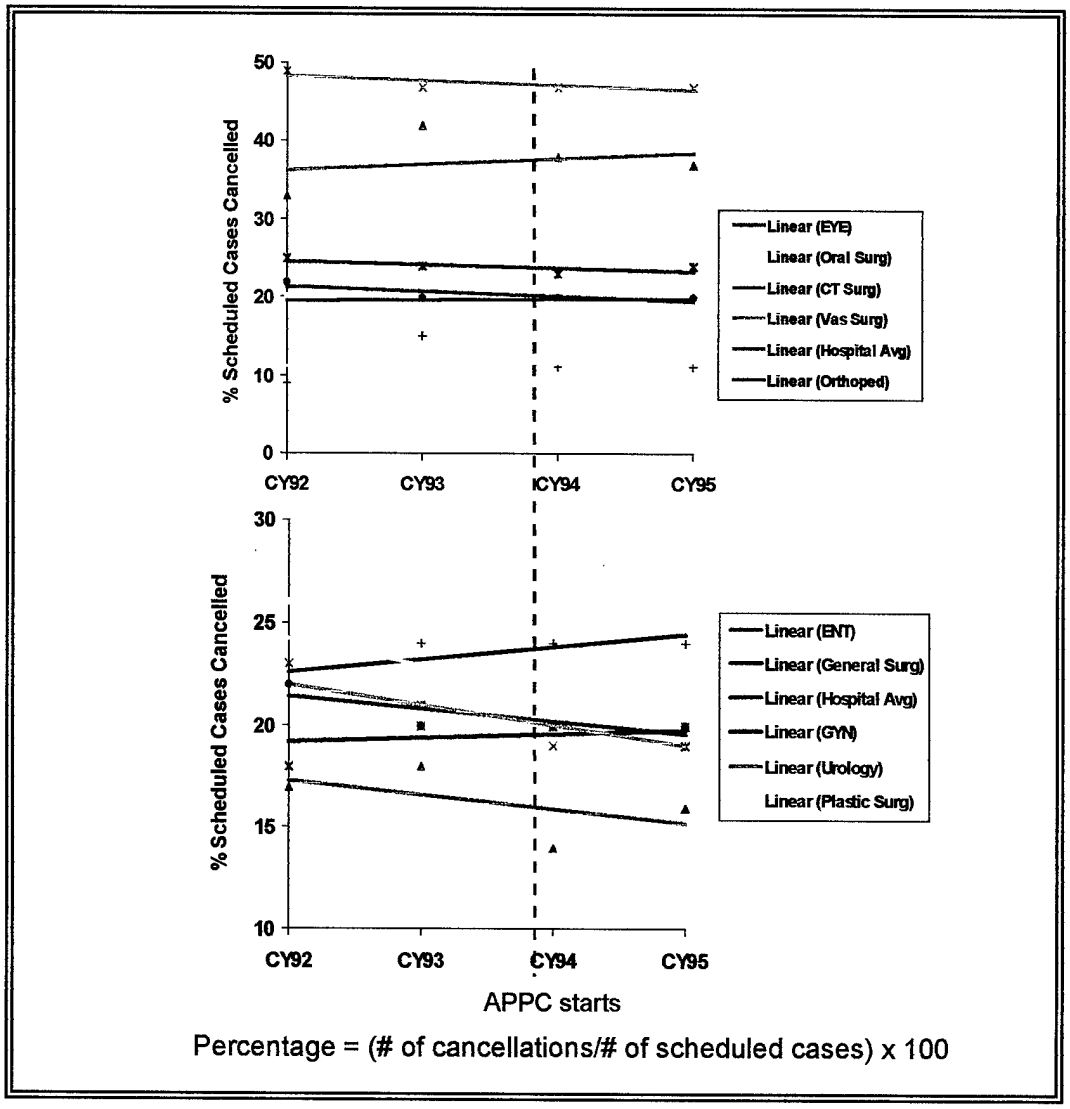
Figure 5. --Trends in ALOS from FY87 to FY95 for the Top 12 Clinical Services



Operating Room Cancellations

Data on operating room (OR) cancellations for the period under study were captured by calendar year. In addition, data exist for only ten of the top twelve clinical services. Dropped from this analysis were two services that typically do not use the OR, Gastroenterology and Cardiology. Plotted on the charts in Figure 6 are the percentage of scheduled OR cases cancelled in a given calendar year for each of the ten services. Also plotted is the hospital average. The hospital average for the percent of scheduled OR cases cancelled has remained steady at roughly 20 to 22 percent for CY92 through CY95. Several services have shown some modest improvement in decreasing the amount of OR cancellations (Plastic Surgery, Urology and ENT). One service, Cardiothoracic Surgery, has had a marked increased over the period. Others remain basically unchanged. The analysis of OR cancellation rates was complicated by the limited availability of data. Summary information did exist for CY92 through CY94, however specific causes of OR cancellations is unavailable for those years. In FY95, a new database system made it possible to track and analyze the causes of OR cancellations. Information from this database was extracted for the calendar year, 1995, and incorporated in the analysis. The recent data is strikingly similar to the old data in terms of overall percentage of scheduled cases cancelled. However, with respect to the causes of OR cancellations, and, specifically the implied benefit of preadmission services and the APPC, the findings in this performance area are inconclusive, at best.

Figure 6. -- Trends in the Percent of Scheduled OR Cases Canceled for CY92 through CY95 for 10 of the Top 12 Clinical Services

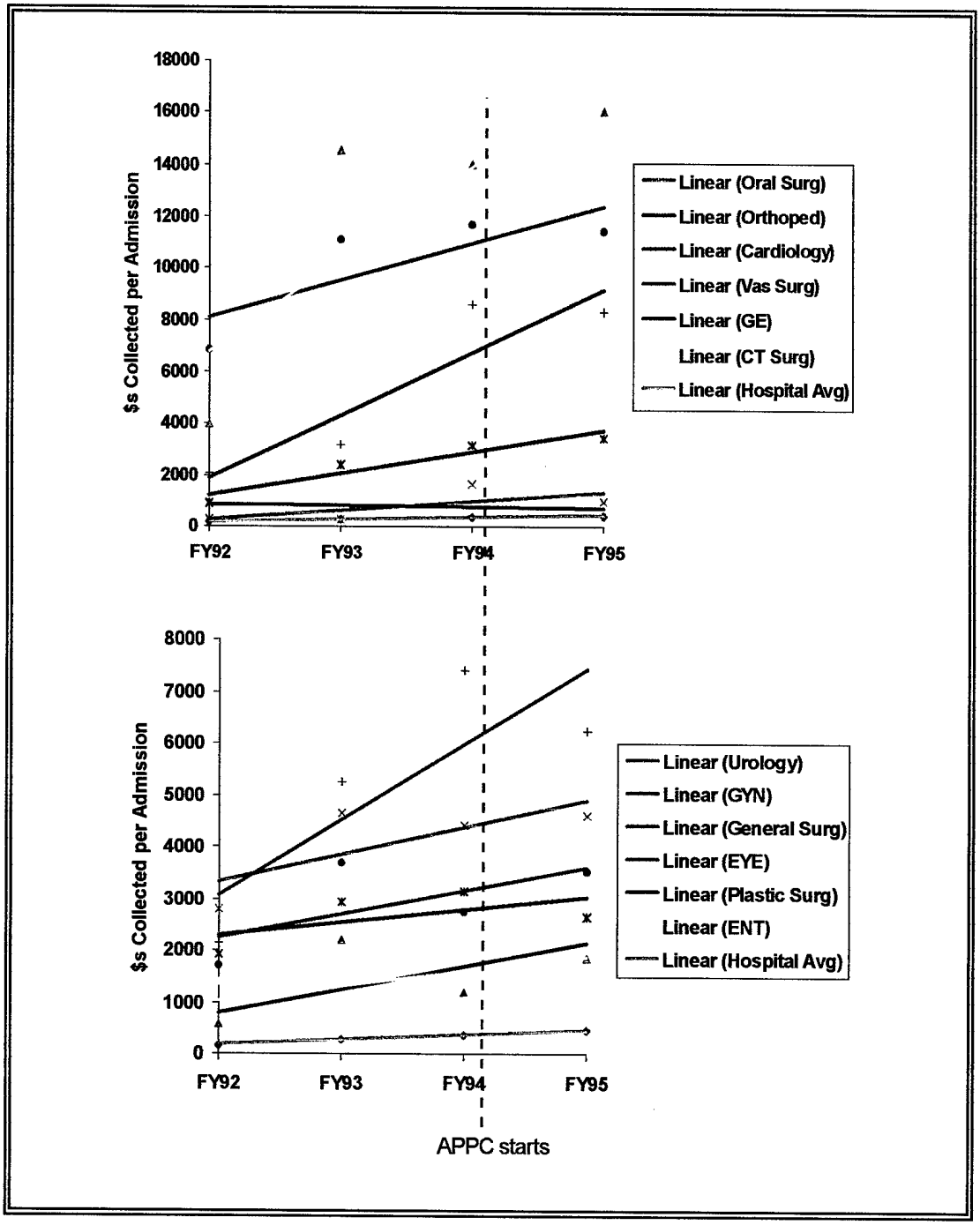


Third Party Collections

The trend in third party collections (TPC) across all services is for greater cash inflows to the organization. These results are expected given changes in Public Law that make it possible for military treatment facilities to bill private

insurance companies, and management support for the program. Improvements in the administrative processing of claims has produced dramatic increases in collections despite a steady decrease in inpatient workload. Figure 7 plots the rise in TPC per admission for each of the top twelve clinical services from FY92 to FY95 and also shows the trend in the hospital-wide average. A table listing total collections, total admissions and collections per admission for top twelve services and the hospital is in Appendix F. While hospital average of insurance dollars collected per admission has slightly increased over the four year period, several of the clinical services have shown continuous and measurable improvement. Most noteworthy are the resource intensive surgical specialties (Cardiothoracic, Vascular, General Surgery and Urology), and, the Cardiology Service. The exact contribution of preadmission services and the APPC to improved TPC cannot be defined from this analysis. Certainly such initiatives as placing a TPC administrative clerk in the APPC has facilitated the claims process and directly supports the continuous effort to increase collections. The trends suggest that preadmission services might be helping to enhance collections, although it can not be unequivocally stated to what extent that support is generating measurable revenues for the organization. Nevertheless, indications are that preadmission services and the APPC are functioning harmoniously with the organization's performance goal to increase TPC.

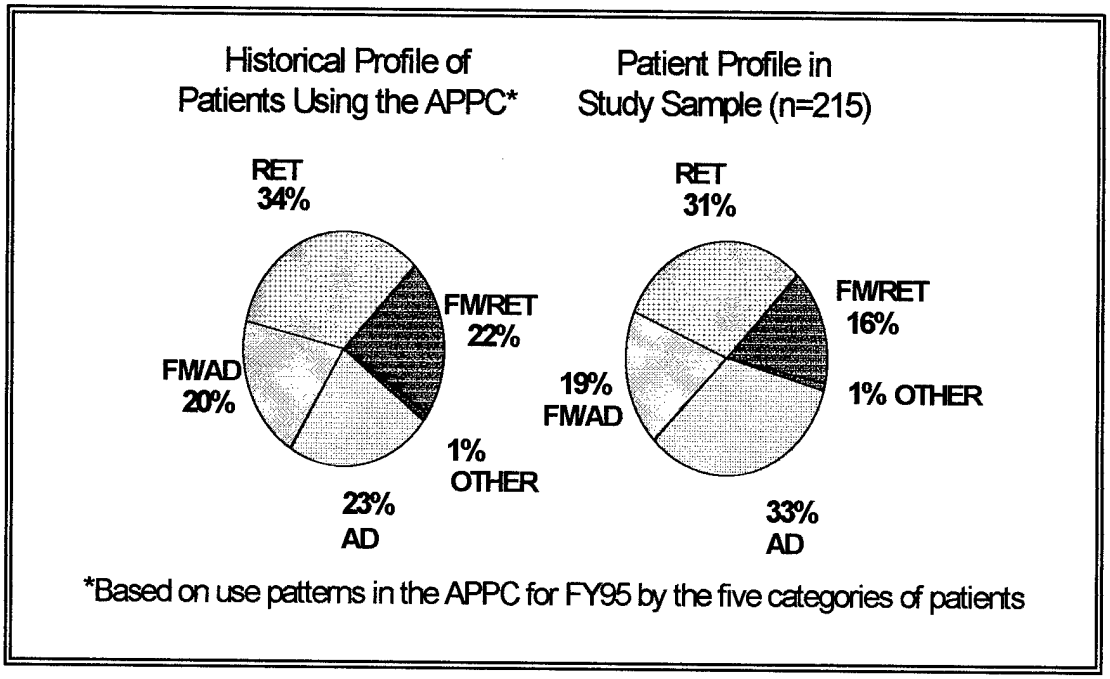
Figure 7. --Trends in TPC per Admission from FY92 to FY95 for the Top 12 Clinical Services



Survey Results

The survey sample (n=215) adequately reflects the population based on historical use in the APPC during FY95 (see Figure 8). Despite the low response rate of 30 percent, the low rate of missing data, averaging 5 percent, coupled with the representativeness of the sample contributes to the reliability and usefulness of the measurement tool.

Figure 8. -- Sample Representativeness



Descriptive statistics for the scales used in the satisfaction survey are shown in Table 7 and Appendix D. A measure of scale reliability is also listed in the table. All domains of the survey exceed the minimum alpha level of .60 for reliability. The lowest amount of internal consistency was found in the domain measuring

satisfaction with the Nonnursing Staff. Overall, these results suggest that summarizing responses to several questions and computing mean scores for each domain is possible. An alpha level was not computed for the single-item measure of overall satisfaction.

Table 7. -- Descriptive Statistics and Reliability Estimates for Domains (n=215)

Domain	Number of items	Scale mean	Standard deviation	Reliability (alpha)
Clinic Visit	2	4.51	.78	.746
Physical Environment	4	4.75	.43	.795
Nonnursing Staff	3	4.86	.31	.663
Nursing Staff	4	4.86	.38	.946
Overall Satisfaction	1	4.86	.34	N/A

The results show generally high ratings of satisfaction with the APPC. The lowest ratings were recorded by the clinic visit, which marks patient encounters before arriving at the APPC. Nevertheless, the mean scores in all areas easily exceed the operationally defined baseline of 4.0 for meeting the qualitative performance goal of customer satisfaction.

The correlations of the four major domains and overall satisfaction were computed (see Table 8). Correlations were highest for the domains of the Nursing

and Nonnursing Staff and Overall Satisfaction. The data were further analyzed using a multiple regression model to test the hypothesis that overall satisfaction varied with the four domains. Results of the regression analysis indicate that 52.9 percent of the variability in overall patient satisfaction can be predicted by the domains (see Table 9). Furthermore the standardized regression coefficients show the relative importance of each domain as a predictor. Examination reveals that patient satisfaction with the nursing and the nonnursing staffs were the most important determinants of overall satisfaction, followed by the clinic visit. Patient satisfaction with the physical environment was not a significant predictor of overall satisfaction at the alpha level of .05. With this exception, the hypothesis that patient satisfaction varies as a function of physician, nursing and nonnursing encounters with the patient is confirmed.

Table 8. -- Correlation Matrix Showing Domains and Overall Satisfaction

	1	2	3	4	5
1. Overall Satisfaction	1.0000				
2. Clinic Visit	.3639	1.0000			
3. Physical Environment	.3659	.4259	1.0000		
4. Nonnursing Staff	.6440	.3267	.3730	1.0000	
5. Nursing Staff	.6527	.2340	.3790	.6672	1.0000

Table 9. -- Multiple Regression of Overall Satisfaction on the Four Domains (n=215)

Independent Variables	B	SE of B	Beta	t
Clinic Visit	.067638	.023515	.153778	2.876*
Physical Environment	.025891	.044179	.032489	.586
Nonnursing Staff	.353714	.073383	.321494	4.893**
Nursing Staff	.348917	.272495	.389855	6.018**
	R = .727	R^2 = .529		

*ρ<.01 **ρ<.001

The correlations for patient demographics, referring clinical service and overall satisfaction were computed in a second matrix and are listed in Appendix G. Here, correlations were quite low. The multiple regression model demonstrated the low predictive efficiency of patient demographics and the identity of the referring clinical service on the dependent variable (overall satisfaction) at an alpha level of .05 (see Appendix H). Patients across the board report high satisfaction with the APPC, regardless of their age, status, gender, or the service they are visiting. The null hypothesis, which assumes that these parameters make no difference in overall satisfaction, is applicable with these results.

Miscellaneous data collected during the survey process, but not factored in the hypothesis testing are listed in Table 10. The patient poll says a high percentage of patients (61.9%) would use the APPC if it were open on Saturdays. Conversely, the percentage of patients confirming they have third party insurance is low at 19 percent when compared with the TPC benchmark of 23-25 percent. Patient comments were

categorized along specific attributes and the number of persons expressing concerns in those areas was tabulated (see Table 11). Positive comments outweigh negative ones. Commendations to the staff of the APPC were numerous. On the negative side, several patients expressed displeasure over the length of time spent in the APPC and the efficiency of the operation. Two patients objected to being told that they must return another day because they arrived in the APPC at the close of the normal business day.

Table 10. -- Results of Miscellaneous Patient Poll (n=215)

Survey Question	Yes	No	No Response
Would you use the APPC on Saturdays?	133 (61.9%)	59 (27.4)	23 (10.7%)
Do you have Medical Insurance?	41 (19.0%)	154 (71.7%)	20 (9.3%)

Table 11. -- Patient Comments

# of Negative Comments	Attributes	# of Positive Comments
0	Friendliness/Courtesy of APPC Staff	23
10	Waiting Time/Efficiency in APPC	6
2	Physical Environment in APPC	0
2	Service in the Referring Clinic	2
0	Physician/Anesthesiologist Services	2
2	Institutional Concerns (e.g., Parking)	0
0	WRAMC Overall	2

DISCUSSION

Measuring and assessing performance in the APPC offers information that validates past management decisions and is useful in shaping improvements in a key organizational process. Transformation of historical data and survey results into meaningful information is at the heart of this research. By the criteria used in operationally defining the performance assessment of the APPC, there is evidence to suggest that the service has met several objectives outlined in the Business Plan in its first full year of operation. Figure 9 shows the results of the study in report card format. In two areas, Utilization and OR Cancellations, preadmission services are not meeting projections or demonstrating benefits. For OR cancellations, the historical data simply does not exist to relate events in the APPC to activities in the operating room. In the absence of quantifiable data, this dimension of performance cannot be assessed. With the introduction of new database systems in 1995, the OR has begun to track scheduling and cancellations in detail. Preliminary data from 1995 suggests that more than 26 percent of all operating room cancellations were due to inadequate medical evaluations (Dahlander 1996). While they are not presently being measured, costs are associated with this lost of operating room time.[4] Better utilization of preadmission services will reduce the probability that a patient arrives for surgery with inadequate medical workup. This is a fundamental

objective of preadmission services. To test this hypothesis, data collection needs to reflect, not only the causes of OR cancellations, but also whether the patient was processed through the APPC, and the identity of the referring clinical service. From these data, a performance measure can be developed that quantifies the contribution made by the APPC in reducing OR cancellations. Attaching specific cost figures to the number of cancellations enhances the usefulness of the measurement.

Figure 9. -- Performance Report Card for the APPC in FY95

Category	Numerical Score*	Performance Assessment
Customer Satisfaction		
• Clinic Visit	4.51	★
• Physical Environment	4.75	★
• Nonnursing Staff	4.86	★
• Nursing Staff	4.86	★
• Overall Satisfaction	4.86	★
Cost Effectiveness		
• Trends in Utilization	Flat	—
• Trends in ALOS	Decrease	★
• Trends in OR cancellations	n/a	?
• Trends in TPC	Increase	★

★ = met performance goals

? = inconclusive based on data

— = performance goals were not met

*Numerical scores are based on a scale from 1-5 where 1 is the lowest and 5 the highest

Underutilization of preadmission services reflects an organization-wide deficiency and only partially indicates a performance weakness in the APPC. Despite the commitment of management to institutionalize preadmission processing with the creation of the APPC in late 1994, utilization patterns have not significantly changed. In a recent survey of the preoperative assessment process by Nursing Anesthesia, only 30 percent of the presurgical evaluations were done in the APPC (Dahlander 1996). Even though anesthesiology has concentrated resources in the preadmissions area, fully 70 percent of anesthesia interviews are still conducted in the traditional and less systematic fashion, usually the day of surgery or late the night before the procedure. This process, while not entirely avoidable, is wasteful and inefficient, and is a cause of frustration for staff members (Quality Idea Form 1996). There is a high probability that last minute evaluations will detect legitimate medical disqualifiers and result in surgical cancellations, again, at some cost to the facility. Reducing these occurrences and simplifying the preoperative process for staff and patients is possible through better utilization of the APPC.

In the Business Plan, the APPC projected the capacity to handle 22,800 admissions annually given the required resources. This approximates 100 percent of the annual admissions at WRAMC in FY95. During its first full year of operations, the APPC processed only 24 percent of all hospital admission, equaling the historical average. Multiple causes exist for the shortfall: the service has never been fully funded; the original estimates may have been ambitious, particularly in an

academic medical center; the data collection systems may not accurately reflect the workload in the APPC; and the mission in the APPC has been modified over time to exclude certain types of admissions. Often mentioned as causes for underutilization are the vagaries of a military patient population[5] and the lack of physician support for the service. Parallel organizations, such as the National Naval Medical Center (NNMC), report similar reasons for lower then expected use of preadmission services (Banks-Tarr 1996). Unfortunately, a clear-cut national standard for using preadmission services in teaching hospitals does not exist. Existing benchmarks suggest that, as a goal, 100 percent of elective, ambulatory surgical procedures should be systematically prescreened (Banks-Tarr 1996). Civilian counterparts have very strong financial motives for channeling all nonurgent admissions through preadmission services. Not only does the service reduce excessive and redundant testing, but it clearly shortens the length of stay and improves customer satisfaction, a predictor of returning business in a hospital. The strongest financial motivator for maximizing the use of preadmission services stems from the dictums of the payers of healthcare. Revenue collections, and, therefore economic viability, is intimately associated with managing utilization, in this case, prescreening of nonurgent admissions, particularly same-day surgical procedures. The closest that WRAMC comes to this financial imperative is in the areas of third party collections and, recently, automatic budget decrements that assume utilization is being managed.

Attempts to improve utilization within the APPC should begin with an

introspective examination of the preadmission process and an organization-wide investigation. How to provide better service to all patients and potential users of the APPC should be the focus of a specially chartered Process Action Team (PAT) or Work Group. In polling patients about their preferences for Saturday hours in the APPC, almost two thirds (61.9%) affirmed they would use the facility. In the comments section of patient satisfaction survey, two patients were very specific that their needs could not be met because of the closing policy in the clinic. Also on the survey, a question addressing satisfaction with the hours of operation in the APPC received the third lowest rating (see item EN4_1, Appendix D). Expanding the hours of service, and adequately funding and internally marketing that expansion, may be a first step in improving utilization patterns. Hospitals comparable in size and mission to WRAMC report having the largest staffs and longest hours of operation in their preadmission units (The Advisory Board Company 1994). Efficiencies in these larger facilities are gained by cross training personnel, maintaining staffing flexibility in order to respond to periods of fluctuating volume, and using an appointment system whenever possible. The most significant gains in APPC utilization will come only through a shift in the practice patterns of physicians. Understanding the concerns of these key users is paramount to effecting any change in the organization. Conducting a user survey to identify the problems perceived by physicians in using preadmission services would be appropriate. The results, combined with the findings in this research and further internal process

review, should be used to find a system-wide solution to the problem of underutilization. The absence of a national standard or model should not deter management from experimenting with ways to improve utilization and efficiency in the APPC. Internal benchmarks, or criteria, should be established, while surveying the external environment for best practices in comparable facilities. Established criteria for utilization make it possible for run charts or control charts to be used in future performance assessments. Furthermore, it provides the mechanism for obtaining short term feedback at attempts to improve or redesign processes. When searching for ways to improve utilization, thinking beyond the traditional roles and functions of the APPC is best. Since 1991, preadmission services have expanded from simply performing laboratory and radiological testing to a fully staffed center capable of clinically and administratively prescreening admissions and providing post-treatment recovery. The APPC provides not only a valuable clinical and cost saving service that is satisfying to patients, but also an important management function in the patient's continuum of care. There is an evolving need for the APPC to be become a focal point for utilization management within the hospital walls (see Appendix I). Aggressive coordination of the patient's care is the hallmark of a fully developed utilization management program to include the time prior to admission and following discharge. A prerequisite of this strong care coordination is dynamic preadmission planning. As military medicine moves into the world of managed care, the importance of strong care coordination, and, therefore preadmission

planning, in managing utilization, will become more apparent.

The performance assessment graded the APPC as meeting goals for two indicators of cost effectiveness, ALOS and TPC. Because of the limitations of the data, the exact role played by the APPC in reducing ALOS or enhancing TPC cannot be detected. The trends, nevertheless, do generally support the cost effectiveness claims of preadmission services. Future performance assessments should tie the goals of increasing utilization and reducing ALOS together. It might be possible to approximate what level of utilization, as measured by the percentage of admissions processed through the APPC, results in a statistically measurable difference in the risk-adjusted ALOS by clinical service. Attaching a dollar figure to the total number of days avoided in the hospital because of more efficient prescreening would be an effective demonstration of the measurement's usefulness. One difficulty, however, is in determining a legitimate value for the incremental cost of a bed day at WRAMC. Using full cost to estimate possible savings, as in the APPC's own Business Plan, is inaccurate and overstates the benefits. Only relevant costs, those directly related to the decision to use preadmission services as opposed to some alternative, and composed of variable and avoidable costs, are valid.

In the realm of TPC, the data trends are also inferential, but support the claim that preadmission services offer a mechanism for improving collections. Full discussion of the process of TPC is beyond the scope of this research. Several points do warrant consideration. First, during the patient satisfaction survey, 19 percent of

the respondents stated they had insurance. This figure is low compared with the hospital benchmark that assumes that 23-25% of the beneficiaries have insurance. Part of this discrepancy can be explained by the inflated level of Active Duty persons in the survey sample. Second, the reimbursement rules of the indemnity insurance companies are becoming increasingly stricter with respect to precertification and admission procedures. Data on claims denial and precertification monetary penalties should be collected and analyzed against the utilization of preadmission services. A performance measure can then be created that tracks the money lost for patients with insurance processed through the APPC versus patients with insurance admitted elsewhere in the hospital. Proving that a cost is associated with not properly prescreening patients with insurance before admission improves the usefulness of the measurement. Finally, the rise of managed care and, specifically, the formation of the military Health Maintenance Organization, TRICARE, poses uncertainty for the future of TPC. Early experience suggests that beneficiaries will drop their insurance coverage when they enroll TRICARE, causing a corresponding decrease in collections. The long term impact is vague at this point. TPC management needs to insure that every effort is made to identify patients with insurance, and that proper procedures, including prescreening, are followed to maximize collections and reduce avoidable denials and penalties. The industry literature states that the functions of the billing office and the preadmission unit do not need to be combined or even collocated within the

hospital. However, their activities need to be well coordinated.

The patient satisfaction survey offers the most statistically valid data that the APPC is meeting a major performance objective, that is, customer satisfaction. The overwhelmingly positive response raises a suspicion that an element of response bias exists in the survey. A low response rate for an on-site survey of 30 percent suggests distribution and collection deficiencies in the survey process, and compounds the bias. Lastly, all on-site investigations suffer in part from the so-called, Hawthorne Effect, where respondents overstate opinions in an honest attempt to meet the expectations of the researchers. Despite these shortcomings, the high ratings achieved in this study are compatible with the results in the literature. It is not surprising to find patients' satisfaction closely correlating with their perception of the care they have received from the nurses, the administrative staff, and the physicians. Statistically, the survey has revealed very little controversial findings, possibly with the exception that patient demographics are not a suitable predictor of satisfaction among users of the APPC. Only age was slightly related to overall satisfaction, with satisfaction increasing with age (see Appendix G). While recognizing there may be limitations in the survey design, it can be stated with a fair degree of confidence that the APPC is providing a highly satisfying service to all patients in the population. This high level of patient satisfaction is testimony to the outstanding quality of care rendered in the APPC and should not be underestimated in its potential to instill brand loyalty and predict returning business for the hospital.

Information of some usefulness to management can be garnered from further analysis of the statistical findings. The patient's visit to the clinic before arriving in the APPC was suspected to be a source of dissatisfaction by the administrators. However, while the clinic visit received the lowest rating in patient satisfaction of the four major domains, it in fact correlated positively with overall satisfaction and marginally contributed to the measured variability. The presumption that patients arrive in the APPC already biased against the service cannot be substantiated in this survey. The data, quite literally, shows the opposite. Similarly, meaningful correlation between a patient's high level of satisfaction and the identity of the referring clinic does not exist. This information can be used by management to internally market preadmission services to the physicians. Legitimate concerns of individual staff members about the benefits of preadmission services for their patients can at least be partially assuaged by the results of the survey. Patients are almost universally happy with the service in the APPC whatever the source of the referral.

The limitations of this research need to be recognized. Mentioned earlier, the use of an on-site survey, while seemingly innocuous and cost efficient, can be highly biased. A lower than expected response rate compounds this limitation. On the other hand, the representativeness of the sample, along with the validity and reliability of the instrument and the findings help to legitimize the results. The use of administrative data to draw conclusions on the performance of the APPC is valid

only within the operational definitions of this study. Ideally the business plan should contain very definitive and quantifiable objectives as a condition for acceptance. Retrospectively establishing performance goals has many shortcomings including issues of validity and limited data availability. Without specific predetermined measures of performance, using run charts and examining trends in the administrative data offers the best source of information for determining whether stated benefits are being achieved. These patterns only infer the possibility of a connection between preadmission services and the operationally defined markers performance. It remains in the judgement of management which areas warrant further research and evaluation.

CONCLUSIONS AND RECOMMENDATIONS

In its first full year of operation, the APPC has met several key performance objectives listed in the Business Plan. Undoubtably, the clinic's greatest achievement in the past year has been to provide a service that most patients find very satisfying. This is a bonafide indicator that the quality of care is high. Less clear are the accomplishments of preadmission services in achieving measurable cost effectiveness. Trend analysis of administrative data suggests that for at least two indicators, ALOS and TPC, the APPC is on target with respect to its cost effectiveness goals. For OR cancellations, data trends are inconclusive. Reducing OR cancellations due to inadequate medical workup is a critical objective of preadmission services. To properly assess this dimension of performance, more intensive measurement is needed to capture the causes of OR cancellations, and relate them to APPC utilization. Utilization in the APPC is far short of projections and the overall trend for admissions processed through preadmission services is flat. The reasons are largely systemic, although internal analysis of the APPC is will likely uncover some process deficiencies. The greatest effect on utilization patterns in the APPC will come from changes in the practice patterns of the physicians. Understanding the concerns and expectations of this group of key users will be an

important first step to improving utilization. Recommendations for improving the overall performance of the APPC and the measurement process for subsequent assessments are listed in Figure 10.

Figure 10. -- Recommendations

1. **Conduct a survey of users** focusing on utilization of the APPC in order to determine systemic issues discouraging the use of preadmission services.

2. **Charter a Process Action Team (PAT) or Work Group** to review internal procedures and processes in the APPC focusing on activities that might improve service to the users and increase utilization.

3. **Identify OR cases canceled due to inadequate work-up** and correlate to the use of preadmission services. Set an institution-specific goal aimed at minimizing these events and report costs associated with failure to properly prescreen surgical cases.

4. **Track utilization rates in the APPC by clinical service** and, if applicable, attempt to measure changes in the risk-adjusted ALOS for the service. Report these changes as incremental cost savings for the institution.

5. **Assign a cost to every case by clinical service** in which a third party claim has been denied or a precertification penalty has been assessed for failure to properly prescreen prior to admission. Set an institution-specific goal to eliminate these costs and track the progress toward that goal.

6. **Repeat the patient satisfaction survey** after the second full year of operation and compare performance to this year's survey. Consider administering by mail and increasing sample size to reduce the influence of response bias.

7. **View the future role of the APPC** in the context of the changing environment in healthcare and the shift in military medicine to managed care. Dynamic preadmission planning needs to be incorporated in a fully developed utilization management program.

8. **As a general rule, require all Business Plans** reviewed by senior management to have definitive and measurable objectives, as well as, a prescribed timeline for assessing performance based on those objectives.

Creation of the APPC at WRAMC represented a commitment to the preadmission process and the expanding role of ambulatory medicine. The decisions of management were based in part on a sound Business Plan that promised many benefits. The qualitative nature of those goals posed a challenge in attempting to quantify, measure and assess the performance of the APPC. Establishing meaningful performance measures has been as much a part of this research as the overall assessment. While recognizing that there are limitations in using administrative data, as a measurement tool and a source of information for senior managers, the analysis is sound. Indications are that the APPC is providing positive returns on the investment made by management. The high ratings of patients attest to the quality of the service and should be used as benchmarks for future surveys and performance assessments. Of paramount concern is the level of utilization. The role of preadmission services at WRAMC has remained stagnant, precisely at a time when it should be expanding to meet the changing managed care world. Future investigations should be targeted at pinpointing the causes of underutilization, designing workable solutions and, finally, creating performance measures that simplify future assessments and validate process improvement strategies.

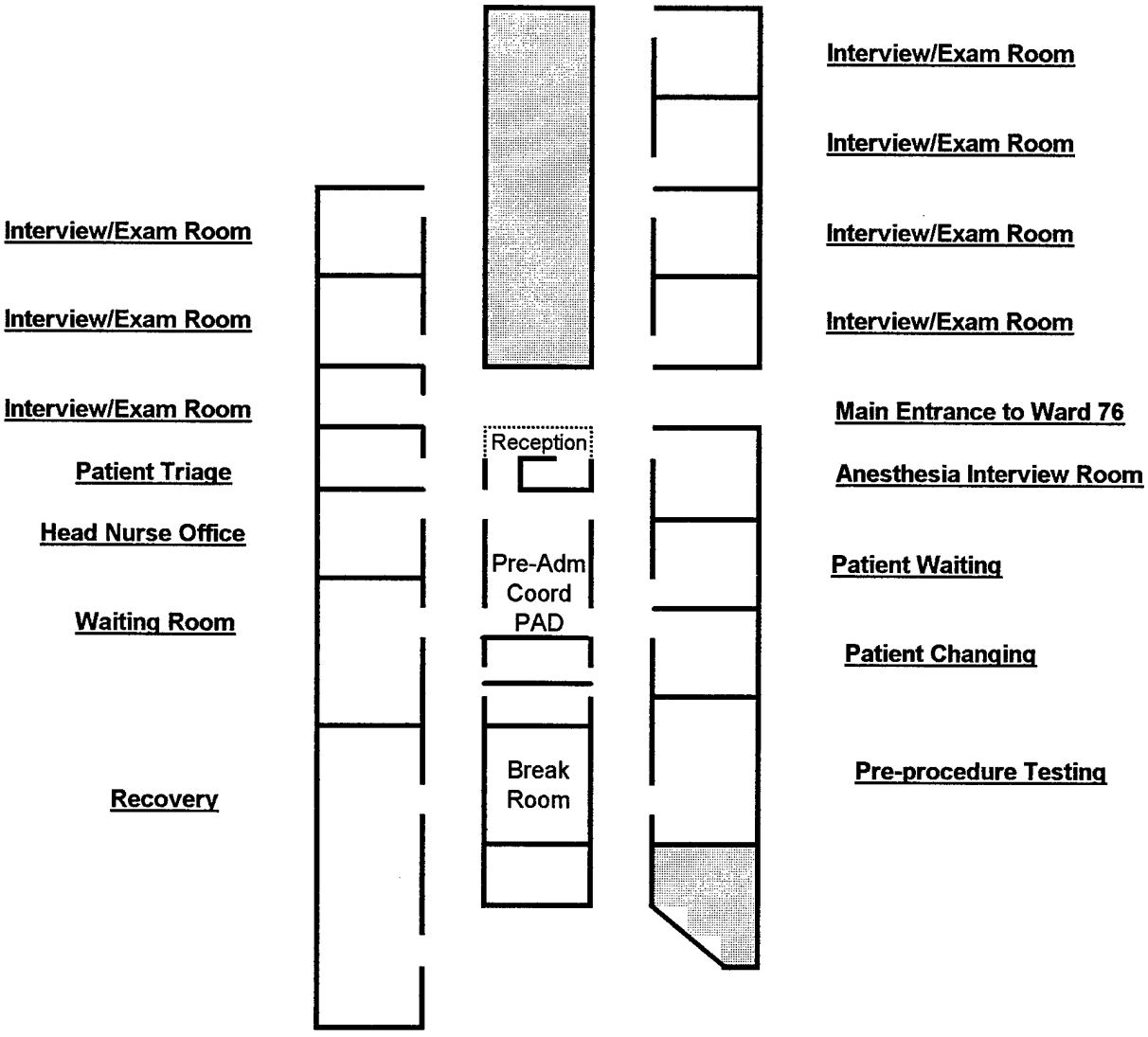
APPENDIX A

LIST OF ABBREVIATIONS

ALOS	Average Length of Stay
AN	Army Nurse Corps
APPC	Ambulatory Processing & Procedure Center
CT	Cardiothoracic
CY	Calendar Year (1 Jan - 31 Dec)
ENT	Otorhinolaryngology
EYE	Ophthalmology
FM/AD	Family Member of Active Duty
FM/RET	Family Member of Retiree
FTEs	Full Time Equivalents
FY	Fiscal Year (1 Oct - 30 Sept)
GE	Gastroenterology
GYN	Gynecology
LPN	Licensed Practical Nurse
OR	Operating Room
RN	Registered Nurse
TPC	Third Party Collections
WRAMC	Walter Reed Army Medical Center

APPENDIX B

FLOOR PLAN OF THE APPC



APPENDIX C

SURVEY INSTRUMENT

Ambulatory Processing & Procedures Center

Won't you please share your opinions?

We would like to know how satisfied you were with our performance in the APPC. Your ratings and comments will provide us with valuable feedback that will be used to make changes to improve care for our patients. Although we ask for some background information, the survey is anonymous and confidential. We thank you for your cooperation.

Please rate the following items on the scale provided. Circle the number that corresponds to your answers (for example, Very dissatisfied = 1, Somewhat dissatisfied = 2, No Opinion/Neutral = 3, Somewhat satisfied = 4, and Very satisfied = 5).

Your Clinic Visit	Very satisfied	Somewhat satisfied	No Opinion/ Neutral	Somewhat dissatisfied	Very dissatisfied
1. **Before** you arrived at the APPC, how satisfied were you with the amount of time you had to spend in the clinic?	5	4	3	2	1
2. How satisfied were you with the information your doctor gave you about the APPC?	5	4	3	2	1
Physical Environment in the APPC					
3. How satisfied were you with the appearance of the reception desk?	5	4	3	2	1
4. How satisfied were you with the appearance of the interview rooms?	5	4	3	2	1
5. How satisfied were you with the waiting area?	5	4	3	2	1
6. Are you satisfied with the hours of operation (0530 to 1800) in the APPC?	5	4	3	2	1
Non-Nursing Staff in the APPC					
7. Were you satisfied with the courtesy and helpfulness of the reception desk personnel?	5	4	3	2	1
8. Were you satisfied with the courtesy and helpfulness of the admissions clerk?	5	4	3	2	1
9. Were you satisfied with the courtesy and helpfulness of the Anesthesiologist or Nurse Anesthetist?	5	4	3	2	1
Nursing Staff in the APPC					
10. Were you satisfied with the courtesy and helpfulness of the Nurses?	5	4	3	2	1
11. Were you satisfied with the instructions you received?	5	4	3	2	1
12. Were you satisfied with the nurses' efforts to answer your questions and keep you informed?	5	4	3	2	1
13. Were you satisfied with the amount of time you spent with the nurse?	5	4	3	2	1

Overall Rating of the APPC	Very satisfied	Somewhat satisfied	No Opinion/ Neutral	Somewhat dissatisfied	Very dissatisfied
14. Overall, how satisfied were you with your visit to the APPC?	5	4	3	2	1

The following questions are for statistical purposes only. They help us to understand how different groups of people feel about our services. All questions are optional. **Please circle the appropriate response.**

1. What is your age?

- Under 18
- 18 to 24
- 25 to 34
- 35 to 44
- 45 to 54
- 55 to 65
- 65 to 74
- 75 or older

2. What is your status?

- Active Duty
- Family Member of Active Duty
- Retiree
- Family Member of Retiree
- Other

3. What is your gender?

- Male
- Female

4. Are you being admitted to the hospital **today**?

- No
- Yes

5. If the APPC were open on Saturdays would you use the clinic?

- No
- Yes

6. Do you have Medical insurance?

- No
- Yes

7. What Clinical Service is providing your care?

- Gastroenterology
- General Surgery
- Cardiothoracic Surgery
- Vascular Surgery
- Neurosurgery
- Oral Surgery
- Ophthalmology (Eye)
- Otorhinolaryngology (Ear, Nose, Throat)
- Plastic Surgery
- Urology
- Gynecology
- Orthopedics
- Podiatry
- Other _____
- Not Sure

The final section is for your comments. Please let us know what positive and negative experiences you had while in the APPC. Tell us your thoughts so that we might better serve you.

Comments:

APPENDIX D

DESCRIPTIVE STATISTICS

Variable	Mean	Std Dev	Minimum	Maximum	Valid N
CL1_1	4.49	.93	1.0	5.0	215
CL2_1	4.53	.81	1.0	5.0	215
EN1_1	4.81	.49	3.0	5.0	215
EN2_1	4.75	.52	3.0	5.0	215
EN3_1	4.73	.52	3.0	5.0	215
EN4_1	4.69	.65	2.0	5.0	215
NN1_1	4.92	.31	3.0	5.0	215
NN2_1	4.89	.38	2.0	5.0	215
NN3_1	4.79	.50	3.0	5.0	215
NU1_1	4.87	.38	3.0	5.0	215
NU2_1	4.85	.42	3.0	5.0	215
NU3_1	4.87	.39	3.0	5.0	215
NU4_1	4.84	.46	3.0	5.0	215
OVER_1	4.86	.34	3.0	5.0	215

CL1_1 and CL2_1 are variables focused on the Clinic Visit
EN1_1 thru EN4_1 are variables focused on the Physical Environment
NN1_1 thru NN3_1 are variables focused on the NonNursing Staff
NU1_1 thru NU4_1 are variables focused on the Nursing Staff
OVER_1 is a single-item domain measuring overall patient satisfaction

APPENDIX E

HISTORICAL USE OF PREADMISSION SERVICES AS MEASURED BY THE NUMBER OF VISITS FOR ALL CLINICAL SERVICES

CLINICAL SERVICE	FY95	FY94	FY93	FY92
Gastroenterology	3774	3224	3632	4354
Otorhinolaryngology	1367	1053	950	852
General Surgery	1345	1422	1292	1454
Urology	1106	970	910	747
Gynecology	695	770	891	937
Ophthalmology	681	775	678	608
Plastic Surgery	661	948	1087	969
Orthopedics	490	259	71	113
Cardiology	416	318	331	215
Periph Vascular Surgery	297	245	227	252
Oral Surgery	270	261	252	242
Cardiothoracic Surgery	166	108	33	39
Pediatric Sedation	166	276	123	99
Podiatry	134	184	202	128
Organ Transplant	129	110	34	14
Obstetrics	108	828	298	300
Hematology/Oncology	102	103	223	353
Neurology	96	115	167	256
Hand Surgery	70	142	90	46
Neurosurgery	68	166	94	139
Endocrinology	42	54	78	103
Internal Medicine	23	13	163	354
Nephrology	14	21	37	52
Pediatrics	0	2	172	160
Newborn Nursery	0	0	184	258
Allergy/Immunology	0	0	605	451
Dermatology	0	0	159	135
All Others	29	38	37	65

APPENDIX F

TABLE OF THIRD PARTY COLLECTIONS, ADMISSIONS & COLLECTIONS PER ADMISSION FOR THE TOP 12 CLINICAL SERVICES

	TPC ($s in 000s)				Admissions				$s (000s) Collected/Adm			
Clinical Service	FY92	FY93	FY94	FY95	FY92	FY93	FY94	FY95	FY92	FY93	FY94	FY95
Cardiology	281.0	440.0	796.1	1024	1358	1380	923	1227	207.0	318.8	862.5	834.5
Cardiothoracic	170.1	523.5	418.5	581.7	425	359	298	362	400.2	1458	1404	1607
Gastroenterology	257.0	171.4	155.1	217.0	2641	2459	2392	2484	97.3	69.7	64.8	87.3
General Surgery	324.1	747.1	987.6	831.6	1512	1426	1332	1336	214.4	523.9	741.4	622.4
Gynecology	237.3	411.8	382.9	316.6	1237	1395	1212	1188	192.0	295.1	316.0	266.5
Ophthamology	131.0	255.5	189.1	215.7	758	693	689	610	173.0	368.7	274.4	353.6
Oral Surgery	4.80	3.40	25.1	15.9	168	162	147	159	28.6	23.1	170.7	100.0
Orthopedics	137.4	354.7	467.0	488.0	1481	1415	1464	1400	92.8	250.7	319.0	348.6
Otorhinolaryngology	72.5	283.7	151.0	232.0	1250	1285	1270	1249	58.0	220.8	119.0	185.7
Peripheral Vascular	180.1	330.8	464.3	420.3	262	297	397	367	687.4	1114	1169	1145
Plastic Surgery	98.0	29.5	97.5	121.0	707	660	631	485	138.6	44.7	154.5	249.5
Urology	404.5	608.5	657.8	592.2	1444	1496	1485	1285	280.1	409.8	443.0	460.7
Hospital-Wide	4501	7596	9461	10405	26517	26281	24848	22689	169.7	289.0	380.7	458.6

APPENDIX G

CORRELATION MATRIX FOR PATIENT DEMOGRAPHICS, REFERRING CLINICAL SERVICE AND OVERALL SATISFACTION

	OVER_1	GEND_1	AGE1	AGE2	AGE3	AGE4	AGE5
OVER_1	1.0000						
GEND_1	.0346	1.0000					
AGE1	-.1452	.0055	1.0000				
AGE2	-.2696	.0298	-.0377	1.0000			
AGE3	.0698	.2195	-.0708	-.1409	1.0000		
AGE4	-.0158	.0189	-.0678	-.1349	-.2535	1.0000	
AGE5	.0730	-.0495	-.0465	-.0925	-.1737	-.1664	1.0000
AGE6	.0663	-.0369	-.0576	-.1145	-.2151	-.2060	-.1412
AGE7	.0501	-.0754	-.0499	-.0993	-.1866	-.1787	-.1225
AGE8	.0501	-.1649	-.0499	-.0993	-.1866	-.1787	-.1225
STA1	-.0670	-.1398	-.0916	.2927	.3269	.1299	.0415
STA2	-.0606	.4113	.1995	.0098	.2241	.1563	.0358
STA3	.1196	-.5072	-.0896	-.1783	-.3350	-.1668	-.0184
STA4	.0716	.4057	-.0576	-.1145	-.2151	-.1072	-.0118
STA5	.0320	.0455	-.0164	-.0326	.0363	.0414	-.0402
SVC1	-.0788	-.0734	-.0253	-.0502	-.0944	.0418	-.0619
SVC2	.0481	-.1174	-.0164	-.0326	.0363	.0414	-.0402
SVC3	.0110	.3221	-.0586	.0860	.3201	-.1773	-.0160
SVC4	.0635	.0322	-.0253	-.0502	-.0300	.2401	.0245
SVC5	.0459	-.0176	-.0477	-.0948	.0439	.0192	.0818
SVC6	-.0587	-.0312	-.0190	.2325	.0138	.0190	-.0465
SVC7	-.0054	-.2791	-.0648	-.0815	-.1235	-.0188	.0004
SVC8	.0844	.0800	.1431	-.0572	-.0505	-.0444	-.0706
SVC9	-.1022	-.0957	-.0133	-.0265	-.0499	-.0477	-.0327
SV10	.0682	-.1638	-.0453	-.0901	-.1308	-.0831	-.0594
SV11	.0914	.2818	-.0363	.0017	.0032	.0126	.1597
SV12	.0391	-.0957	-.0133	-.0265	-.0499	-.0477	-.0327
SV13	-.1153	.1053	.1698	.1928	.0718	.0489	-.1197
SV14	-.0806	-.1604	.0827	.0491	-.0317	.1476	.0642
SV15	.0276	.0730	-.0094	-.0187	-.0352	.1387	-.0231

	AGE6	AGE7	AGE8	STA1	STA2	STA3	STA4
AGE6	1.0000						
AGE7	-.1517	1.0000					
AGE8	-.1517	-.1316	1.0000				
STA1	-.2500	-.2414	-.2414	1.0000			
STA2	-.1999	-.1734	-.1734	-.3182	1.0000		
STA3	.2136	.3033	.3350	-.4333	-.3113	1.0000	
STA4	.2657	.1744	.0929	-.2783	-.1999	-.2722	1.0000
STA5	.0617	-.0432	-.0432	-.0792	-.0569	-.0774	-.0497
SVC1	.1442	-.0665	.0970	-.0653	-.0877	.1098	.0705
SVC2	-.0497	.0805	-.0432	.0068	.0450	.0093	-.0497
SVC3	.0032	-.0337	-.1545	.1083	.1280	-.2208	.0757
SVC4	-.0767	-.0665	-.0665	.0484	.1143	-.0621	-.0767
SVC5	-.0179	-.0786	.0622	-.0020	-.0108	.0051	-.0179
SVC6	-.0576	-.0499	-.0499	.1322	.0226	-.0896	-.0576
SVC7	.1084	.2434	-.0578	-.0516	-.1320	.2743	-.0612
SVC8	.1083	-.0034	.0691	-.0384	.0194	-.0853	.1083
SVC9	.2317	-.0351	-.0351	-.0645	-.0463	.1488	-.0405
SV10	.0385	-.0216	.4183	-.1171	-.1170	.2312	-.0055
SV11	-.0574	.0219	-.0957	-.0530	.0192	-.1306	.2074
SV12	-.0405	.1160	.1160	-.0645	-.0463	.1488	-.0405
SV13	-.0652	-.0825	-.0825	.0843	.1342	-.1339	-.0652
SV14	-.1264	-.0049	-.1096	.1265	-.0582	-.0499	-.0792
SV15	-.0286	-.0248	-.0248	-.0455	-.0327	-.0445	.1635

	STA5	SVC1	SVC2	SVC3	SVC4	SVC5	SVC6
STA5	1.0000						
SVC1	-.0218	1.0000					
SVC2	-.0142	-.0218	1.0000				
SVC3	-.0507	-.0781	-.0507	1.0000			
SVC4	-.0218	-.0337	-.0218	-.0781	1.0000		
SVC5	.2154	-.0635	-.0412	-.1474	-.0635	1.0000	
SVC6	-.0164	-.0253	-.0164	-.0586	-.0253	-.0477	1.0000
SVC7	-.0560	-.0864	-.0560	-.2004	-.0864	-.1629	-.0648
SVC8	-.0249	-.0383	-.0249	-.0890	-.0383	-.0723	-.0288
SVC9	-.0115	-.0178	-.0115	-.0413	-.0178	-.0335	-.0133
SV10	-.0391	-.0604	-.0391	-.1401	-.0604	-.1139	-.0453
SV11	.1293	-.0484	-.0314	-.1124	-.0484	-.0913	-.0363
SV12	-.0115	-.0178	-.0115	-.0413	-.0178	-.0335	-.0133
SV13	-.0422	-.0650	-.0422	-.1509	-.0650	-.1227	-.0488
SV14	-.0360	-.0555	-.0360	-.1287	-.0555	-.1046	-.0416
SV15	-.0081	-.0125	-.0081	-.0291	-.0125	-.0237	-.0094

	SVC7	SVC8	SVC9	SV10	SV11	SV12	SV13
SVC7	1.0000						
SVC8	-.0984	1.0000					
SVC9	-.0456	-.0203	1.0000				
SV10	-.1549	-.0688	-.0319	1.0000			
SV11	-.1242	-.0552	-.0256	-.0868	1.0000		
SV12	-.0456	-.0203	-.0094	-.0319	-.0256	1.0000	
SV13	-.1669	-.0741	-.0343	-.1166	-.0936	-.0343	1.0000
SV14	-.1423	-.0632	-.0293	-.0995	-.0798	-.0293	-.1071
SV15	-.0322	-.0143	-.0066	-.0225	-.0180	-.0066	-.0242

	SV14	SV15
SV14	1.0000	
SV15	-.0207	1.0000

LEGEND:

OVER_1 = OVERALL SATISFACTION
GENDER_1 = GENDER
AGE1 = UNDER 18
AGE2 = 18-24
AGE3 = 25-34
AGE4 = 35-44
AGE5 = 45-54
AGE6 = 55-64
AGE7 = 65-74
AGE8 = 75 AND OLDER
STA1 = ACTIVE DUTY
STA2 = FM/AD
STA3 = RETIREE
STA4 = FM/RET
STA5 = OTHER

SVC1 = GASTROENTEROLOGY
SVC2 = NEUROSURGERY
SVC3 = PLASTIC SURGERY
SVC4 = PODIATRY
SVC5 = GENERAL SURGERY
SVC6 = ORAL SURGERY
SVC7 = UROLOGY
SVC8 = OTHER
SVC9 = CARDIOTHORACIC SURGERY
SVC10 = OPHTHAMOLOGY
SVC11 = GYNECOLOGY
SVC12 = VASCULAR SURGERY
SVC13 = OTORHINOLARYNGOLOGY
SVC14 = ORTHOPEDICS
SVC15 = NOT SURE

APPENDIX H

MULTIPLE REGRESSION OF OVERALL SATISFACTION ON PATIENT DEMOGRAPHICS AND REFERRING CLINICAL SERVICE

Listwise Deletion of Missing Data

Equation Number 1 Dependent Variable.. OVER_1
Block Number 1. Method: Enter

GEND_1 AGE1 AGE2 AGE3 AGE4 AGE5 AGE6 AGE7 AGE8 STA1
STA2 STA3 STA4 STA5 SVC1 SVC2 SVC3 SVC4 SVC5 SVC6
SVC7 SVC8 SVC9 SV10 SV11 SV12 SV13 SV14 SV15

Multiple R	.42885
R Square	.18391
Adjusted R Square	.05598
Standard Error	.33382

Analysis of Variance

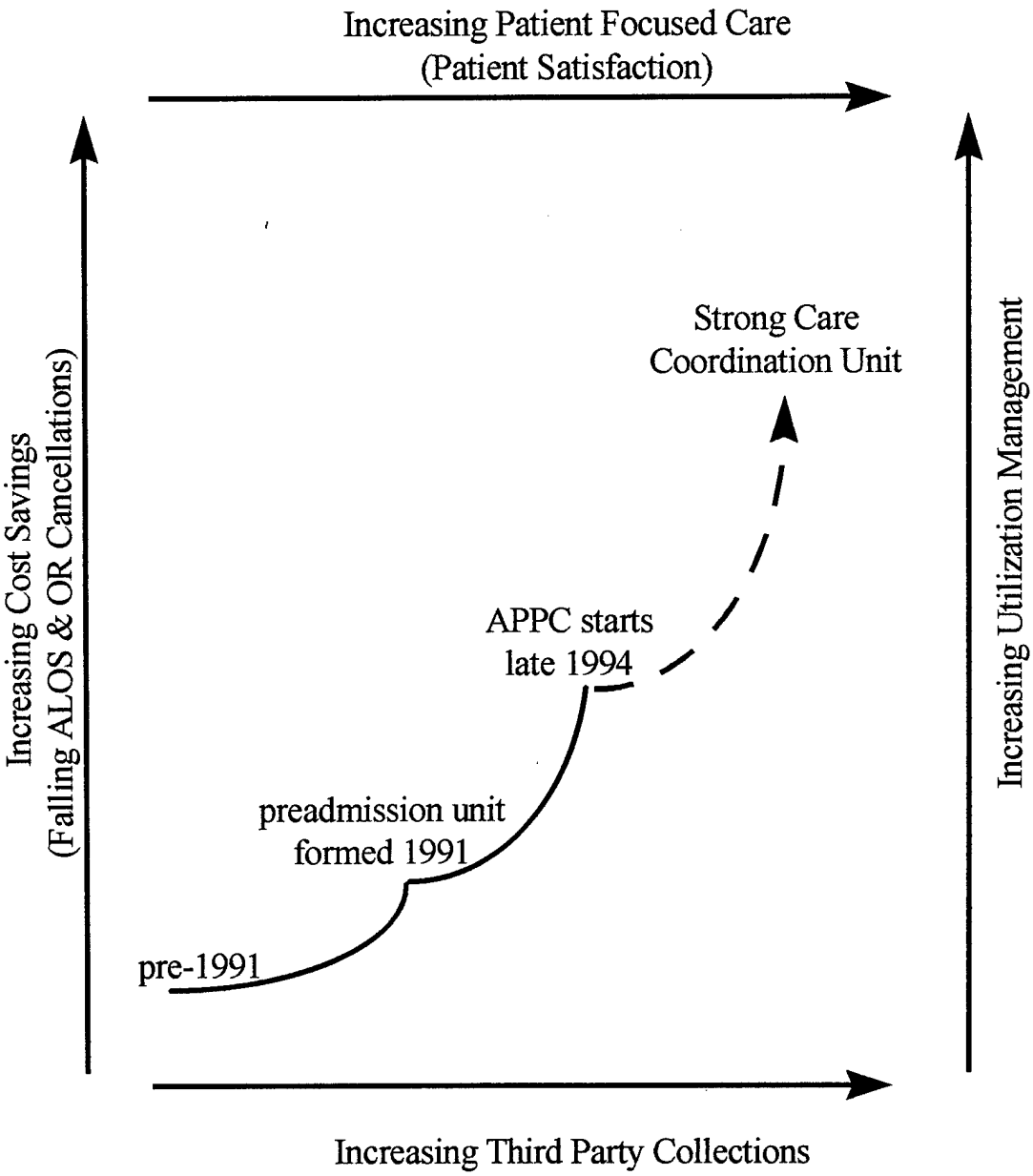
	DF	Sum of Squares	Mean Square
Regression	29	4.64590	.16020
Residual	185	20.61564	.11144

F = 1.43763 Signif F = .0798

Variable	B	SE B	Beta	T	Sig T
GEND_1	.031754	.075153	.045084	.423	.6731
AGE1	-.272662	.341170	-.107485	-.799	.4252
AGE2	-.313124	.321647	-.232717	-.974	.3316
AGE3	.065566	.309676	.077814	.212	.8326
AGE4	-8.73754E-04	.307059	-.001011	-.003	.9977
AGE5	.048900	.297004	.043237	.165	.8694
AGE6	.050251	.303141	.052179	.166	.8685
AGE7	-.019528	.307957	-.018262	-.063	.9495
AGE8	-.017134	.300681	-.016024	-.057	.9546
STA1	.230372	.166870	.309989	1.381	.1691
STA2	.170208	.173203	.193233	.983	.3270
STA3	.339764	.169390	.453218	2.006	.0463
STA4	.247280	.183168	.256768	1.350	.1787
STA5	.253717	.257752	.086822	.984	.3262
SVC1	-.282867	.245992	-.146458	-1.150	.2517
SVC2	.064187	.289516	.021965	.222	.8248
SVC3	-.058960	.214750	-.062001	-.275	.7840
SVC4	.052333	.242095	.027096	.216	.8291
SVC5	-.067004	.215857	-.060418	-.310	.7566
SVC6	-.045286	.272636	-.017852	-.166	.8683
SVC7	-.119985	.215399	-.134886	-.557	.5782
SVC8	.107993	.234650	.063096	.460	.6459
SVC9	-.563991	.323400	-.157953	-1.744	.0828
SV10	-.039712	.218391	-.034394	-.182	.8559
SV11	.034014	.224827	.024483	.151	.8799
SV12	.004591	.316999	.001286	.014	.9885
SV13	-.093233	.219517	-.085653	-.425	.6715
SV14	-.100915	.225475	-.081541	-.448	.6550
SV15	.047863	.413435	.009501	.116	.9080
(Constant)	4.673976	.153592		30.431	.0000

APPENDIX I

EVOLUTION OF PREADMISSION SERVICES



NOTES

1. While ownership of the APPC falls under the Department of Nursing (DON), the service is not organized in a strictly vertical pattern with respect to lines of authority. The ward is loosely configured around a specific service, or product line, with an amalgamated staff draw from, not only the DON, but also the Anesthesia Service, Patient Administration Directorate, Chaplain Service, and Third Party Collections. This is the typical pattern of horizontal integration found in matrix organizations.

2. Surgi-Server 2000 is a proprietary software package designed to streamline OR operations and effectively monitor activity through a sophisticated scheduling and management system. The system superseded the earlier reporting system in the OR in 1995. Data used in this study to analyze trends in OR cancellations employ both sources.

3. The Department of Nursing Research at WRAMC reviewed the survey tool and with minor exception, judged it to be a well designed questionnaire. The logos, use of card stock and overall neatness gave the questionnaire an official and professional appearance. Carefully worded instructions, use of bold font and orderliness facilitated navigation through the instrument and minimized the probability that items would be missed.

4. Proprietary information from a private consultant firm analyzing OR costs in military treatment facilities (MTFs) suggests that OR cancellations result in measurable and substantial costs to an institution. Permission was not granted to use specific cost data in this study, nor was the use of the consultant's name allowed.

5. WRAMC's service area is truly worldwide. Military beneficiaries are referred to the facility for evaluation and treatment from a broad geographical area, often arriving at unpredictable times and with the expectation that they are to be admitted to the facility. Cases of financial hardship and inadequate travel funding complicate administrative matters. In many instances, it is in the best interest of the patient to circumvent the initial preadmission process and admit the patient.

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