Final Program Review

Gulf War Veterans' Illness Demonstration Project

Portland VA Medical Center

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August 15, 2000

The Portland-based Demonstration Project has met all the objectives listed in its original project proposal and has completed the project on time. The project has provided a large amount of useful findings about the delivery of medical care to populations of gulf war veterans. The details of the study's methods, results, and conclusions are provided in the accompanying Detailed Summary Report.

Report Date August 15, 2000

DETAIL SUMMARY SHEET

TITLE: Implementation and Evaluation of Gulf War Veterans' Demonstration Project

KEYWORDS: Primary Care, Patient Satisfaction, Medical Care Costs

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VA SITE: Portland VAMC, Puget Sound VAHCS **STATUS: __.__ Ongoing**
__X_Complete

APPROVAL DATE: July 8, 1998

FUNDING: **Current FY: $ 349,742** **Total: $ 699,736**

STUDY OBJECTIVES

1. Compare physical and psychological functioning and satisfaction with VA care between GW veterans who receive care from the targeted clinical programs and GW veterans who receive care only from other clinical sites in the two VA medical centers.
2. Evaluate a panel of GW veterans who had received care at either of two urban VA medical centers prior to July 1, 1998, to measure whether implementing carefully designed outpatient clinical programs is associated with improvement of mean levels of physical and psychological functioning and satisfaction with VA care for the entire panel.
3. Assess and describe the sources of dissatisfaction among GW veterans who report problems with VA services they have received.
4. Examine whether satisfaction with VA services among GW veterans is associated with demographic characteristics, levels of medical comorbidity, and physical and psychological functioning.
5. Compare utilization of VA clinical services between GW veterans who are followed in the targeted clinical programs and those who receive conventional VA care.
6. Measure the operating costs of the targeted clinical programs.

TECHNICAL APPROACH

Study Design

This demonstration project implemented dedicated clinical programs for providing comprehensive medical care to veterans of the Persian Gulf War (GW) at two large VA Medical Centers in VISN 20. A carefully designed evaluation was conducted to measure each program's impact on the satisfaction and health-related functioning of GW veterans. The evaluation component of the project used a quasi-experimental design, in that veterans were not assigned by the investigators to alternative treatment groups (such as a randomized trial of a new clinic). The project used an innovative approach to program evaluation that will provided data about the clinical impact of the programs at the two participating medical centers.

The study design included two components. Component 1was a prospective cohort study of all GW veterans who received any VA services at either of the two participating medical centers during a twelve month period prior to implementation of the targeted clinical programs. Cohorts at each center (Portland and Puget Sound) were assessed at three time points during the course of the project (at months 4, 14, and 21). The targeted clinical programs for GW veterans were implemented at month 6, following the first data collection. The members of the cohort were sub-divided into two groups: patients who received services in the new targeted clinical programs (special care) and those who did not receive services from the new programs (customary care).

The second component of the study compared all GW veterans who used the new clinics to all GW veterans who did not use the new clinics. Thus, Component 2 examined both patients who had used VA services prior to program implementation and patients who began using VA services after implementation. All of the members of the cohort used for Component 1 were included in Component 2. Essentially, Component 2 examined a larger number of patients than were enrolled in the cohort. As for Component 1, data collection for Component 2 was conducted at months 4, 14 and 21. The additional patients used in Component 2 were identified from patient logs maintained by the clinics at both sites. Because the new users of VA services were not identified prior to program implementation, baseline data were not collected for them. However, questionnaire data (including verification of SW Asian service) on these veterans were collected at months 14 and 21.

Subjects

All patients enrolled in the study had verified military service in SW Asia after August 2, 1990. The initial lists of potential subjects were constructed by downloading the social security numbers of all patients who had received clinical services at the Portland VAMC or the Puget Sound VA Health Care System in FY1998 and had been discharged from the military after August 2, 1990. These lists were then submitted to VA Headquarters and were matched against DoD lists of veterans who had served in the gulf war theater. All veterans who had gulf war theater or combat service after August 2, 1990 were considered eligible for the study. The Time 1 questionnaire mailing was based upon this verified list, and the Time 2 and Time 3 mailings were derived from these initial lists. A small number of patients who were newly enrolled in the special care clinics were added to the Time 2 and Time 3 mailings. These added patients had gulf war service verified through face to face interviews in the clinics. The mailed questionnaires also included a question about service in the gulf war. If a respondent answered that he/she in fact had not served in the gulf war theater, then the individual was deleted from the study.

Implementation of Clinical Programs for GW Veterans

Because the target population is a relatively young group without major physical disabilities, the clinical programs were based in the outpatient setting. The programs were organized and designed with two primary goals in mind. The first was to address the particular health care needs of veterans who have served in SW Asia. These needs were determined from the findings of ongoing research conducted by the Portland Environmental Hazards Research Center (PEHRC). The second goal was to respond to problems with care in the VA system as outlined in recent reports of focus groups and surveys conducted by the Veterans Health Administration National Customer Feedback Center (NCFC) among veterans who served in SW Asia (1,2).

A central issue in designing clinical programs is to identify the medical expertise and resources needed to provide appropriate medical care to GW veterans. Research conducted at the Portland VAMC and at other institutions (3-7) has shown that this group of veterans has diverse symptoms that fall into multiple discreet categories. The clinical programs required effective systems for performing initial evaluation of patients and identifying the types of specialty services that met their needs. The two VA medical centers participating in this project are highly developed tertiary care centers with full complements of specialized clinical services. In planning the clinical programs, it became clear that the clinical programs should capitalize upon the available specialty services, rather than creating isolated programs that attempted to duplicate services already available in the medical centers. Nevertheless, the majority of the problems reported by GW veterans in prior studies fall into two major clinical categories: general internal medicine and mental health. Therefore, the strategy in designing these clinical programs was to create core clinics that included on-site internal medicine and mental health professionals, along with a case management approach that would facilitate specialized services such as rheumatology, neurology, dermatology, and women's health.

The clinical strategy for the programs differed at the two sites. In Seattle a clinic dedicated to the care of GW veterans had been established several years earlier, based on a specialty services model. In the 1997-98 fiscal year, mental health staffing was added to the clinic, and there was local interest in enhancing mental health services in that clinic. In Portland, there were no clinical programs for GW veterans. Thus, the strategy of this project was to develop different clinical programs at each site, so that it could be measured whether clinical strategies led to different patient population and clinical service profiles at each site. In Seattle, the clinic focused on mental health services, and in Portland the clinic was based on a primary care delivery model.

In addition to responding to the clinical needs of veterans, the clinic developed in Portland was organized in the following ways to address and ameliorate the previously described service problems identified by the focus groups and the survey of GW veterans:

1. To reduce the length of time to schedule appointments the capacity of primary care providers and critical specialty clinics such as rheumatology was expanded.
2. To reduce the inconvenience of appointment times for veterans with job and family constraints and to increase flexibility and options in scheduling appointments, evening clinic sessions were included. Sufficient primary care providers were employed so that appointment times are available throughout the week.
3. To increase continuity and coordination of care, all providers in the clinic are staff physicians, rather than residents or interns.

4. To help veterans learn how to obtain VA health care services, a dedicated telephone number for GW veterans was instituted. This phone was answered by office staff, and calls were referred to the clinic manager when necessary.

The medical directors of the clinical programs at both facilities were the directors of the GW veterans registry programs at their respective centers (Ronald Grewenow, MD, at Portland, and Stephen Hunt, MD at Puget Sound). Both physicians have performed extensive clinical examinations on hundreds of GW veterans and have developed extensive clinical skills on the medical problems of this patient group. Both of these physicians are well versed in the types of specialty services required by this veteran group.

Coordination of care for GW veterans served by the new clinics was based on models of case management in managed care systems. The VA has mounted an initiative to reorganize its clinical services to adhere to managed care principles (8). This initiative grew out of the Prescription for Change described by the VA's undersecretary for health (9). The case management strategy in the clinics at both facilities emphasized both treating illness and promoting health by means of comprehensive patient-centered continuous care with a multi-disciplinary team.

A component of the original plans for the clinics for GW veterans at the two participating VA facilities was to publicize the clinics to the population of GW veterans residing in the Portland and Seattle metropolitan areas. This part of the plan needed to be modified because of coexsting changes in the VA system. In the year prior to the start of the study, procedures for implementation of the VA's new eligibility and enrollment guidelines were fully developed at the Portland and Puget Sound facilities. Because of a high demand for care by veterans, both facilities had encountered limitation in providing care to veterans in enrollment categories 5, 6, and 7. Local managers at both facilities had concerns that efforts to publicize VA services for gulf war veterans would lead to GW veterans in the higher enrollment categories applying for care and then not being allowed to schedule appointments due to a need to accommodate first other veterans belonging to the lower enrollment categories. Thus, publicity for the clinics was limited to mailings of letters and clinic brochures only to veterans who already were enrolled at the two facilities. The mailing in Portland included a questionnaire asking the respondent to indicate whether he/she is interested in obtaining an appointment in the clinic and several options for indicating why an appointment was not desired.

Clinical Program at Portland VAMC

At the Portland VAMC, the principal clinical staff consisted of five primary care providers who all were full time staff physicians who also worked in the facility's general medicine clinic. These individuals had expressed an interest in the clinical care of GW veterans and had volunteered to adjust their schedules to work in the new clinic. All of these physicians are board-certified internists who have extensive experience in providing primary care services to veterans.

Mental health services were provided via augmentation of the existing mental health consultation liaison program for the general medicine clinic. This program was based upon a well-developed model of integrated medical and psychiatric care (10-14). It also operated support groups on stress management, coping with chronic illnesses, PTSD issues, family relationships, and smoking cessation. The staff also referred patients to other group therapy and support group services available in the Portland VAMC Mental Health Division. The consultation liaison

program was staffed by two full time psychiatrists, a full time psychologist, and two full time psychiatric nurse practitioners. For the new clinic, a psychologist was added as an on-site clinician. This individual (Daniel Storzbach, PhD) implemented a routine psychological testing program for the clinic.

The psychological testing program developed by Dr. Storzbach is an abbreviated psychological profile that can be administered in approximately 15 minutes. It includes psychological symptom profiles for assessing depression, anxiety disorders, and PTSD symptoms, as well as scales of general psychological functioning. It has been developed to be administered using laptop computers (15) or by paper and pencil format. The data gathered through the testing enabled the clinic to provide specific clinical data to the primary care physicians to help guide their decisions about consultation and clinical services.

Two of the core investigators of the Portland Environmental Hazards Research Center provided useful liaison to specialty consultations. Dr. Dennis Bourdette is the principal investigator of the PEHRC and Chief of the Neurology Service at the Portland VAMC. Dr. Bourdette has a research and clinical interest in the neurologic disorders of GW veterans and facilitated consultation in the Neurology Clinic for GW veterans who had neurologic complaints. Dr. Andre Barkhuizen is a staff rheumatologist at the Portland VAMC with an interest in fibromyalgia, which is a relatively common clinical problem among GW veterans. Dr. Barkhuizen provided rheumatology consultations for GW patients needing such services. Yet another consultative link was with the Womens' Health Program, which provided consultation for female GW veterans.

Clinical Program at Seattle Division of VA Puget Sound Health Care System

The Seattle Division of VA Puget Sound Health Care System has provided population-specific medical and mental health care to GW veterans since 1993. The clinical program that pre-dated this project primarily had been achieved through the efforts of Stephen Hunt, MD, the Persian Gulf registry director who has fostered affiliations with outpatient mental health, post traumatic stress disorder programs, general internal medicine and various medical specialty clinics. Dr. Hunt has seen over 1500 GW veterans for registry exams since 1993, and over 800 GW veterans have been seen for medical or mental health clinic visits in FY98. The clinical program developed for this project was a significant enhancement of existing services. The program was an integrated and comprehensive treatment program for GW veterans who were experiencing negative health consequences as a result of service in the Gulf. The new program increased accessibility of services to GW veterans by: expanding the number of clinicians (medical and mental health) available to see GW veterans in a timely fashion; expanding the number of available clinical service-related hours, and dedicating a special phone line for GW veterans for making appointments or having questions answered.

The new program sought to improve treatments with an orientation towards an integration of interventions which address both current physical and mental health concerns, and which have an emphasis towards long-term health promotion and maintenance. To achieve this, the clinic conducted an education program consisting of 12 modules aimed at addressing areas known to be problematic for this special population. Topics included education about potential environmental exposures, PTSD symptoms, skill building for coping with depression, anger management, better nutrition, communication building, and physical health conditioning. Clinic staff also created a dedicated evaluation and follow-up component to the clinic so that all GW veterans have an identified primary medical and mental health provider. The Seattle clinic also provided ongoing process and support psychotherapy groups and a psychological testing program in Seattle similar

to that described above for the Portland program. To enhance follow-up and consultative care, the Seattle staff identified specific liaison providers from specialty clinics such as rheumatology, women's clinic, neurology, nutrition and physical therapy who could support the clinic with appropriate and timely consultation.

Data Collection

The study used three principal data sources: (1) Questionnaires mailed to study subjects; (2) Utilization and cost data obtained from the facilities' DSS administrative data systems, and (3) Patient characteristics obtained from national VA data sources.

Questionnaires

Similar questionnaires were used for three major data collection efforts based on mailings to study subjects at fixed time intervals during the course of the demonstration project (at months 4, 14, and 21). The questionnaire packet included a cover letter and a consent form to be returned with the completed questionnaire. In order to analyze the panel data (Component 1 of the study) as a cohort, patient identifiers were required on the returned questionnaires, so that baseline and post-intervention results could be linked.

The questionnaires included the SF-36V health status instrument (16) and a satisfaction instrument. Additional sociodemographic items were collected so that characteristics of study subjects could be described, thereby enabling the results of this study to be applied to similar populations of VA patients. These items included age, gender, health insurance coverage (Medicare, private insurance, and state Medicaid eligibility), education, and ethnicity. VA eligibility status was assessed using the VISTA computer system.

Health related quality of life is an important measure of the impact of disease, and there are many available instruments. We used the SF-36V (16), which is a modified version of the SF-36 (17), a widely accepted and practical instrument for outpatient studies. It is a 36-item instrument that contains eight scales of functioning. The SF-36V modifies the original SF-36 by replacing the original dichotomous response choices on the Role-Emotional and Role-Physical subscales to 5-point ordinal choices. These changes reduce floor and ceiling effects and increase reliability. Higher scores on the subscales reflect better functioning. The questionnaire also included three additional items for assessing depression. These additional items are included in the 1993 version of the SF-36 distributed by the Health Outcomes Institute.

Because previous studies had found that psychological symptoms are prevalent among GW veterans, we also included four scales from the Brief Symptom Inventory (BSI) in the mailed questionnaire. The BSI (18) is a 53-item self-report symptom inventory that covers nine symptom dimensions. For this study, we used the somatization, depression, anxiety, and hostility scales, which comprise 24 items. Each item has a 5-point ordinal response. Scale scores are calculated by summing the scores of all items in the scale. A higher raw score indicates greater psychological distress.

The most recent version of the VA National Ambulatory Care Customer Satisfaction Survey was included in the questionnaire. It is a measure of the process of care that identifies whether or not customer service standards in seven different areas are met (e.g. timeliness/access, education, preferences, emotional support, coordination of care, continuity, and courtesy). In order to gain

additional insight into sources of dissatisfaction, we modified the instrument by adding open-ended response fields. We asked subjects to provide an explanation whenever they gave a response on the questionnaire that indicated there was a problem with their experience. In addition, we included five open-ended questions to allow patients to describe what would make their care more convenient, what would make their care more effective and helpful, what would help them recover faster or cope better with their health problems, anything else that would make a difference for them, and the most important changes they would like to see made. Responses were reviewed to develop comment code categories. Comments and codes were entered into a database using Ethnograph Software.

Comorbidity Measures

To control for diagnosis-associated health status differences, we included a health status proxy measure - Diagnostic Cost Group (DCG) – which is based on both inpatient and outpatient diagnoses obtained from administrative files (19). The initial DCG models (DCG-PIP) included only inpatient diagnoses, but subsequent development has led to incorporation of outpatient diagnoses as well into the DCG-HCC (Hierarchical Coexisting Conditions) model to predict concurrent and prospective expenditures. The DCG-HCC model organizes closely-related conditions into hierarchies, and a person is assigned a score in one of 23 diagnostic categories based upon the most serious condition in that hierarchy (19). Multiple conditions are allowed in the DCG-HCC to account for comorbidities.

The DCG scores for FY1998 for each individual in the study sample were obtained from the files maintained by the Management Decision and Research Center (MDRC) in the Austin Automation Center. Patients new to the VA system with no recorded prior VA utilization were assigned a value of zero, and an indicator variable was added to the regression model to control for this missing data, which avoids the loss of observations due to missing DCG scores. For patients with non-missing data, higher values are associated with greater severity of illness.

Demographic characteristics of Portland and Puget Sound veterans used as covariates in the cost and utilization analyses were obtained from the 1998 and 1999 Outpatient Care Files that reside at the Austin Automation Center. The specific demographic characteristics that were obtained included age, gender, race, marital status, income, and percent service connection.

Methodology for Estimating Costs and Utilization

Utilization and costs measurements were derived from administrative data obtained from the Decision Support System (DSS), which is a comprehensive administrative database used nationally by the VA system. DSS includes VISTA-derived clinical workload data and cost allocation data derived from local administrative sources. Each VA medical center maintains current data files and enters all cost data into the database. Each center also manages the monthly uploads of VISTA data into the database. For this study, DSS data were obtained for fiscal years 1998, 1999, and the first two quarters of fiscal year 2000. These DSS extracts provided patient-level data for the fixed direct, variable direct, fixed indirect, and total cost for every patient encounter. Utilization estimates were generated by summing the number of encounters for a given patient.

The DSS data were obtained by preparing a list of social security numbers of all patients in the clinic and control groups. For the clinic groups, the logs of patients who completed visits in the

clinics were used to construct the lists. The control groups were constructed differently at the two sites. For Puget Sound, all patients who returned a questionnaire and had never been seen in the GW clinic were included. For Portland, the control group list included all patients who had returned a questionnaire (and had not been seen in the GW clinic) and a random sample of non-responders After the DSS files were produced, the social security numbers were removed, to maintain confidentiality.

A second DSS file was prepared by searching for all visits to the GW clinics at each facility and aggregating all costs associated with these visits. This file permitted us to check the accuracy of the patient lists collected by the GW clinics. Because calculation of the costs of operating the clinics was based on the clinic visit costs, this verification step ensured the accuracy of the calculations.

Direct costs refer to all costs directly associated with patient care, such as physician and nurse time. Fixed direct costs refer to the expense for inputs that are required for every patient encounter (e.g., nurse time for checking a patient in). Variable direct costs refer to expenses that vary with the length and intensity of a patient encounter (e.g., casting supplies, physician time). Fixed indirect costs refer to costs associated with activities that support patient care, such as administrative and janitorial services. Fixed and variable direct costs were summed to form the cost measures for every patient in our sample.

Costs and utilization were partitioned into ten cost categories as follows:
1) Gulf War, non-mental health care
2) Gulf War mental health care
3) Non-Gulf War primary care
4) Non-Gulf War mental health care
5) Non-Gulf War, non-mental health (specialty) care
6) Pharmacy
7) Imaging
8) Laboratory
9) Other (e.g., chaplain, food service, clinical dietitians, recreation)
10) Inpatient.

DSS department codes were grouped into these ten categories so that all patient encounters in fiscal years 1998, 1999, and 2000 could be grouped into one of these mutually exclusive categories. Resource use in the Gulf War clinics in Portland and Puget Sound was tracked separately in this taxonomy. The Gulf War clinic in Portland was designated as a primary care clinic, and encounters were tracked under the first category. In Puget Sound, the Gulf War clinic provides specialty services and mental health services. As a result, Gulf War mental health services were tracked in the second cost category and non-mental health services were tracked in the first cost category.

DSS maps multiple clinics to a DSS department, so specific attribution of resource use to encounters with specific Gulf War providers was not possible. Thus, cost and utilization of encounters with Gulf War providers were aggregated along with encounters to non-Gulf War providers for those clinics which are mapped to the same DSS department code as the Gulf War clinic (19). Since these analyses are based upon comparisons of Gulf War and non-Gulf War clinic patients, not a comparison of Gulf War clinics and non-Gulf War clinics, this level of aggregation is not a problem. This patient-level, DSS encounter data cannot be used to calculate the total costs generated by a specific provider or a specific clinic, unless there is a one-to-one mapping of a clinic to a DSS department code. That was not the case for the Gulf War clinics, so

all resource use comparisons are done at the patient level instead of the clinic level.

For the analysis of resource use, these ten categories were further grouped into seven categories:
1) Primary Care (#1 and #3 above)
2) Mental Health (#2 and #4)
3) Non-mental health specialty (#5)
4) Ancillary and Other (#6-9)
5) Total Outpatient (#1-9)
6) Total Inpatient (#10)
7) Total Inpatient and Outpatient (#1-10).

All utilization and cost comparisons for Gulf War clinic and non-Gulf War clinic patients in Portland and Puget Sound are based upon these seven categories. Since costs for fiscal year 2000 were only available for the first two quarters, FY2000 data were annualized to allow comparisons of similar time periods. All 1998 and 1999 costs were inflated to 2000 dollars, using Portland-specific and Puget Sound-specific medical components of the Current Price Index (CPI-M).

For the cost and utilization analyses, there were two additional veteran characteristics that were controlled in the multivariate regressions: an indicator for Gulf War clinic patient and an indicator for the American Lake campus as the source of care for the Puget Sound sample. The independent variable of interest – Gulf War clinic patient – was based upon encounter data derived from DSS. Any encounters in DSS that were recorded with specific Gulf War providers were flagged as Gulf War clinic utilization. All veterans in our sample that generated such utilization were identified as a Gulf War clinic patient. These data were then validated against patient self-report data for the sample of patients that also completed a survey. The patient self-report was considered the gold standard in cases of disagreement between the DSS-derived indicator and the self-reported indicator of Gulf War clinic attendance. This indicator variable was constructed for every veteran in our sample, which included veterans who used and did not use VA services in a given year. Veterans may show no observed costs in a year either because they were not VA users during that year or because they were VA users but had no need for VA care in that year. These two possibilities have different implications for our analysis. If a veteran was not a VA user in that year, then that veteran's cost data should be included as a missing value for that year. If a veteran was a VA user but chose not to use VA services, then that veteran's costs should equal zero for that year. Unfortunately, the DSS cost data did not include VA user status, so we were unable to distinguish between the two possibilities. To solve this problem, we assumed continuous VA user status for all veterans and set costs equal to zero in any year during which we did not observe an encounter. This process allowed us to create a complete cost history for all veterans in our analysis file.

For patients in the Puget Sound sample, veterans were defined as American Lake patients if a majority of their encounters occurred at the VAMC in American Lake. These encounters were identified from the facility code listed in every encounter from DSS.

Analyses of Utilization Data

The utilization and cost data collected from veterans seen in the Portland and Puget Sound VA medical centers were analyzed using bivariate and multivariate techniques. The bivariate analyses were conducted to assess the significance of differences between Gulf War clinic and non-Gulf War clinic veterans. For those resource measures that were significantly different in the bivariate analyses, multivariate regressions were used to control for confounding of important

veteran characteristics that were not accounted for in t-tests. A discussion of the specific methods for each analysis are presented below.

Utilization counts of the number of encounters for primary care, mental health, non-mental health specialty, ancillary and other services, and the total number of outpatient encounters were compared between Gulf War clinic and non-Gulf War clinic patients. In addition, the total number of inpatient hospital stays were compared for the two groups. Utilization counts were calculated for fiscal years 1998, 1999, and 2000.

T-tests were calculated to test the null hypothesis that there were no significant utilization differences between Gulf War and non-Gulf War clinic patients. For utilization counts that were found to be significantly different, these counts were used as dependent variables in multivariate regression analyses that controlled for important patient characteristics. Since utilization variables are count variables in which many veterans have no use, analysis using ordinary least squares (OLS) would lead to biased estimates. Analysis of count data is typically modeled using Poisson or negative binomial models (20,21). The use of the Poisson model requires that the variance equals the mean of the dependent variable, an assumption which is rarely met in utilization data. If the variance exceeds the mean, then the counts display overdispersion which results in biased estimates.

A common method for dealing with overdispersion in count data is the negative binomial regression model which can be generated by a gamma mixture of Poissons. The association between Gulf War clinic attendance and utilization of inpatient and outpatient services was estimated using a negative binomial regression with a log link for expected utilization. This regression is run as a repeated measures model which allows for analysis of trends over time by including a fixed effect for time. All models include a cluster correction since there are three observations for every veteran, based upon their utilization in FY1998, 1999, and 2000. The total number of encounters of a given type was modeled as a function of the following covariates:

Utilization = f(Gulf War clinic user, Male, Race, Age, Marital Status, Percent Service Connected, Income, DCG, Year).

The explanatory variable of interest was a dichotomous variable indicating whether the patient was treated in the Gulf War clinic or not. Several variables were included to control for observable case-mix differences between patients seen in Gulf War and non-Gulf War clinics. Case-mix adjustment was necessary because Gulf War clinic patients may, on average, be healthier (or sicker) than non-Gulf War clinic patients. Available case-mix measures from AAC databases include age, gender, ethnicity, marital status, percent service connected, and DCG. Again, higher DCG scores are associated with greater severity of illness. Race was defined as Caucasian (reference group), African-American, Hispanic, other, and unknown race. Marital Status was defined as married or not. Percent service connected was a continuous variable ranging between 0-100. Income was a continuous variable, and the DCG score was continuous, ranging from 0.70 to 10.00. The variable YEAR represents a vector of dummy variables for resource use in 1998, 1999, or 2000.

Health care costs from DSS data for Gulf War clinic patients were compared with costs for non-Gulf War clinic patients for the seven cost categories identified above. T-tests were also calculated for all cost variables in fiscal years 1998, 1999, and 2000 to test for significant differences between Gulf War and non-Gulf War clinic patients. For costs that were significantly different between the two groups, multivariate regression analysis was conducted to determine if these differences remained significant after controlling for important patient characteristics and

fixed effects for time. All models included a cluster correction since there are three observations for every veteran, based upon their costs in FY1998, 1999, and 2000. To test this hypothesis, a linear regression (OLS) equation of the following form was specified.

Cost = f(Gulf War clinic user, Male, Race, Age, Marital Status, Percent Service Connected, Income, DCG, Year).

RESULTS

Patient Population

From the VISTA files for FY1998, 622 patients were identified at the Portland VAMC who had received clinical services, had Persian Gulf War as VA period of service, and had gulf war theater or combat service confirmed by DoD. This group comprised the initial Portland patient sample. Of these, 139 no longer had valid mailing addresses, so the initial questionnaire sample was 483 veterans (Table 1). Of these, 8 refused participation in the study, and 14 stated on the questionnaire that they had not served in the gulf war. Because of a concern about adequacy of sample size, an additional mailing was conducted in January, 1999, to 630 Portland patients who had Persian Gulf War period of service and were listed as either non-theater or unknown by the DOD records. This mailing asked the veteran to state whether he/she had gulf war combat or theater service and to complete the study questionnaire. Of these, 214 (34%) returned questionnaires, and 40 of these respondents reported gulf war theater or combat service. These 40 individuals were added to the Portland patient sample. Another 73 patients with verified gulf war service were added to the Portland sample at the time of the second mailing. These were patients who had not had prior care at the Portland VAMC and enrolled in the Portland gulf war clinic as new patients. Of the 588 patients in the Portland sample, 371 (62%) returned at least one of the three mailed questionnaires.

For the Puget Sound site, the VISTA database of patients receiving services in FY1998 included 1729 patients who had gulf war combat or theater service verified by DOD records (Table 1). Of these, 415 no longer had valid mailing addresses. Two refused participation, and 41 reported that they had not served in the gulf war. Of the 1271 remaining patients in the Puget Sound sample, 618 (49%) returned a complete questionnaire.

Response rates were good for the mailed questionnaires in the three time periods (Table 2) A relatively large number of veterans had invalid addresses on the first mailing, but this problem was minor in the subsequent mailings. Due to an administrative error, approximately one third of the questionnaires for the third mailing were not sent. These questionnaires have now been sent but were not included in the datasets for this report. Thus, the sample sizes are smaller for the third time period. The additional questionnaires for the third mailing will be included in subsequent reports from this study.

Information about the demand for VA clinical services by gulf war veterans was provided by a supplementary survey that was included with an informational letter about the Portland Gulf War Clinic mailed in early 1999. The survey was mailed to the 501 verified gulf war patients identified at the time of the first mailing of the main study questionnaire. A total of 242 individuals returned the survey, of whom 101 (42%) replied that they desired care in the new clinic. Of the 141 who did not desire an appointment, 64 reported that they already received care from a VA primary care provider, and 47 (19% of total respondents) replied that they believed they did not need ongoing primary care. An additional 30 patients reported geographic or

scheduling barriers to pursuing primary care through the VA. These findings suggest that a high proportion of gulf war veterans who have had prior contact with the VA system desire continued VA care.

Patient Demographics

The patients who returned questionnaires appeared to be representative of the larger population of VA patients at the two sites. The demographic characteristics of veterans who returned at least one survey ("respondents") and veterans who never returned a survey ("non-respondents") are summarized in Table 3. In Portland, the respondents tended to be slightly older ($p<.001$) and more likely to be married (($p<.05$), but there were no other significant demographic differences. In Puget Sound, most demographic characteristics were significantly different, but the absolute magnitude of the differences tended to be small. The Puget Sound group of non-respondents included more than 400 individuals with invalid mailing addresses, which suggests that this was a geographically mobile group and not necessarily representative of the population of gulf war veterans who received ongoing care at that facility.

Demographic characteristics of patients differed between the Portland and Puget Sound facilities, and there also were differences between the clinic and control populations at each site (Table 4). In general, the gulf war veterans who received care at the two sites tended to be under 40 years of age, male, Caucasian, and to have education beyond high school. The Puget Sound patients tended to be slightly older and more likely to be non-Caucasian. They also were less likely to be employed full-time. In Portland, the patients who received care in the Gulf War clinic were more likely than control group patents to be married and less likely to have education beyond high school. In Seattle, patients followed in the Gulf War clinic were less likely to be married and less likely to be employed full-time than the control group patients.

While the patient characteristics reported in Table 4 were obtained only from patients who returned questionnaires, the demographic data collected from the Austin files were obtained for all patients in the clinic and control groups. These data showed similar trends as for the questionnaire-derived variables. Portland clinic patients tended to be slightly older, more likely to be male, and less likely to be service connected than the control group patients. There were no significant differences in the Austin-derived demographic variables between the clinic and control patients at the Puget Sound site.

Health Status

Because the Portland gulf war clinic population was not defined until after the first questionnaire administration, the number of patients who completed questionnaires in the clinic group increased for the second and third questionnaire administrations (Table 5). In both the clinic and control groups, the Portland patients tended to report reduced health status, particularly for the vitality and general health perception scales of the SF36V. At both times 1 and time 2 the respondents in the clinic group did not have significantly different health status scores than the respondents in the control group. At time 3, mean health status scores were higher in the clinic group for all the SF36V scales except the pain and mental health scales. These differences were greatest for the physical functioning, social functioning, and role-physical scales but did not reach statistical significance.

At every time period, patients followed in the Puget Sound-Seattle clinic had significantly ($p<.05$) worse health status than the Puget Sound control group patients or either of the Portland patient groups (Table 6). Mean values of the SF36V scales were particularly low for the vitality and general health perception scales. Sample sizes for the Puget Sound population were relatively constant across the 3 time periods, which reflects the stable clinic population in the Seattle Gulf War clinic. Over time, patients in the Seattle Gulf War clinic showed improvement in mean scores for the social functioning and role-emotional scales of the SF36V.

Psychological symptoms, as measured by the BSI, were moderate among the Portland patients (Table 5). For both the clinic and control groups, mean scores for all four scales were generally less than 1.0 and were not significantly different between study groups. Although these scores are significantly higher than have been reported for healthy adults (18), they are lower than reported for patients receiving care in psychiatric outpatient clinics. These scores did not significantly change over time.

At the Puget Sound site, BSI scores were consistently and significantly higher in the clinic group than in the control group (Table 6). The mean scores for the clinic group were similar to those reported for outpatients in psychiatric clinics in other studies (18). Both the BSI and SF36V scores for the patients in the Seattle clinic suggest that this population has substantial psychological distress.

The cross-sectional comparisons included different patient groups at each of the different time periods. A better measure of the influence of clinical services upon patient functioning is provided by data on the cohort of patients who completed questionnaires at multiple time periods. Because the Portland clinic population was not defined until after the first questionnaire administration, very few Portland clinic patients completed all three questionnaires. A larger number completed two questionnaires, particularly questionnaires at both the second and third time periods. Therefore, we decided to define the cohort as consisting of all patients who had completed at least two questionnaires. If an individual had completed all three questionnaires, the questionnaires for the first and third time periods were used. The results of the physical and psychological function measures for the Portland cohort are summarized in Table 7. For all SF36V scales except pain, mean scores were slightly higher on the last questionnaire than on the first questionnaire, but these trends were not statistically significant. For the control group, there were no differences in mean SF36V scores except for significantly ($p<.05$) lower scores on the last questionnaire for the role-physical scale. For the BSI scales, mean scores also consistently were lower on the last questionnaire for the clinic group but tended to be higher for the control group.

In the Puget Sound cohort, there were no consistent trends in differences between the first and last questionnaires (Table 8). Scores on the physical functioning scale fell in the control group ($P<.02$), but there were no other significant changes. For the smaller group of subjects who completed all three questionnaires, there were no significant trends in either Portland or Puget Sound (Tables 9 and 10).

Ratings of Quality of Care

In the cross sectional analysis, patients followed in the Portland gulf war clinic tended to report higher ratings of VA clinical care over time than patients in the control group (Table 11). As would be expected, there were no between group differences in ratings of care at time 1, which was before the Portland clinic had begun operation. At time 2, the GW clinic patients had

significantly (p=.006) higher ratings than the control group on the measure of VA care being as good as anywhere, and at time 3, their rating of overall quality of VA care in the past 12 months was significantly higher. For all quality of care measures except pharmacy services, ratings in the clinic group tended to be higher at times 2 and 3. Similar findings were not observed among the Puget Sound patients (Table 12), which may reflect the more serious psychological problems of the GW clinic patients at that site.

Patient ratings of quality of care did not show trends toward improvement in the cohorts of patients who completed 2 or 3 questionnaires (Tables 13-16). It is notable that the mean ratings on the first questionnaire among the cohort were consistently higher than the time 1 mean ratings in the cross sectional analysis. Comparison of subgroups of patients showed that those who returned only the first questionnaire had significantly lower ratings of care than patients who returned a second or third questionnaire. Thus, there may have been a ceiling effect for ratings of care in the cohorts.

The association of demographic characteristics and physical and psychological function with three measures of overall evaluation of health care was examined using the data from the first cross-sectional surveys at the Portland VAMC and Puget Sound Health Care System. Demographic characteristics included: age in years, gender, educational attainment (high school graduate, some college, college graduate, post-graduate); marital status (married, divorced/widowed, never married); employment (full-time, part-time, none); school attendance (full-time, part-time, none); and ability to get along on income (never make ends meet, sometimes make ends meet, have just enough, some months have money left over, always have money left over). We also looked at whether the veterans had health insurance outside the VA, whether they had received health care elsewhere in the past year and whether they had applied for compensation and pension benefits, and their satisfaction with that experience. The three measures of health care were the rating of the quality of the most recent clinic visit (poor to excellent), the rating of the quality of care received during the past 12 months (poor to excellent) and agreement with the statement that "Medical care at the [Portland or Puget Sound] VA is as good as that provided anywhere" (never/almost never to always/almost always).

Age was only modestly associated with ratings of the quality of care. Correlations (r) between age and overall quality of the visit were 0.12 (p=.07) in Portland and 0.22 (p>.0001) in Puget Sound. Correlations between age and overall quality of care in the past 12 months were 0.17 (p=.01) in Portland and 0.205 (p>.0001) in Puget Sound, and correlations between age and "VA care is as good as anywhere" were 0.276 (p>.0001) and 0.235 (p>.0001) in the two sites, respectively. Gender was not associated with ratings of quality of care at either site, nor were education, marital status or employment. Being in school part-time was associated with lower ratings on all three measures at Puget Sound but not at Portland. Ratings on all three measures were significantly associated with ability to get along on income at both sites. Veterans who sometimes or always had money left over rated their care more highly than veterans who could not make ends meet. Ratings of care were not associated with whether veterans had insurance at either site. At both sites, veterans who had received health care elsewhere in the past year were significantly less likely to agree that VA care was as good as anywhere. And at both sites, veterans who were dissatisfied with their compensation and pension benefit applications gave lower ratings on all three measures of quality of care than did veterans who had applied and were satisfied with their experience.

In general, better physical and psychological functioning were associated with higher ratings of quality of care, although the magnitude of the associations was small. At Puget Sound, the strongest correlations were between greater BSI-depression and less agreement that VA care is as

good as anywhere (r=-0.213), greater BSI-hostility and lower rating of care in past year (r=-0.186) and between better SF-36V-Mental Health and higher rating of overall care in past year (r=0.182), all p>0.0001. In Portland, the strongest correlations were between VA care is as good as anywhere and BSI-hostility (r=-0.257), BSI-depression (r=-0.265) and SF36V-Mental Health (r=0.243).

Table 17 shows the proportions of veterans who reported problems with services on the first questionnaire at Portland and Puget Sound. The rank order of frequency of problems is very similar between the two sites and there is no general tendency for clinic or control groups to report more or fewer problems.

More than 50% of veterans reported problems with the same four items at both facilities. Dissatisfaction with the VA compensation and pension (C&P) process among veterans who had applied was widespread. Although much of C&P determination takes place outside of the medical center, veterans' C&P experience influences their perception of their VA medical care. The majority of veterans would not choose to come to their VA facility if they could get free care outside. However, more than half of veterans who commented on their answer said the reason was that their VA facility was too far from where they live and they would like care closer to home. Most veterans felt that a wait of 20 minutes or less for prescriptions was reasonable. In fact, though, most veterans reported that they usually waited more than 30 minutes for prescriptions. Finally, more than half of veterans who said they had needed medical help or advice right away in the past year felt that their problem should have been handled sooner.

The next most frequently cited problems have to do with continuity/coordination of care (no one provider, provider not familiar with history, don't know next step, don't know who to ask questions) and long waits (in clinic, at the pharmacy, to get an appointment).

Veterans' responses to the specific questions about the care they have received are important because they indicate where patients experience problems in the health care system and because the report of problems is strongly associated with the ratings of quality of care. On almost every item, veterans who give responses that indicate a problem with a specific aspect of their care rate the overall quality of their care as substantially lower than veterans who report no problem with that aspect of their care. The differences in mean ratings on quality of care are on the order of one to two standard deviations.

Tables 18 and 19 show how veterans at Portland and Puget Sound responded to the five open-ended questions on the first questionnaire regarding what their VA health care facility could do to provide better care. Proportions are based only upon veterans who chose to write a response to the question, not upon all veterans who returned a questionnaire. Proportions of responses in a category are not shown if less than 5% of veterans' comments were coded in that category.

In response to the first question, "What could we do to make care more convenient?", the greatest number of comments at Portland had to do with appointments and scheduling and geographic inconvenience of the facility. At Puget Sound, the majority of comments had to do with appointments and scheduling, long waiting times in the clinics and interaction with the provider. Because the majority of gulf war veterans are employed or in school full or part-time, they wanted to be consulted about what days and times were convenient for them before appointments were scheduled, rather than being sent a letter in the mail notifying them of an appointment time assigned by the facility. In fact, two-thirds of veterans who indicated on the questionnaire that appointment times for primary and specialty care were very or somewhat inconvenient stated that

the appointment scheduling process did not accomodate their individual schedules and constraints.

The second question was "What could we do to make care more effective and helpful?". In Portland, the most frequent comment was a compliment about care received, followed by suggestions for appointments and scheduling and interaction with the provider. In Puget Sound, the most frequent comments were in the interaction with provider category, followed by long waits in clinics and appointments and scheduling.

At Portland and Puget Sound veterans' responses to question #3, "What could we do to help you recover faster or cope better with your health problem?", most often had to do with their interaction with the provider and, specifically, with wanting to know exactly what their problems are, what caused them and more information about them. Many veterans expressed frustration about their providers' perceived inability to find a cause for their problems and give them a prognosis.

Wanting to know what their problems are and more information about them was also the most frequently cited response by Puget Sound veterans to question # 4, "Is there anything else that would make a difference for you?". This was followed by higher ratings and faster decisions for compensation and pension and more courtesy and caring from non-physician staff. At Portland, the most frequent responses to question # 4 had to with compensation and pension and appointments and scheduling.

Question #5 was "What are the *most* important changes you would like to see made?". At Portland, reduction of waiting time in the pharmacy was cited first, followed by improvements in appointment scheduling, care closer to home, and waiting times in clinics. At Puget Sound, waiting times in clinics and interactions with providers were cited first, followed by appointment scheduling, attitudes of non-physician staff, and compensation and pension.

Cost and Utilization of Gulf War Clinic and Non-Gulf War Clinic Patients

Estimates of VA health care costs and utilization for veterans in Portland indicate that primary care costs and utilization were significantly greater for non-Gulf War clinic patients in 1998 but were similar in 1999 and 2000 (Table 20). For Gulf War clinic users with positive utilization, Gulf War clinic-related primary care accounted for an increasing share of total primary care costs over time. For the subset of clinic users with positive use in a given year, Gulf War clinic-related primary care accounted for 35% of total primary care utilization in 1998, 47% in 1999, and 78% in 2000. This change over time reflects a shift in the locus of primary care away from non-Gulf War clinics and to the Gulf War clinic for veterans who sought care in the Gulf War clinic.

Over these three years, primary care costs increased to the same level as non-Gulf War clinic patients, and they remained fairly constant for non-Gulf War clinic patients. Non-Gulf War clinic patients had slightly greater utilization of mental health services in 1998, but there were no other differences in mental health resource use as measured by costs and utilization. Mental health utilization and costs increased for Gulf War clinic veterans between 1998 and 2000 in Portland.

Specialty care costs were significantly lower for Gulf War veterans in 1999 only, but utilization was significantly lower in both 1998 and 1999. Utilization and costs increased in FY2000 for Gulf War clinic patients compared to 1998 and 1999 levels, but this resource use was not

significantly different from that of non-Gulf War clinic patients. Ancillary and other utilization and costs were significantly lower for Gulf War clinic veterans than for non-Gulf War clinic patients in all three years.

Total outpatient utilization and costs were significantly lower for Gulf War clinic patients in 1998 and 1999 but were not significantly different from utilization and costs of non-Gulf War clinic patients in Portland in fiscal year 2000. Over this three year period, total outpatient costs increased 40% for Gulf War clinic patients, from $1440 in 1998 to $2404 in 2000. Total inpatient costs were not significantly different in FY1998, but utilization was significantly lower for Gulf War clinic patients in 1999. In FY2000, total inpatient costs and utilization were significantly lower for Gulf War clinic patients. Finally, total inpatient and outpatient costs were lower and slightly different in 1998 and 1999 between the two groups, but were not significantly different in fiscal year 2000. It appears that Gulf War clinic patients had lower utilization and costs below non-Gulf War clinic patients in the fiscal years 1998-2000, although there appears to be a trend toward reaching a similar level to non-Gulf War patients over time.

A different picture emerges for patients seen in the Puget Sound Gulf War clinic (Table 21). In general, patients seen in the long-established Gulf War clinic in Seattle and American Lake have higher costs than patients seen in other VA outpatient clinics. Primary care costs were not significantly different in 1998 between the two groups, but increased significantly for Gulf War clinic patients in 1999 because Gulf War clinic primary care costs increased from $100 to $340 and non-Gulf War clinic primary care costs increased from $285 to $516. Annualized primary care costs in FY2000 were not significantly different between the two groups in 2000. Primary care utilization was significantly higher in 1998 and 1999, but was similar in 2000. For Gulf War clinic users with positive utilization, Gulf War clinic-related primary care accounted for 43% of total primary care utilization in 1998 and 1999, but only 23% of total primary care utilization in 2000.

Utilization of mental health services was more than twice as large for Gulf War clinic patients in 1998 and 1999 and became more than three times as large (9.3 vs. 2.7) in FY2000. However, a very small proportion (5-9%) of these visits were Gulf War clinic-related mental health visits for those Gulf War clinic veterans with positive use. This utilization difference translated into mental health costs that were more than twice as large in fiscal years 1999 and 2000. Utilization of specialty care was significantly greater for Gulf War clinic patients in all three years, but costs were only significantly greater in 1999. Ancillary and other costs were only significant in FY2000, but cost and utilization were insignificant otherwise.

Total outpatient utilization was greater for Puget Sound Gulf War clinic patients in all three years, but costs were only significantly greater in 1999 and 2000. Costs rose significantly for Gulf War clinic patients between 1998 and 1999, but decreased for non-Gulf War clinic patients. Inpatient hospital stays and costs were not significantly different in the two groups over the three-year period. Finally, overall inpatient and outpatient costs were significantly greater for Gulf War clinic patients in 1999 and 2000, due to outpatient cost differences.

The Portland Gulf War Clinic, which was based on a primary care model appeared to achieve cost savings. Multivariate regressions were performed to control for confounding variables not controlled in the bivariate comparisons of Portland patients. Table 22 summarizes the *difference* in resource use between Gulf War and non-Gulf War clinic patients for each utilization and cost measure. Gulf War clinic patients were found to have significantly ($p<.05$) lower resource use of three types. Utilization of specialty care and costs of ancillary and other care were slightly lower for Gulf War clinic patients (-$259.30) when averaged across the three years. Finally, utilization

and costs of inpatient care were both slightly lower for Gulf War clinic patients but only weakly so. Total outpatient care and overall inpatient and outpatient costs were not significantly different across the two groups when patient characteristics were controlled.

In the Puget Sound analysis, Gulf War clinic patients had higher resource use in all five cost categories that were examined using multivariate regression using all three years of data. Table 23 presents the *difference* in resource use between Gulf War and non-Gulf War clinic patients for each utilization and cost measure. Primary care, mental health and specialty care utilization and costs were significantly higher for Gulf War clinic patients than for non-Gulf War clinic patients. As a result of these three cost differences, total outpatient costs for Gulf War clinic were much higher (by $1776.86) than were costs for non-Gulf War clinic patients. When inpatient and outpatient costs were added together, the overall costs for Gulf War clinic patients was $2088.44 greater than non-Gulf War clinic patients, even after controlling for patient characteristics that might have confounded the bivariate results described above.

In sum, it appears that Gulf War clinic patients in Portland had similar or slightly lower utilization and costs than a non-random sample of veterans seen in other VA clinics. At Puget Sound clinics in Seattle and American Lake, Gulf War clinic patients had significantly, consistently higher utilization and costs when compared with a non-random sample of non-Gulf War clinic patients.

Operating Costs of Gulf War Clinics

Operating costs in current (2000) dollars for the Portland Gulf War clinic in 1998, 1999, and 2000 were $22591, $70483, and $73780, respectively. The comparable operating costs for the Puget Sound Gulf War clinics in Seattle and American Lake were $56208, $149234, and $105870. Costs in Portland tripled between 1998 and 1999 because the Gulf War clinic didn't become fully functional until 1999. The operating costs in the Puget Sound clinics were significantly higher than costs of the Portland clinic because these clinics had been fully staffed and functioning for three years and didn't require startup time. The jump in costs for the Puget Sound clinics between 1998 and 1999 is due, primarily, to the addition of a nurse practitioner and greater commitment of staff time to the Gulf War clinic and less time to other clinical duties (e.g., C&P exams).

CONCLUSIONS

This observational study has provided valuable insight into the clinical status, health care experiences, and satisfaction of gulf war veterans at two large VA medical centers. The study has shown that two clinical care programs based on different care models attracted distinctly different patient populations. The Puget Sound program, which used a mental health case management model, served a population that had significant psychological distress and required a higher level of medical care resources. The Portland program, based on a primary care delivery model, served a population with less severe health status impairments, but both programs served populations that were substantially impaired when compared to community norms of patients of a similar age range.

In cross sectional analyses, the Portland gulf war clinic patients had higher satisfaction with their VA medical care than patients in the control group. This finding suggests that clinics dedicated to the care of gulf war veterans have the potential to improve perceptions of VA care among this

veteran group. Further studies that examine different organizational models of care will be valuable to determine how durable and generalizable this finding is. The Portland clinic also was associated with slightly lower utilization and costs of care, when compared to the control group. This finding suggests that an integrated primary care model can enhance efficiency in the VA system.

The health care utilization patterns and costs in the present study reflect unique aspects of the clinical populations and the clinical programs for Gulf War veterans. There are a number of factors that might explain increased utilization and outpatient costs accrued by the Seattle Gulf War clinic users. The Seattle Gulf War Veterans' Clinic clinical philosophy is predicated on the principle that aggressive interventions should encompass a comprehensive, integrated approach as part of the treatment strategy. Such interventions involve higher initial costs, which may be offset by decrements in management costs and diminished total expenditures resulting from decreased disability and enhanced function over time.

The increased primary care costs in 1999 (compared to the prior year) may reflect the effort on the part of the Seattle Gulf War Clinic to intervene in areas of health maintenance and health behaviors. The Gulf War clinics' model of health care focuses on long term goals by promoting greater self-management of health problems and improving general health maintenance. Non-Gulf War clinic-related primary care (e.g., visits to the general internal medicine clinic) was expected to increase, because Gulf War clinic providers advocated for veterans with non-Gulf War clinic providers to improve the continuity and coordination of care across clinics.

Efforts were also made at increasing Gulf War clinic users' enrollment in mental health services. Data from this and other studies demonstrate the high prevalence of psychiatric problems among Gulf War veterans. Therefore, veterans were encouraged to enroll in exercise/cognitive behavior therapy treatment programs, group therapy, smoking cessation programs, and substance abuse treatment programs. These efforts also included additional primary care visits for education, health assessments associated with the intervention programs and ongoing monitoring of health concerns during participation in the programs.

Another factor contributing to increased health costs for the clinic users of the Seattle Clinic may be the "specialty" nature of the clinic and the health status of clinic patients. Clinic users may represent a sub-group of Gulf War veterans with more complex and more serious health concerns. The Gulf War clinic often receives referrals from other primary care clinics for veterans whose symptoms have remained treatment refractory and thus are in need of more "specialty" care.

It is also of interest and perhaps clinically significant that although clinic users reported significantly lower health status than non-clinic users, inpatient utilization and costs of this group are no higher than those of the non-clinic user groups. Although it is not clear what the effect of being a clinic user has on preventing the need for inpatient care, it is believed that the specialty services provided by the Gulf War clinic may decrease the need for expensive inpatient care.

The cost and utilization analyses are subject to several limitations. The first limitation is the lack of controls for the systematic enrollment of healthier or sicker Gulf War veterans into Gulf War clinics. This type of selection bias would affect our cost estimates because there are unobserved characteristics that may influence enrollment in the Gulf War clinic and subsequent costs. Since this study was not a randomized clinical trial, we were unable to ensure that Gulf War clinic and non-Gulf War clinic patients would be likely to be similar in all observed (and unobserved characteristics). We were unable to apply formal statistical models that explicitly estimate the

Gulf War clinic enrollment decision that may be used to correct for sample selection bias, if restrictive statistical conditions are met.

The second limitation concerns case-mix adjustment. It is possible that patients treated in Gulf War clinics are healthier or sicker than patients treated at other clinics of the Parent VAMCs in ways that we were not able to capture. Case-mix differences between Gulf-War clinic and non-Gulf War clinic patients may have resulted from 1) patient self-selection, 2) targeted enrollment/recruitment strategies at Gulf War clinics, and/or 3) specific VA enrollment policies. The DCG score was not a significant predictor of costs in the multivariate regressions because DCG scores between Gulf War and non-Gulf War clinic patients were not significantly different. However, SF-36 scores were significantly different in the two groups and resource use differences might have been narrowed had this measure been available for use in casemix adjustment.

The third condition is that FY2000 had to be annualized (e.g., doubled) because data were only available for the first and second quarters. If there are seasonality effects in resource use, annualized data may over- or under-estimate the actual utilization and costs that will occur over the entire fiscal year. However, annualization was necessary to make resource use comparisons consistent across all three years.

Finally, the use of Decision Support System (DSS) data may be subject to errors of omission or commission for specific encounters captured in our sample. The accuracy of the costs observed in our sample is contingent on the accurate reporting of costs in the cost accounting system. Fortunately, costs for patients in the same VAMC are likely to be calculated in a similar manner, so that it is assumed that there is internal consistency within each facility. However, if some clinical units frequented by Gulf War clinic patients over-report workload or under-report costs, then costs for Gulf War clinic patients will be under-estimated.

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Table 1. Population of Gulf War Veterans

	Portland	Puget Sound
Total Enrolled Veterans with PGW Service Verified by DOD	622	1729
No longer have valid address	139	415
Denied Gulf War Service or Refused Participation	22	43
Additional Portland Patients Identified by Mailed Survey	40	
Patients Newly Enrolled in Portland PGW Clinic	73	
Total Patients Available for Cost Analyses	574	1271
Failed to Return Questionnaire	217	653
Total Patients for Satisfaction and Health Status Analyses	363	618

Table 2. Response Rates for Questionnaire Mailings

	Portland		Puget Sound	
	Clinic	Control	Clinic	Control
Mailing 1 (January, 1999)				
Questionnaires Mailed	77	545	244	1485
Bad Addresses & Refusals	0	161	40	418
Questionnaires Returned	39	164	120	498
Response Rate	51%	43%	59%	47%
Mailing 2 (November, 1999)				
Questionnaires Mailed	138	362	303	441
Bad Addresses & Refusals	3	14	16	6
Questionnaires Returned	83	179	129	261
Response Rate	61%	51%	45%	60%
Mailing 3 (June, 2000)				
Questionnaires Mailed	158	203	153	260
Bad Addresses & Refusals	1	1	2	1
Questionnaires Returned	74	121	71	114
Response Rate	47%	60%	47%	44%

Table 3. Patient Characteristics (Derived from Austin Files)

	Portland		Puget Sound	
	Respondents (n= 363)	Non-Respondents (n= 201)	Respondents (n= 609)	Non-Respondents (n= 1262)
Mean (SD) Age (years)	35.4 (0.4)	34.0 (0.5)	38.2 (0.3)	35.6 (0.2)
Male Gender (%)	90	89	87	88
Caucasian (%)	80	85	67	59
Married (%)	44	30	58	48
Service Connected (%)	23.5	19.2	26.2	19.3
Mean (SD) Comorbidity Score	1.8 (0.1)	1.9 (0.1)	1.8 (0.1)	1.6 (0.1)
Mean Yearly Income ($)	$17,834.	$18,550.	$20,782.	$18,508.

Table 4. Patient Characteristics (Derived from Questionnaire Responses)

	Portland		Puget Sound	
	Clinic (n= 116)	Control (n=251)	Clinic (n=174)	Control (n=435)
Mean (SD) Age (years)	37.0 (8.0)	38.1 (8.6)	39.9 (8.3)	41.2 (8.7)
Male Gender (%)	93.1	88.4	85.7	87.8
Caucasian (%)	85.3	80.2	66.1	65.4
Education Beyond High School (%)	70.6	82.8	77.1	82.3
Married (%)	61.2	54.4	59.2	66.9
Employed Full-Time (%)	61.2	66.8	49.1	61.4
Student Full-Time (%)	10.3	9.6	12.6	14.5

Table 5. Cross Sectional Comparison of Mean (SD) Health Status Scores Among Patients in PGW Clinic and Control Groups at Portland Site

	Time 1		Time 2		Time 3	
	Clinic (N=41)	Control (N=196)	Clinic (N=83)	Control (N=177)	Clinic (N=74)	Control (N=121)
SF36V Scales						
Physical Functioning	67.9 (24.0)	68.8 (25.0)	70.0 (23.7)	68.2 (26.8)	69.9 (24.8)	65.1 (25.9)
Pain	48.1 (17.8)	49.8 (25.0)	51.7 (21.8)	49.9 (24.6)	49.5 (23.1)	50.4 (25.6)
Social Functioning	59.7 (28.2)	57.8 (29.7)	59.9 (29.4)	58.4 (33.0)	63.4 (28.0)	58.5 (30.8)
Vitality	39.1 (25.5)	42.5 (22.6)	36.8 (24.3)	41.3 (24.7)	41.1 (24.6)	40.2 (23.0)
Mental Health	61.5 (22.1)	59.5 (24.0)	58.7 (22.6)	60.8 (24.5)	60.2 (21.8)	60.7 (21.9)
General Health Perception	44.6 (25.2)	48.3 (24.2)	48.9 (24.3)	47.7 (25.3)	49.3 (24.8)	46.7 (24.7)
Role-Physical	59.8 (29.1)	63.9 (29.3)	64.2 (29.7)	64.1 (30.7)	64.5 (31.4)	60.6 (30.2)
Role-Emotional	67.5 (31.7)	69.3 (32.5)	68.1 (30.3)	69.5 (32.7)	70.0 (29.2)	68.7 (32.0)
BSI Scales						
Somatization	1.06 (0.68)	0.90 (0.74)	0.80 (0.68)	0.94 (0.80)	0.83 (0.73)	0.92 (0.78)
Depression	0.92 (0.85)	0.93 (1.04)	0.98 (1.0)	0.97 (1.05)	0.86 (0.94)	0.92 (1.07)
Anxiety	0.79 (0.80)	0.80 (0.87)	0.82 (0.85)	0.86 (0.97)	0.75 (0.79)	0.84 (0.94)
Hostility	0.89 (0.91)	0.94 (1.02)	0.94 (0.92)	0.94 (0.98)	0.73 (0.79)	0.92 (0.96)

Table 6. Cross Sectional Comparison of Mean (SD) Health Status Scores Among Patients in PGW Clinic and Control Groups at Puget Sound Site

	Time 1		Time 2		Time 3	
	Clinic (N=120)	Control (N=421)	Clinic (N=129)	Control (N=261)	Clinic (N=71)	Control (N=114)
SF36V Scales						
Physical Functioning	54.5 (25.1)	64.9 (25.2)	54.3 (25.9)	62.8 (24.6)	51.4 (26.9)	62.8 (25.0)
Pain	36.6 (18.3)	47.0 (22.8)	36.5 (18.6)	46.3 (22.6)	36.6 (23.0)	45.9 (24.7)
Social Functioning	40.2 (26.5)	55.6 (28.8)	42.8 (27.9)	56.7 (29.5)	46.1 (28.5)	53.6 (30.2)
Vitality	25.3 (21.0)	39.9 (22.9)	27.2 (21.7)	38.8 (22.1)	26.9 (19.3)	38.2 (23.6)
Mental Health	44.0 (21.5)	56.9 (23.2)	49.7 (21.7)	59.2 (23.3)	48.5 (23.1)	58.3 (24.1)
General Health Perception	29.9 (21.8)	45. (23.6)	32.3 (22.3)	43.9 (23.1)	30.8 (20.9)	42.4 (24.2)
Role-Physical	45.6 (29.0)	62.6 (27.7)	46.0 (29.7)	61.4 (26.7)	42.2 (31.4)	61.0 (28.2)
Role-Emotional	46.9 (31.5)	67.7 (28.8)	51.2 (32.2)	67.1 (29.6)	51.9 (33.4)	65.4 (31.6)
BSI Scales						
Somatization	1.53 (0.82)	1.04 (0.84)	1.45 (0.79)	1.04 (0.79)	1.40 (0.80)	1.04 (0.83)
Depression	1.7 (1.16)	1.20 (1.1)	1.44 (1.10)	1.11 (1.11)	1.43 (1.08)	1.10 (1.07)
Anxiety	1.6 (1.02)	1.0 (0.95)	1.4 (0.99)	0.91 (0.90)	1.27 (0.95)	0.98 (0.96)
Hostility	1.6 (1.1)	1.04 (1.0)	1.32 (1.02)	0.99 (1.0)	1.14 (0.99)	0.97 (0.98)

Table 7. Comparison of Mean (SD) Health Status Scores Between First and Last Questionnaires in Portland Cohort

	Clinic (n=67)		Control (n=161)	
	First Questionnaire	Last Questionnaire	First Questionnaire	Last Questionnaire
SF36V Scales				
Physical Functioning	68.1 (22.7)	70.6 (22.3)	68.9 (24.7)	66.7 (26.5)
Pain	50.9 (19.5)	48.8 (19.80)	50.6 (24.8)	50.5 (24.9)
Social Functioning	60.1 (30.4)	63.9 (26.9)	58.6 (30.1)	58.4 (30.7)
Vitality	36.0 (23.6)	38.4 (23.9)	42.9 (23.2)	41.3 (22.5)
Mental Health	59.8 (21.7)	61.2 (21.1)	60.8 (24.0)	59.9 (22.3)
General Health Perception	46.6 (24.1)	48.3 (23.6)	48.7 (23.3)	47.2 (24.6)
Role-Physical	62.8 (30.3)	63.6 (29.2)	65.6 (28.9)	61.6 (30.5)
Role-Emotional	68.8 (32.2)	70.5 (29.7)	70.2 (31.9)	68.4 (31.8)
BSI Scales				
Somatization	0.89 (0.72)	0.80 (0.72)	0.86 (0.69)	0.91 (0.76)
Depression	0.91 (0.96)	0.87 (0.94)	0.88 (1.0)	0.92 (1.0)
Anxiety	0.82 (0.90)	0.80 (0.83)	0.78 (0.84)	0.84 (0.91)
Hostility	0.87 (0.92)	0.77 (0.77)	0.89 (0.98)	0.88 (0.91)

Table 8. Comparison of Mean (SD) Health Status Scores Between First and Last Questionnaires in Puget Sound Cohort

	Clinic (n=108)		Control (n=304)	
	First Questionnaire	Last Questionnaire	First Questionnaire	Last Questionnaire
SF36V Scales				
Physical Functioning	53.9 (25.8)	52.0 (26.7)	65.1 (25.0)	62.7 (24.9)
Pain	36.6 (18.5)	36.3 (20.4)	46.8 (22.1)	45.6 (22.8)
Social Functioning	46.4 (28.0)	43.1 (27.1)	56.5 (28.3)	55.7 (29.6)
Vitality	27.8 (22.2)	27.1 (20.0)	40.1 (22.0)	38.8 (22.5)
Mental Health	49.3 (21.2)	48.4 (23.0)	57.2 (22.5)	58.0 (23.5)
General Health Perception	32.6 (22.6)	31.6 (21.3)	45.2 (22.4)	44.3 (23.2)
Role-Physical	47.7 (29.7)	44.6 (30.7)	62.4 (26.9)	61.5 (27.5)
Role-Emotional	51.0 (32.6)	51.3 (32.5)	67.9 (27.9)	66.3 (30.4)
BSI Scales				
Somatization	1.46 (0.76)	1.43 (0.76)	1.02 (0.81)	1.05 (0.82)
Depression	1.46 (1.11)	1.50 (1.09)	1.13 (1.04)	1.15 (1.10)
Anxiety	1.45 (1.00)	1.38 (0.98)	0.94 (0.91)	0.97 (0.95)
Hostility	1.24 (1.03)	1.26 (1.03)	0.99 (0.92)	0.98 (1.00)

Table 9. Comparison of Mean (SD) Health Status Scores Between First, Second, and Third Questionnaires (Qx) in Portland Cohort

	Clinic (n=14)			Control (n=80)		
	First Qx	Second Qx	Third Qx	First Qx	Second Qx	Third Qx
SF36V Scales						
Physical Functioning	66.5 (23.9)	55.4 (29.5)	60.0 (23.4)	66.5 (24.6)	66.7 (26.2)	65.0 (26.0)
Pain	51.2 (16.5)	52.5 (23.0)	54.4 (18.7)	49.1 (24.8)	49.1 (25.8)	50.9 (26.4)
Social Functioning	66.7 (25.2)	67.7 (20.3)	67.3 (19.5)	59.5 (32.5)	58.1 (34.3)	58.3 (32.3)
Vitality	38.2 (22.4)	35.7 (21.3)	41.4 (22.7)	43.9 (24.1)	42.1 (27.1)	41.1 (23.4)
Mental Health	65.7 (15.7)	61.4 (19.9)	64.3 (21.8)	61.6 (25.3)	62.9 (24.8)	61.6 (21.9)
General Health Perception	44.0 (18.7)	44.4 (19.1)	47.9 (21.8)	48.4 (24.30	46.7 (25.7)	47.1 (24.8)
Role-Physical	64.9 (27.9)	57.7 (29.9)	60.1 (29.5)	60.9 (29.0)	60.7 (30.7)	60.2 (32.0)
Role-Emotional	69.6 (26.5)	69.2 (26.4)	66.7 (31.9)	70.0 (33.8)	68.6 (34.3)	69.4 (33.3)
BSI Scales						
Somatization	0.99 (0.67)	0.81 (0.54)	0.86 (0.51)	0.85 (0.71)	0.90 (0.76)	0.83 (0.71)
Depression	0.85 (0.58)	0.76 (0.73)	0.83 (0.93)	0.84 (0.71)	0.90 (1.07)	0.90 (1.08)
Anxiety	0.56 (0.52)	0.60 (0.42)	0.60 (0.44)	0.73 (0.86)	0.78 (0.97)	0.81 (0.91)
Hostility	0.86 (0.78)	0.88 (0.89)	0.58 (0.63)	0.91 (1.01)	0.93 (1.01)	0.90 (0.91)

Table 10. Comparison of Mean (SD) Health Status Scores Between First, Second, and Third Questionnaires (Qx) in Puget Sound Cohort

	Clinic (n=37)			Control (n=56)		
	First Qx	Second Qx	Third Qx	First Qx	Second Qx	Third Qx
SF36V Scales						
Physical Functioning	49.1 (24.4)	49.2 (23.8)	46.6 (58.9)	67.6 (24.4)	62.9 (24.5)	63.4 (24.5)
Pain	33. (19.0)	34.5 (18.3)	36.1 (23.8)	51.0 (25.2)	49.7 (25.5)	48.4 (25.6)
Social Functioning	42.0 (26.6)	38.2 (26.5)	41.0 (26.3)	60.9 (28.6)	56.9 (30.2)	58.3 (29.4)
Vitality	25.0 (22.4)	21.9 (18.7)	25.5 (19.8)	39.0 (21.8)	39.1 (23.8)	40.0 (24.6)
Mental Health	46.4 (21.0)	45.1 (20.4)	43.9 (22.3)	59.5 (21.9)	63.9 (22.8)	62.0 (23.5)
General Health Perception	26.7 (21.0)	27.6 (18.6)	25.8 (15.5)	45.5 (22.8)	42.1 (26.4)	44.7 (23.6)
Role-Physical	45.7 (28.6)	42.0 (32.1)	39.4 (30.8)	64.7 (25.8)	62.2 (25.4)	65.3 (25.5)
Role-Emotional	52.1 (30.7)	49.1 (30.5)	49.3 (31.7)	68.5 (26.7)	72.6 (26.5)	68.9 (28.7)
BSI Scales						
Somatization	1.46 (0.65)	1.48 (0.65)	1.36 (0.62)	0.87 (0.71)	0.89 (0.69)	0.84 (0.74)
Depression	1.47 (1.07)	1.31 (0.91)	1.60 (0.97)	0.95 (1.02)	0.90 (1.08)	0.95 (1.03)
Anxiety	1.43 (1.03)	1.42 (0.89)	1.44 (0.85)	0.75 (0.82)	0.70 (0.72)	0.75 (0.82)
Hostility	1.44 (1.19)	1.43 (1.00)	1.38 (1.05)	0.85 (0.95)	0.85 (0.94)	0.89 (0.94)

Table 11. Cross Sectional Comparison of Quality of Care Measures Among Patients in PGW Clinic and Control Groups at Portland Site

	Time 1		Time 2		Time 3	
Category	Clinic N=41	Control N=196	Clinic N=75	Control N=128	Clinic N=63	Control N=88
Overall Quality of Care over Prior 12 Months (Mean (SD))	3.62 (1.07)	3.58 (0.96)	3.87 (0.81)	3.80 (0.80)	4.08 (1.04)	3.76 (0.96)
Overall Quality of Most Recent Clinic Visit (Mean (SD))	3.78 (0.95)	3.76 (1.01)	4.16 (0.83)	3.97 (0.90)	4.17 (0.97)	3.92 (1.06)
Quality of Pharmacy Services (Mean (SD))	2.76 (1.06)	2.80 (1.19)	2.54 (1.13)	2.45 (1.24)	2.71 (1.27)	2.56 (1.33)
VA Medical Care as Good As Provided Anywhere (Mean (SD))	4.08 (0.87)	4.05 (0.87)	4.47 (0.67)	4.16 (0.80)	4.24 (0.84)	4.24 (0.88)
Problems Scheduling Appointment (%)	47	34	21	24	13	26
One Provider or Clinic in Charge of Care (%)	56	56	85	76	81	72
Know who to Ask for Questions (%)	60	72	89	83	87	84

Table 12. Cross Sectional Comparison of Quality of Care Measures Among Patients in PGW Clinic and Control Groups at Puget Sound Site

	Time 1		Time 2		Time 3	
Category	Clinic N=120	Control N=421	Clinic N=98	Control N=172	Clinic N=47	Control N=70
Overall Quality of Care over Prior 12 Months (Mean (SD))	3.41 (1.08)	3.39 (1.08)	3.47 (1.01)	3.65 (1.03)	3.68 (0.86)	3.70 (1.06)
Overall Quality of Most Recent Clinic Visit (Mean (SD))	3.57 (1.13)	3.59 (1.09)	3.61 (1.07)	3.87 (1.06)	3.78 (1.01)	3.78 (1.12)
Quality of Pharmacy Services (Mean (SD))	3.08 (1.16)	3.07 (1.21)	3.17 (1.14)	3.47 (1.07)	3.17 (1.38)	3.48 (1.15)
VA Medical Care as Good As Provided Anywhere (Mean (SD))	3.80 (1.20)	3.89 (1.09)	3.93 (1.06)	4.08 (0.93)	3.96 (0.90)	4.14 (0.94)
Problems Scheduling Appointment (%)	19	31	31	32	24	33
One Provider or Clinic in Charge of Care (%)	60	41	67	62	70	64
Know who to Ask for Questions (%)	64	62	73	76	76	75

Table 13. Comparison of Quality of Care Scores Between First and Last Questionnaires in Portland Cohort

Category	Clinic (n=55)		Control (n=106)	
	First Questionnaire	Last Questionnaire	First Questionnaire	Last Questionnaire
Overall Quality of Care over Prior 12 Months (Mean (SD))	3.82 (0.91)	3.83 (0.99)	3.80 (0.85)	3.75 (0.93)
Overall Quality of Most Recent Clinic Visit (Mean (SD))	4.13 (0.89)	4.00 (0.99)	3.93 (1.0)	3.98 (0.99)
Quality of Pharmacy Services (Mean (SD))	2.64 (1.2)	2.58 (1.2)	2.84 (1.3)	2.48 (1.3)
VA Medical Care as Good as Provided Anywhere (Mean (SD))	4.41 (0.79)	4.26 (0.81)	4.17 (0.86)	4.14 (0.89)
Problems Scheduling Appointments (%)	33	19	28	45
One Provider or Clinic in Charge of Care (%)	67	94	78	75
Know Who to Ask for Questions (%)	78	89	81	82

Table 14. Comparison of Quality of Care Scores Between First and Last Questionnaires in Puget Sound Cohort

	Clinic (n=75)		Control (n=194)	
Category	First Questionnaire	Last Questionnaire	First Questionnaire	Last Questionnaire
Overall Quality of Care over Prior 12 Months (Mean (SD))	3.56 (1.02)	3.63 (0.90)	3.58 (1.05)	3.66 (1.04)
Overall Quality of Most Recent Clinic Visit (Mean (SD))	3.65 (1.10)	3.75 (0.96)	3.84 (1.00)	3.80 (1.09)
Quality of Pharmacy Services (Mean (SD))	3.18 (1.11)	3.16 (1.26)	3.19 (1.21)	3.47 (1.12)
VA Medical Care as Good as Provided Anywhere (Mean (SD))	3.92 (1.10)	3.89 (0.93)	4.14 (0.95)	4.11 (0.95)
Problems Scheduling Appointments (%)	14	30	28	28
One Provider or Clinic in Charge of Care (%)	61	70	53	62
Know Who to Ask for Questions (%)	78	79	66	75

Table 15. Comparison of Quality of Care Scores Between First, Second, and Third Questionnaires (Qx) in Portland Cohort

	Clinic (n=12)			Control (n=52)		
Category	First Qx	Second Qx	Third Qx	First Qx	Second Qx	Third Qx
Overall Quality of Care over Prior 12 Months (Mean (SD))	3.70 (1.2)	4.10 (0.57)	4.00 (0.89)	3.94 (0.73)	3.86 (0.75)	3.82 (0.95)
Overall Quality of Most Recent Clinic Visit (Mean (SD))	3.64 (0.81)	3.55 (0.82)	3.56 (0.73)	4.00 (1.02)	4.08 (0.83)	4.04 (1.05)
Quality of Pharmacy Services (Mean (SD))	2.78 (0.67)	2.56 (1.01)	3.11 (0.60)	2.76 (1.23)	2.44 (1.25)	2.27 (1.12)
VA Medical Care as Good as Provided Anywhere (Mean (SD))	4.56 (0.53)	4.36 (0.67)	4.27 (0.79)	4.21 (0.85)	4.20 (0.73)	4.34 (0.82)
Problems Scheduling Appointment (%)	38	17	14	34	50	36
One Provider or Clinic in Charge of Care (%)	69	91	91	70	75	82
Know Who to Ask for Questions (%)	64	70	80	86	86	80
Know Who to Ask for Questions (%)	64	70	80	86	86	80

Table 16. Comparison of Quality of Care Scores Between First, Second, and Third Questionnaires (Qx) in Puget Sound Cohort

	Clinic (n=23)			Control (n=51)		
Category	First Qx	Second Qx	Third Qx	First Qx	Second Qx	Third Qx
Overall Quality of Care over Prior 12 Months (Mean (SD))	3.68 (1.06)	3.48 (0.96)	3.68 (0.95)	3.65 (1.01)	3.58 (0.99)	3.81 (0.75)
Overall Quality of Most Recent Clinic Visit (Mean (SD))	3.44 (1.3)	3.52 (1.2)	3.57 (1.12)	3.90 (0.94)	3.92 (0.89)	3.88 (0.86)
Quality of Pharmacy Services (Mean (SD))	3.21 (1.13)	3.05 (1.18)	3.32 (1.38)	3.26 (1.29)	3.52 (1.04)	3.48 (0.85)
VA Medical Care as Good as Provided Anywhere (Mean (SD))	3.96 (1.22)	4.22 (0.90)	4.04 (0.88)	4.00 (0.76)	4.12 (0.78)	4.24 (0.66)
Problems Scheduling Appointment (%)	17	25	25	32	20	15
One Provider or Clinic in Charge of Care (%)	64	63	72	41	63	65
Know Who to Ask for Questions (%)	56	69	74	71	80	79

Table 17. Proportions of Veterans' Reporting Problems with Service on First Questionnaire in Portland and Puget Sound Clinic and Control Groups

	Portland		Puget Sound	
	Clinic	**Control**	**Clinic**	**Control**
Dissatisfaction with C & P process/outcome	66.7	61.6	80.8	69.5
Would not use VA if free care available outside	65.8	70.9	68.5	66.4
Usually have to wait for prescriptions more than 30 minutes	75.9	72.8	54.5	51.8
Problem should have been handled sooner	52.4	53.0	57.4	59.7
Don't have one provider in charge of care	43.6	43.8	39.6	58.7
Provider not always familiar with history	44.7	30.3	41.6	44.3
Don't always know next step in care	36.8	32.3	57.9	41.9
Wait in waiting room too long	39.0	35.8	36.1	41.3
Service from pharmacy fair/poor	41.3	37.4	31.5	29.7
Had to wait greater than 20 minutes to be seen	36.6	25.5	28.6	33.8
Don't know who to ask questions	35.9	24.0	34.5	32.4
Didn't get appointment as soon as wanted	30.0	32.4	23.5	31.1
Don't have complete confidence and trust in doctor	15.0	28.3	34.2	31.5
Not given enough info about health	25.6	26.1	38.0	30.1
Not told when to find out test results	30.8	21.5	35.9	23.9
Never got to see specialists when needed to	17.7	30.7	26.4	30.9
Main reason for visit not addressed	27.5	23.9	37.1	28.0
Care at VA as good as anywhere (never/rarely/sometimes)	23.0	21.8	29.3	30.5
Inconvenient appointment times	28.2	19.9	27.3	27.1
Had to wait more than 10 minutes to check in	21.9	18.9	22.2	27.3
Patient not involved in decisions	17.1	21.3	29.7	26.8

Table 17. Continued

Test results not explained	22.2	16.9	27.3	18.5
Not told how to find out results	14.8	17.7	29.5	21.1
Not told what to do if problems continue	12.5	18.6	21.6	20.6
Provider didn't ask how family might effect health	9.8	16.9	23.7	14.1
Usually/often have difficulty making appt. with specialists	22.2	13.8	22.9	23.9
Providers don't always know about tests results	205	16.1	25.0	16.7
Ever felt like a second class citizen	15.4	14.7	24.1	17.3
Overall quality of care in last 12 months fair/poor	12.8	13.2	18.6	21.4
Don't know who to call for help	15.0	14.8	17.0	21.0
Confused because told different things	12.8	14.9	20.0	12.7
Didn't spend as much time as wanted	10.0	16.6	20.5	16.9
Did not discuss concerns with doctor	17.2	13.6	25.0	16.9
Did not completely understand answers to questions	15.0	16.5	18.6	17.6
Provider didn't listen	7.3	13.2	17.5	14.0
Overall quality of visit fair/poor	7.5	10.5	14.4	15.0
Didn't get chance to explain reason for visit	9.8	9.5	13.3	10.5
Side effects of medications not explained	12.5	9.6	16.9	10.3
Courtesy of provider fair/poor	10.0	7.9	8.5	11.0
Purpose of medication not explained	7.5	5.9	4.2	6.5

Table 18. Proportion of Veterans' Responses to Open-ended Questions Regarding VA Care that were Assigned to Each Comment Code Category-Portland, First Questionnaire

Comment Code Categories	Question #1	Question #2	Question #3	Question #4	Question #5
Appointments & Scheduling	29	16	5	13	13
Communicate, accommodate re: appointments	9	5		8	2.5
Evening, weekend hours	9	1		2	4
Timeliness, interval between appointments	8	2		3	4
Problems with phone access	3	8		--	2.5
Geographic Inconvenience	20	9	5	8	13
Compliments	9	18			
Pharmacy (long waits)	8			8	14
Waiting in clinic & not enough staff	8	8			10
Attitudes of non-physician staff	6			6	6
Compensation & Pension, Benefits	5			15	6
Interaction with provider		14	29	8	9
Listen, be concerned		5	8	4	4
Coordination of care		4	--	--	1
Problem not resolved, want information		4	21	4	3
Not enough time		1	--	--	1

Table 18. Continued

Comment Code Categories	Question #1	Question #2	Question #3	Question #4	Question #5
Not getting care desired		9	33	13	6
Better information systems for follow up/follow through		8	21	10	7
Training/qualifications of staff		6			
Nothing can be done/resigned to problem			14	6	
Physical Facility				6	5

Question 1.: "What could we do to make care more convenient?"

Question 2.: "What could we do to make care more effective and helpful?"

Question 3.: "What could we do to help you recover faster or cope better with your health problems?

Question 4.: "Is there anything else that would make a difference for you?"

Question 5.: "What are the most important changes you would like to see made?"

Table 19. Proportions of Veterans' Responses to Open–ended Questions Regarding VA Care that were Assigned to Each Comment Code Category-Puget Sound, First Questionnaire

Comment Code Categories	Question #1	Question #2	Question #3	Question #4	Question #5
Appointments & Scheduling	28	11			12
Communicate, accommodate re: appointments	8	--			1
Evening, weekend hours	8	2			3
Timeliness, interval between appointments	9	7			6
Problems with phone access	3	2			2
Geographic Inconvenience	8			7	
Compliments	11	7	5		6
Pharmacy (long waits)				5	8
Waiting in clinic & not enough staff	18	16		7	18
Attitudes of non-physician staff		8	5	11	10
Compensation & Pension, Benefits			11	18	10
Interaction with provider	13	27	41	33	18
Listen, be concerned	3	8	6	9	8
Coordination of care	5	3	2	5	2
Problem not resolved, want information	5	15	33	19	8
Not enough time	--	1	--	--	--

Table 19. Continued

Comment Code Categories	Question #1	Question #2	Question #3	Question #4	Question #5
Not getting care desired		13	23	11	6
Better information systems for follow up/follow through					
Training/qualifications of staff					
Nothing can be done/resigned to problem					
Physical Facility					

Question 1.: "What could we do to make care more convenient?"

Question 2.: "What could we do to make care more effective and helpful?"

Question 3.: "What could we do to help you recover faster or cope better with your health problems?

Question 4.: "Is there anything else that would make a difference for you?"

Question 5.: "What are the most important changes you would like to see made?"

Table 20. Average Costs and Utilization for Gulf War and Non-Gulf War Clinic Patients in Portland

	Cost ($)		Utilization (#)	
	GW Clinic	***Non-GW Clinic***	*GW Clinic*	*Non-GW Clinic*
Primary Care				
1998	289.13 (23.58)	432.19 (33.44)***	2.42 (0.19)	3.72 (0.35)**
1999	489.62 (33.38)	490.76 (34.88)	3.62 (0.22)	4.33 (0.38)
2000	441.82 (46.06)	379.08 (52.44)	3.42 (0.31)	3.20 (0.60)
Mental Health				
1998	270.15 (76.25)	456.47 (103.66)	1.24 (0.31)	4.05 (1.05)*
1999	404.96 (75.97)	434.99 (79.62)	2.39 (0.40)	4.05 (0.89)
2000	421.97 (96.63)	446.49 (93.43)	2.67 (0.55)	3.64 (0.79)
Non-MH Specialty				
1998	243.34 (33.29)	323.28 (32.97)	1.43 (0.19)	2.29 (0.23)**
1999	223.24 (26.96)	480.09 (65.23)***	1.27 (0.13)	2.84 (0.30)***
2000	438.18 (75.96)	375.73 (63.16)	2.11 (0.32)	2.03 (0.25)
Ancillary/Other				
1998	640.83 (89.59)	1021.85 (115.18)***	9.50 (0.89)	15.38 (1.13)***
1999	699.38 (72.14)	1366.98 (168.12)***	13.4 (0.95)	20.49 (1.36)***
2000	769.41 (100.19)	1129.78 (149.39)*	16.52 (1.07)	19.09 (1.32)
Total Outpatient				
1998	1440.0 (152.93)	2326.58 (202.86)***	14.59 (1.3)	25.44 (2.06)***
1999	1922.5 (153.30)	2920.21 (251.43)***	20.68 (1.4)	31.71 (2.18)***
2000	2403.76 (317.29)	2697.90 (303.47)	26.81 (1.74)	32.19 (2.22)
Total Inpatient				
1998	550.33 (161.64)	732.76 (165.53)	1.41 (0.27)	2.14 (0.30)
1999	512.45 (127.13	849.80 (182.48)	1.42 (0.21)	3.00 (0.56)**
2000	168.44 (48.37)	632.52 (171.65)*	0.82 (0.14)	1.85 (0.27)***
Overall				
1998	2032.53 (329.62)	3065.55 (338.32)*		
1999	2449.87 (279.46)	3721.79 (421.02)*	Not Applicable	
2000	2488.61 (343.55)	3128.22 (392.69)		

Note: Utilization estimates refer to encounters; *** $p < 0.001$, ** $p < 0.01$, * $p < 0.05$; Standard deviations in parentheses

Table 21. Average Costs and Utilization for Gulf War and Non-Gulf War Clinic Patients in Puget Sound

	Cost ($)		Utilization (#)	
	GW Clinic	***Non-GW Clinic***	*GW Clinic*	*Non-GW Clinic*
	N=182	***N=421***	*N=182*	*N=421*
Primary Care				
1998	405.54 (74.72)	324.16 (50.82)	3.71 (0.39)	2.47 (0.21)**
1999	873.25 (112.82)	328.39 (35.71)***	3.73 (0.37)	2.20 (0.18)***
2000	384.88 (60.81)	352.04 (58.76)	2.47 (0.36)	2.50 (0.31)
Mental Health				
1998	695.97 (149.93)	387.64 (81.28)	7.15 (1.49)	3.64 (0.76)*
1999	878.74 (181.73)	311.24 (59.48)***	7.91 (1.42)	3.06 (0.58)***
2000	890.52 (156.37)	303.59 (66.33)***	9.33 (1.70)	2.69 (0.58)***
Non-MH Specialty				
1998	516.63 (87.95)	617.97 (187.80)	6.08 (1.40)	3.63 (0.50)*
1999	843.80 (218.74)	344.44 (36.81)**	7.14 (1.59)	3.34 (0.31)***
2000	647.52 (86.47)	425.50 (75.37)	5.69 (0.64)	3.32 (0.41)**
Ancillary/Other				
1998	1294.74 (317.83)	1043.64 (208.64)	15.24 (1.60)	15.03 (1.38)
1999	1282.83 (208.79)	891.56 (166.03)	20.65 (1.84)	16.66 (1.09)
2000	1334.45 (225.55)	833.53 (94.01)*	22.66 (2.25)	17.57 (1.47)
Total Outpatient				
1998	2777.20 (438.1)	2088.36 (311.07)	32.18 (3.84)	24.77 (2.17)***
1999	3631.86 (395.0)	1733.84 (178.16)***	39.43 (4.07)	25.26 (1.67)***
2000	3490.56 (398.5)	1759.44 (164.31)***	43.18 (4.18)	28.53 (2.31)**
Total Inpatient				
1998	872.68 (297.90)	579.92 (220.62)	0.91 (0.33)	0.50 (0.11)
1999	670.81 (196.62)	516.68 (153.13)	0.94 (0.24)	0.55 (0.09)
2000	308.98 (134.07)	218.86 (65.15)	0.65 (0.15)	0.46 (0.08)
Overall				
1998	3882.23 (716.69)	2872.27 (615.42)		
1999	4711.03 (642.91)	2333.66 (341.01)***	Not Applicable	
2000	4046.13 (540.66)	1828.18 (173.52)***		

Note: Utilization estimates refer to encounters; *** $p < 0.001$, ** $p < 0.01$, * $p < 0.05$; Standard deviations in parentheses

Table 22. Average Cost Differences between Gulf War Clinic and Non-Gulf War Clinic Patients in Portland between 1998-2000 as Calculated by from Regression Analyses

	Relative Cost ($)	Relative Utilization (#)
Primary Care	--	--
Mental Health Care	--	--
Specialty Care	- $ 16.61 (59.72)	- 0.74 (0.11)*
Ancillary and Other Care	- $259.30 (130.91)*	- 0.97 (0.08)
Total Outpatient Care	- $259.70 (247.43)	- 0.92 (0.08)
Total Inpatient Care	- $294.85 (143.38)*	- 0.67 (0.11)*
Overall	- $554.55 (354.07)	--
Sample Size	565	565

Note: *** $p < 0.001$, ** $p < 0.01$, * $p < 0.05$; Standard deviations in parentheses

Table 23. Average Cost Differences between Gulf War Clinic and Non-Gulf War Clinic Patients in Puget Sound between 1998-2000 from Regressions

	Relative Cost ($)	Relative Utilization (#)
Primary Care	$300.71 (85.77)***	1.90 (0.19)***
Mental Health Care	$650.13 (145.69)***	4.21 (0.93)***
Specialty Care	$278.98 (131.41)*	2.26 (0.35)***
Ancillary and Other Care	--	--
Total Outpatient Care	$1776.86 (399.91)***	1.99 (0.21)***
Total Inpatient Care	--	--
Overall	$2088.44 (546.97)***	--
Sample Size	603	603

Note: *** $p < 0.001$, ** $p < 0.01$, * $p < 0.05$; Standard deviations in parentheses

FY00 FINAL REVIEW OF RESEARCH

INSTRUCTIONS: Please answer the following questions and sign at the bottom of the page. Give an explanation for all negative responses.

YES	NO	
__X__	_____	1. Research files are being maintained by the principal investigator.
__X__	_____	2. These files are ready to be inspected as part of the continuing periodic review process as required by VHA and other federal regulations.
__X__	_____	3. If human use, subject participation or risk has not been influenced by new developments or literature.
__X__	_____	4. If human use, the current risk/benefit ratio is about the same (or lower) as when the study was first approved.
__X__	_____	5. If human use, I have reviewed the consent form during this report period to ensure its appropriateness (Date of review: December, 1999). The consent form has been revised and updated, if required, to meet HUC/IRB guidelines.

_____ _____

Signature Date

Report Date August 15, 2000

FY00 LIST OF PUBLICATIONS

(A) Abstracts:

Hickam DH, Joos SK. Effect of a primary care delivery model on satisfaction with medical care among young adult patients. J Gen Intern Med 2000; 15 (Supp 1):121.