

PRIMUS/NAVCARE Cost-Effectiveness Analysis

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Prepared by

Vector Research, Incorporated

for

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ACRONYMS AND ABBREVIATIONS

AFB	Air Force Base
AH	Army Hospital
CEC	CHAMPUS-Equivalent Cost
CEC _{MTF}	CHAMPUS-Equivalent Cost of an MTF Visit
CEC _{P/N}	Total CHAMPUS-Equivalent Cost of a PRIMUS/NAVCARE Visit
CEC _{P/N(G)}	Government Share of Total CHAMPUS-Equivalent Cost of a PRIMUS/NAVCARE Visit
CHAMPUS	Civilian Health and Medical Program of the Uniformed Services
CMI	Casemix Index
CONUS	Continental United States
CPT-4	Physicians' Current Procedural Terminology, Fourth Edition
CRI	CHAMPUS Reform Initiative
CY	Calendar Year
DMIS	Defense Medical Information System
DoD	Department of Defense
ENT	Ears, Nose, and Throat
FI	CHAMPUS Fiscal Intermediary
FT	Fort
FY	Fiscal Year
ICD-9-CM	International Classification of Diseases, Ninth Revision, Clinical Modification
MEPRS	Medical Expense and Performance Reporting System
MHSS	Military Health Services System
MTF	Medical Treatment Facility
MTF _{CMI}	Casemix-Adjusted Marginal Cost of an MTF Visit
NAVCARE	Navy Cares
NH	Naval Hospital
OASD(HA)	Office of the Assistant Secretary of Defense (Health Affairs)
OB/GYN	Obstetrics and Gynecology
OCSR	Outpatient Care for Services Received
OCHAMPUS	Office of the Civilian Health and Medical Program of the Uniformed Services
P/N	PRIMUS/NAVCARE
P/NAV _G	Average Actual Cost of a PRIMUS/NAVCARE Visit
PRIMUS	Primary Care for the Uniformed Services
RAPS	Resource Analysis and Planning System
RRA	Registered Records Administrator
SF 600	Standard Form 600 - Chronological Record of Medical Care
SH	Air Force Strategic Hospital
URI	Upper Respiratory Infection

FOREWORD

This document presents an analysis of issues related to the cost-effectiveness of PRIMUS/NAVCARE clinics. The analysis was conducted as part of an evaluation of PRIMUS/NAVCARE clinics that is summarized in the Final Report to Congress on the PRIMUS/NAVCARE Evaluation (Lewin/ICF, May 1991). The evaluation focused upon the impact of these clinics on access to care, MTF overcrowding, and the cost of providing care, along with an assessment of some aspects of quality.

The primary authors of this document are Ron Mitchell, Kevin Dombkowski, and Charles Roehrig of Vector Research, Incorporated, (VRI). Valuable contributions were also made by David Kennell and Terry Savelle of Lewin/ICF.

While none of the military medical departments has expressly endorsed the contents of this report, Army Regulation 40-66 specifically requires the following statement: "The use of Army medical records in the preparation of this material is acknowledged, but it is not to be construed as implying official Department of the Army approval of the conclusions presented."

1.0 EXECUTIVE SUMMARY

1.1 OVERVIEW OF THE STUDY

The Office of the Assistant Secretary of Defense (Health Affairs) sponsored a Congressionally-required evaluation of the PRIMUS/NAVCARE program. The evaluation focused on four dimensions of the program:

- improved access to care;
- relief of military treatment facility overcrowding;
- cost-effectiveness of care; and
- quality of care.

This document focuses on the cost-effectiveness of the PRIMUS/NAVCARE program using the direct care and CHAMPUS programs for comparison. The cost-effectiveness component of the PRIMUS/NAVCARE evaluation was based upon information obtained from the military medical departments and OCHAMPUS, as well as medical records gathered during site visits to representative PRIMUS/NAVCARE clinics and their sponsoring military medical treatment facilities (MTFs).

The remainder of this executive summary provides a brief overview of the methodology employed to assess the cost-effectiveness of the PRIMUS/NAVCARE program and the results of the cost-effectiveness analysis. The remainder of this document provides the detailed methodology and results on which the executive summary is based.

1.2 METHODOLOGY

The cost-effectiveness portion of the PRIMUS/NAVCARE evaluation involved two basic steps:

- First, adjusting for differences in casemix, PRIMUS/NAVCARE unit costs were compared to unit costs from the CHAMPUS and direct care programs.
- Second, using results from an analysis of PRIMUS/NAVCARE utilization, the impact of PRIMUS/NAVCARE on the overall cost of providing the military primary care benefit was determined.

1.2.1 UNIT COSTS

The unit cost comparisons developed under the methodology described below are aimed at answering the following question:

What would the services provided during a typical PRIMUS/NAVCARE visit cost the government if provided by:

- a PRIMUS/NAVCARE clinic;
- an MTF; and
- a civilian provider under the CHAMPUS program?

Visit costs can vary significantly by geographic location, especially for PRIMUS/NAVCARE and CHAMPUS. Since it was not feasible to analyze each PRIMUS/NAVCARE site individually, we focused on the development of unit cost comparisons at the national level.

PRIMUS/NAVCARE Unit Costs

For PRIMUS/NAVCARE unit costs, we used the average cost per visit in FY89 for all clinics that were in operation that year.

CHAMPUS Unit Costs

In order to estimate the CHAMPUS cost of a typical PRIMUS/NAVCARE visit, we gathered medical record information on procedures performed and medications prescribed for a sample of PRIMUS/NAVCARE visits. Using information on national average CHAMPUS costs per individual procedure, medication costs, and claims processing costs, we calculated what each of these visits would have cost under CHAMPUS. We used the average of these costs as our estimate of the national average CHAMPUS cost of a typical PRIMUS/NAVCARE visit.

MTF Unit Costs

The approach to estimating the MTF cost of a typical PRIMUS/NAVCARE visit differed from that described above for CHAMPUS because data on MTF costs per procedure do not exist. In essence, our approach involved the following two steps:

- estimate the MTF cost per typical MTF primary care visit; and
- adjust this cost for differences in complexity between the typical MTF primary care visit and the typical PRIMUS/NAVCARE visit.

In order to assess differences in complexity between MTF and PRIMUS/NAVCARE visits, we collected medical record information on procedures performed and medications prescribed for a sample of MTF primary care visits. We then compared this information with similar information gathered on PRIMUS/NAVCARE visits to determine the factor used to adjust

the initial MTF cost estimate for differences in MTF and PRIMUS/NAVCARE visit complexity.

An Important Limitation on the Comparability of the Unit Cost Estimates

It should be emphasized that the MTF and CHAMPUS unit costs developed under this methodology refer to the cost of providing the set of services associated with the typical PRIMUS/NAVCARE visit. Because of varying practice patterns and financial incentives, this may be quite different from the unit cost of the care that would actually be provided to the typical PRIMUS/NAVCARE patient at an MTF or under CHAMPUS. PRIMUS/NAVCARE clinics are paid a fixed amount per regular visit, regardless of the procedures performed, and thus there is an incentive to minimize procedures. CHAMPUS physicians, on the other hand, have a financial incentive to maximize the use of profitable procedures. MTF incentives would appear to be more neutral. Thus, one would predict that the actual cost of providing an MTF or CHAMPUS visit to the typical PRIMUS/NAVCARE patient would exceed these unit cost estimates because of differences in services provided, particularly in the case of CHAMPUS.

Using the medical record samples, we attempted to determine whether MTFs conducted more procedures than PRIMUS/NAVCARE patients with similar presenting diagnoses. Our findings were inconclusive. We were unable to conduct a similar analysis of CHAMPUS care due to the absence of medical record data.

Adequacy of Medical Records Sample

Because of the expense involved in gathering and coding medical records, the sample of PRIMUS/NAVCARE and MTF medical records was limited to a total of about 1,300 visits taken from two sites (two PRIMUS clinics and their parent MTFs) over a two-day collection period. It is important to consider the adequacy of this sample for the purposes of the study. Key concerns include the adequacy of the sample size and the extent to which the sample is nationally representative in terms of visit content.

The size of the sample proved to be adequate for identifying statistically significant differences among unit costs. Without additional data collection, it is not possible to determine conclusively whether or not the sample is nationally representative in terms of actual visit content (i.e., procedures and medications per visit). However, for PRIMUS clinics, we found that the sample was nationally representative in terms of the mix of beneficiary types treated.

Due to the absence of national data on the beneficiary mix of MTF primary care visits, we could not test the representativeness of the beneficiary mix in our MTF sample. However, because MTF costs were case-mix adjusted separately for children and adults, MTF beneficiary mix is not a critical concern.

1.2.2 OVERALL COSTS

Our calculation of the overall cost of the PRIMUS/NAVCARE program was based largely upon findings from the utilization portion of the evaluation. That portion of the study classified the 1.5 million PRIMUS/NAVCARE visits that occurred in FY89 into three categories:

- those that would have been MTF visits in the absence of PRIMUS/NAVCARE;
- those that would have been paid for under CHAMPUS in the absence of PRIMUS/NAVCARE; and
- those that were essentially new visits in the MHSS.

The overall cost of the PRIMUS/NAVCARE program was then computed by multiplying the visits in each category by the appropriate unit cost differences. Visits shifted to PRIMUS/NAVCARE from the MTF were costed at the difference between PRIMUS/NAVCARE unit costs and MTF unit costs. Visits shifted from CHAMPUS were costed at the difference between PRIMUS/NAVCARE unit costs and CHAMPUS unit costs. New visits were costed at full PRIMUS/NAVCARE unit costs.

Limitations of the Methodology

The overall cost estimates resulting from this methodology should be interpreted carefully. As already noted, the CHAMPUS unit cost estimates used in computing these overall costs will understate the actual unit costs to the extent that CHAMPUS treatment patterns are more intensive than PRIMUS/NAVCARE. In addition, there are potential savings associated with PRIMUS/NAVCARE that are not accounted for in the

methodology. Because PRIMUS/NAVCARE physicians refer patients to the MTF for specialty care and inpatient care, they provide a mechanism for shifting such care away from CHAMPUS and into the less expensive direct care system.¹ Lastly, there are interrelationships among MTFs, PRIMUS/NAVCARE clinics, and CHAMPUS that should be recognized. For example, MTFs may provide various ancillary services to PRIMUS/NAVCARE patients, and many prescriptions written by CHAMPUS physicians are actually filled by an MTF pharmacy. As a result, there is some intermingling of cost and workload among the three practice settings that is difficult, if not impossible, to isolate with current data systems.

1.3 RESULTS

Unit Costs

Although there is considerable variability in average cost per visit among individual PRIMUS/NAVCARE clinics, we determined that, on average, the government paid \$49 per PRIMUS/NAVCARE visit in FY89. As shown below, our findings indicate that the cost to the government would have been less if this average PRIMUS/NAVCARE visit had been obtained

¹It should be noted, however, that some portion of the care shifted into the direct care system would otherwise not have involved CHAMPUS. Thus, there may be occasions when government costs are actually increased when direct care referrals are increased.

through CHAMPUS or an MTF. For CHAMPUS, this cost would be \$10 less; for the MTF, approximately \$15 less.

<u>Visit Provider</u>	<u>Cost of Typical PRIMUS/NAVCARE Visit</u>	<u>Savings Relative to PRIMUS/NAVCARE</u>
PRIMUS/NAVCARE	\$48.52	- - -
CHAMPUS	\$38.52	\$10.00
MTF	\$33.60	\$14.92

We also found that the total CHAMPUS cost of a PRIMUS/NAVCARE visit — as opposed to the government share shown above — was about \$52. This exceeds the visit costs for the PRIMUS/NAVCARE program by about \$3.50.

In our analysis of visit complexity, we found that child visits were, on average, less complex than adult visits, both at the PRIMUS/NAVCARE clinics and at the MTF (e.g., a less expensive mix of services was provided, on average, to children). In addition, for both adults and children, MTF visit complexity was found to be higher than in the PRIMUS/NAVCARE clinic. Note that the increased visit complexity at the MTF may be due to variations in treatment patterns as opposed to variations in the complexity of patient illnesses.

Overall Costs

When we linked the results of our unit cost analysis with those of our utilization analysis, we found the net cost to the government of the PRIMUS/NAVCARE program in FY89 to be approximately \$44 million, as summarized below.

<u>CATEGORY OF PRIMUS/NAVCARE VISIT</u>	<u>VISITS</u>	<u>NET COST PER VISIT</u>	<u>TOTAL NET COST</u>
Visits Shifted from MTF	660,000	\$15	\$ 9.8 Million
Visits Shifted from CHAMPUS	170,000	\$10	\$ 1.7 Million
New Visits	670,000	\$49	\$32.5 Million
Total, All Visits	1,500,000	\$29	\$44.1 Million

The government paid approximately \$72 million in FY89 for PRIMUS/NAVCARE program visits (1.5 million visits @ \$49 per visit). We estimate that \$22 million of this sum was offset by decreases in MTF utilization (660,000 visits @ \$34), and \$6 million was offset by decreases in CHAMPUS utilization (170,000 visits @ \$39). These offsets leave \$44 million in net program costs or a net cost per visit of \$29 for each of the 1.5 million PRIMUS/NAVCARE visits. At a net additional cost of more than \$32 million, new visits constitute the largest share of total program increased costs.

These cost estimates are based upon a scenario in which similar patients receive similar services regardless of where the care is received. As noted earlier, it is likely that similar patients would in

reality be treated more intensively under CHAMPUS than at PRIMUS/NAVCARE. Therefore, it is useful to examine some alternate scenarios in which this increased intensity under CHAMPUS is assumed.

If CHAMPUS treatment intensity is twice that of PRIMUS/NAVCARE for similar patients, then the unit cost estimate under CHAMPUS would rise to \$77. Instead of losing \$10 for every visit shifted from CHAMPUS to PRIMUS/NAVCARE, there would actually be a savings of \$28.50 per visit. The net effect is to reduce our overall PRIMUS/NAVCARE cost estimate from \$44.1 million to \$37.5 million. If CHAMPUS treatment intensity was triple that of PRIMUS/NAVCARE, the estimated overall cost of PRIMUS/NAVCARE would be reduced to \$30.9 million.

2.0 UNIT COST ANALYSIS

Estimating the average cost of a PRIMUS/NAVCARE, MTF, or CHAMPUS visit is not in itself a difficult task. All three systems maintain cost and workload data expressed in terms of dollars and visits. As a result, simple average costs per visit could be computed by developing ratios of total dollars to visits. However, it is possible that the services and supplies actually provided during an average visit in each setting may differ. These differences may be due to differences in illness complexity within each system, or different styles of treating similar illnesses. Thus, if the simple average cost of an MTF visit exceeded that of a PRIMUS/NAVCARE visit, it would not be clear whether this was due to higher costs for the same services, or more services being provided per visit. The methodology used in the unit cost analysis is designed to control for differences in treatment intensity per visit.

The remainder of this chapter is divided into two sections. The first section provides an overview of our unit cost methodology, detailing our approach and focusing on our casemix adjustment procedures.¹ Based upon this methodology, the results of our unit cost analysis are presented in the second section of this chapter (which serves as the basis for our evaluation of the PRIMUS/NAVCARE program's cost-effectiveness).

¹This methodology builds upon that used by the Office of the Department of Defense Inspector General, Audit Report No. 90-012, "Primary Care for the Uniformed Services and Navy Cares Programs", 6 December 1989.

2.1 UNIT COST METHODOLOGY

The unit cost comparisons developed under the methodology described below are aimed at answering the following question:

What would the services provided during a typical PRIMUS/NAVCARE visit cost the government if provided by:

- a PRIMUS/NAVCARE clinic;
- an MTF; and
- a civilian provider under the CHAMPUS program?

Visit costs can vary significantly by geographic location, especially for PRIMUS/NAVCARE and CHAMPUS. Since it was not feasible to analyze each PRIMUS/NAVCARE site individually, we focused on the development of unit cost comparisons at the national level.

PRIMUS/NAVCARE Unit Costs

For PRIMUS/NAVCARE unit costs, we used the average cost per visit in FY89 for all clinics that were in operation that year. (Details of this methodology are provided in section 2.1.3 under step 1.)

CHAMPUS Unit Costs

In order to estimate the CHAMPUS cost of a typical PRIMUS/NAVCARE visit, we gathered medical record information on procedures performed and medications prescribed for a sample of PRIMUS/NAVCARE visits. Using information on national average CHAMPUS costs per individual procedure, medication costs, and claims processing costs, we calculated what each of these visits would have cost under CHAMPUS. We used the average of these costs as our estimate of the national average CHAMPUS cost of a

typical PRIMUS/NAVCARE visit. (Details of this methodology are presented in section 2.1.3, steps 2 through 7.)

MTF Unit Costs

The approach to estimating the MTF cost of a typical PRIMUS/NAVCARE visit differed from that described above for CHAMPUS because data on MTF costs per procedure do not exist. In essence, our approach involved the following two steps:

- estimate the MTF cost per typical MTF primary care visit; and
- adjust this cost for differences in complexity between the typical MTF primary care visit and the typical PRIMUS/NAVCARE visit.

In order to assess differences in complexity between MTF and PRIMUS/NAVCARE visits, we collected medical record information on procedures performed and medications prescribed for a sample of MTF primary care visits. We then compared this information with similar information gathered on PRIMUS/NAVCARE visits to form the factor used to adjust the initial MTF cost estimate for differences in MTF and PRIMUS/NAVCARE visit complexity. (Details of this methodology are presented in section 2.3.1, steps 8 through 10.)

The remainder of this section provides a discussion of the methodology developed to control for casemix differences and provide comparative costs between the PRIMUS/NAVCARE, MTF and CHAMPUS programs. The methodology discussion is organized into three subsections. The first subsection contains a discussion of a concept central to our approach to the development of comparative costs, referred to as the

"CHAMPUS-equivalent cost". Next, a discussion of the methodology employed for medical records sampling from the PRIMUS/NAVCARE and MTF systems is presented. Sampling of patient records was performed at PRIMUS/NAVCARE and MTF sites to obtain detailed information in support of the development of CHAMPUS-equivalent costs. This subsection describes our sampling methodology and the representativeness of the casemix adjustment indices derived from that portion of the study. The final subsection presents an overview of the unit cost methodology based upon the CHAMPUS-equivalent cost concept and the sampled medical records from PRIMUS/NAVCARE and MTFs. The overview provides a step-by-step summary of the development of comparable PRIMUS/NAVCARE, MTF and CHAMPUS costs.

2.1.1 DEVELOPMENT OF CHAMPUS-EQUIVALENT COSTS

Comparative unit costs for PRIMUS/NAVCARE, MTF and CHAMPUS outpatient visits were required in order to assess the cost-effectiveness of the PRIMUS/NAVCARE program. A methodology was developed to estimate the average cost of a typical PRIMUS/NAVCARE visit under the current program, as well as average costs for the typical PRIMUS/NAVCARE visit if reimbursed through the CHAMPUS program or performed by an MTF.

Our unit cost methodology takes advantage of the fact that the bills that physicians submit to OCHAMPUS must be itemized by CPT-4 procedure code² and, thus, average costs for each CPT-4 code can be

²American Medical Association, Physicians' Current Procedural Terminology, Fourth Edition.

derived from standard OCHAMPUS reports. In order to implement our unit cost approach, it was necessary to decompose MTF and PRIMUS/NAVCARE visits into their constituent parts, which include physician procedures, allied health professional procedures, laboratory procedures, radiology procedures, and pharmaceuticals. This decomposition was accomplished using detailed visit descriptions contained in a sample of patient charts. From the visit description, a registered records administrator (RRA) was able to identify the specific procedures performed during each visit and assign them the appropriate CPT-4 code.

Once all procedures were identified and coded by the RRA (up to 10 procedures per visit), the CHAMPUS national average cost associated with each CPT-4 code was determined from standard CHAMPUS reports. Summing the costs of all procedures for a given visit produced an estimate of the cost of the visit - i.e., its CHAMPUS-equivalent cost (CEC). As explained further in Section 2.3.1, we also factored into our calculation of each visit's CEC an estimate of medication costs and an estimate of CHAMPUS costs for claims processing.

To summarize, the total CHAMPUS-equivalent cost of a visit was calculated as:

$$CEC = \left[\sum_{i=1}^{10} (UCP_i) \right] + (M \times UCM) + FIC;$$

where,

CEC = total CHAMPUS-equivalent cost of the visit;

UCP_i = CHAMPUS unit cost of procedure i , with i designating one of up to 10 distinct procedures documented in the medical record;

M = medication count;

UCM = unit cost of medications; and

FIC = an estimate of the fee received by a CHAMPUS Fiscal Intermediary (FI) for processing a claim for the visit.

Exhibit 2-1 demonstrates how the CEC would be calculated based on the visit description in an example medical record.

Once calculated, the CHAMPUS-equivalent cost can be used to: place a value on a single visit; compute the average value of a class of visits (e.g., all MTF pediatric visits); or assess the relative value of two visits or two classes of visits. In the unit cost analysis, we make the assumption that the cost of a given procedure (i.e., the charges billed to CHAMPUS) is an indicator of the resource inputs associated with the procedure which, in turn, are an indicator of the demands for or complexity of the case being treated. We compute an average CEC for MTF visits (CEC_{MTF}) and an average CEC for PRIMUS/NAVCARE visits ($CEC_{P/N}$). We use the ratio of the averages ($CEC_{MTF}:CEC_{P/N}$) as a casemix index (CMI) — i.e., a measure of the relative case complexity of the MTF and PRIMUS/NAVCARE settings.

Development of the CMI is necessary because MTFs — unlike the CHAMPUS program — do not currently accumulate procedure-level expense data. The lowest level of disaggregation at which MTF expense data are available is the workcenter, as defined in the Medical Expense and Performance Reporting System (MEPRS). In the ambulatory setting, a MEPRS workcenter corresponds to an outpatient clinic (e.g., workcenter BDA refers to a pediatrics clinic). Given cumulative expense data for an ambulatory workcenter and its performance in terms of visits, it is

EXHIBIT 2-1: EXAMPLE MEDICAL RECORD AND CHAMPUS- EQUIVALENT COST CALCULATION

MEDICAL RECORD VISIT DESCRIPTION

CASE NUMBER: 212

CHIEF COMPLAINT: Still coughing.

SUBJECTIVE FINDINGS: 22 year old female complains of daily cough for three months. Better today. Took Erythromycin without relief. No tobacco/drugs. No current medications. No known allergies. Works on computer.

OBJECTIVE FINDINGS: Lungs - clear
Heart - regular rate and rhythm, normal sounds
Ears/Nose/Throat - normal
CXR - normal

ASSESSMENT: Chronic cough for three months

PLAN: Increase fluids.
Brand X Cough Syrup with Codeine, 1-2 tsp. qid prn.
CBC.
Return to clinic if cough continues.

CEC CALCULATION

	CPT-4 CODE	DESCRIPTION	CHAMPUS COST
PROCEDURE #1	90050	Office and other outpatient medical service; established patient, limited service	\$28.69
PROCEDURE #2	71010	Radiologic examination; chest, single view, frontal	\$26.80
PROCEDURE #3	85024	Blood count; hemogram and platelet count, automated, and automated partial differential WBC count (CBC)	\$22.64
TOTAL PROCEDURE COSTS			\$78.13
MEDICATIONS (1 @ \$7.02)			\$ 7.02
CHAMPUS CLAIMS PROCESSING COSTS			\$ 4.15
TOTAL CHAMPUS-EQUIVALENT COST			\$89.30

possible to calculate an average expense per visit; however, no statement can be made regarding the expense associated with one particular visit in either relative or absolute terms.

It should be noted that $CEC_{P/N}$ and CEC_{MTF} respectively are estimates of what it would cost under CHAMPUS to obtain the services rendered during a typical PRIMUS/NAVCARE visit and a typical MTF primary care visit. What we actually would like to know, however, is what it would cost to treat the typical PRIMUS/NAVCARE patient under CHAMPUS or at an MTF. How and why might these two estimates differ?

The practice of medicine is not entirely standardized. The same patient may receive different care depending upon the provider's economic incentives, as well as the provider's clinical ability and approach. The PRIMUS/NAVCARE contractor is reimbursed a fixed amount per visit regardless of the resources consumed in the visit. Not surprisingly, PRIMUS/NAVCARE contractors generally exercise a system of utilization review intended to identify and minimize the over-utilization of resources per visit by their providers. CHAMPUS providers working on a fee-for-service basis and MTF providers working on a salaried basis are less subject to such pressures. The CHAMPUS provider actually has an economic incentive to increase, rather than constrain, the resource content of a visit. For such reasons, CEC may underestimate the cost of treating a typical PRIMUS/NAVCARE patient in the CHAMPUS or MTF settings.

2.1.2 MEDICAL RECORD SAMPLING TO SUPPORT COMPARATIVE COST DEVELOPMENT

A sample consisting of 1,422 medical records was gathered over a two-day period in July 1990 at two PRIMUS clinics and the adult and pediatric primary care clinics of their sponsoring MTFs.³

<u>PRIMUS/NAVCARE CLINIC</u>	<u>SPONSOR MTF</u>
PRIMUS Killeen	Darnall Army Hospital, Fort Hood, Texas • General Outpatient Clinic • Pediatrics Clinic
PRIMUS Omaha	Ehrling Bergquist Strategic Hospital, Offutt AFB, Nebraska • Primary Care Clinic • Family Practice Clinic • Pediatrics Clinic

All of the clinics use Standard Form 600 (SF 600) to document clinic visits.⁴ For each medical record, the SF 600 bearing the most recently dated entry was photocopied on-site. Off-site, patient demographic information (age, sex, beneficiary category) was abstracted from each SF 600, which was then reviewed by an experienced registered records administrator who assigned a CPT-4 procedure code for each

³While none of the military medical departments has expressly endorsed the contents of this report, Army Regulation 40-66 specifically requires the following statement: "The use of Army medical records in the preparation of this material is acknowledged, but it is not to be construed as implying official Department of the Army approval of the conclusions presented."

⁴SF 600 (Chronological Record of Medical Care) is a problem-oriented medical record that is used to document clinic visits typically in a standard SOAP format (subjective findings, objective findings, assessment, and plan). The single most recently dated entry on a given SF 600 was defined as a visit -- i.e., no attempt was made to construct episodes of care spanning more than one treatment encounter.

procedure documented in the record.⁵ The diagnosis that most prompted the clinic visit was identified and assigned an ICD-9-CM diagnosis code.⁶ Lastly, medications dispensed or prescribed during the visit were tallied.

2.1.3 DEVELOPMENT OF COMPARATIVE UNIT COSTS

Using the concept of CHAMPUS-equivalent costs as a basis for our approach, we developed comparative cost estimates for typical care provided under the three programs:

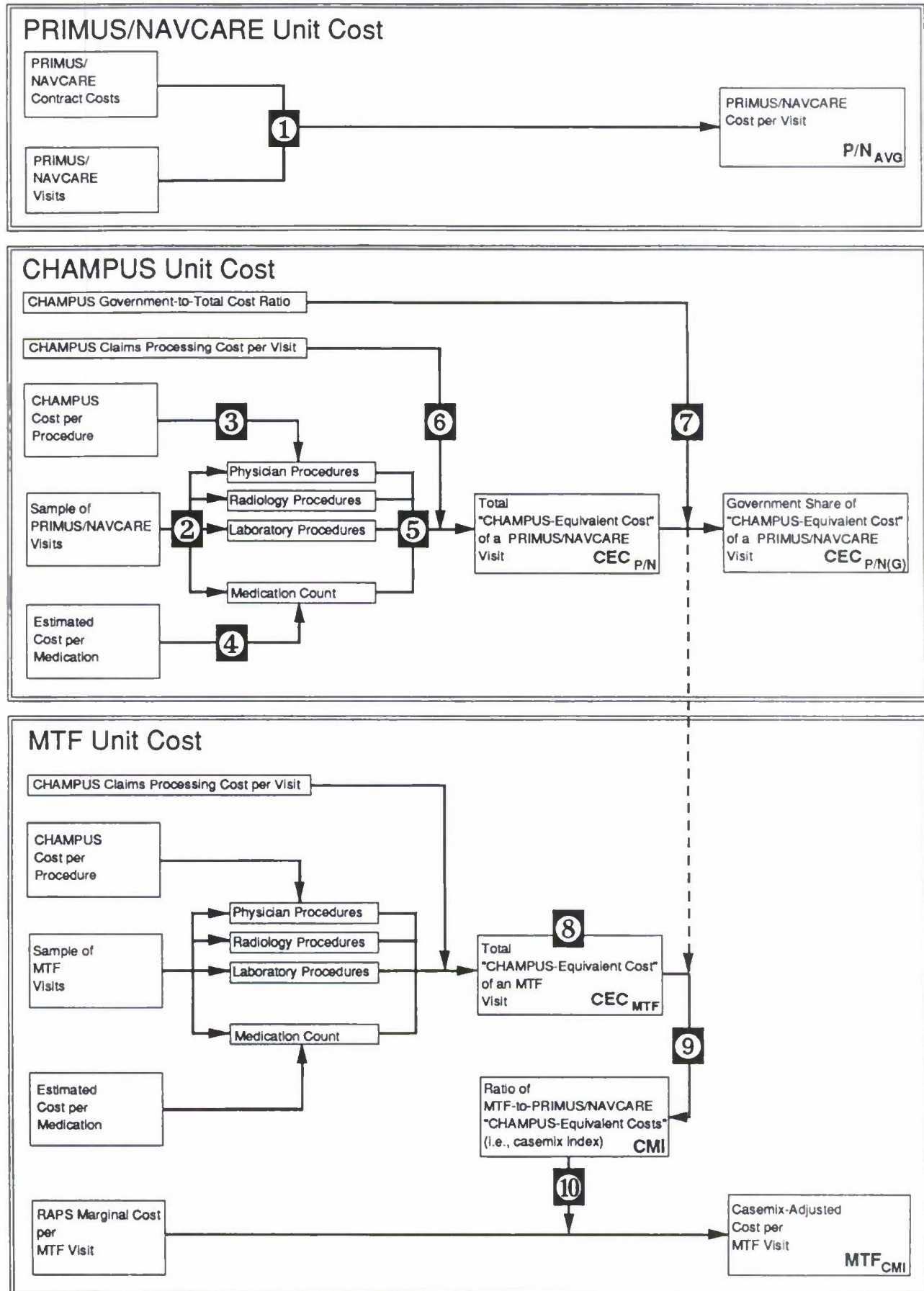
- a typical PRIMUS/NAVCARE visit;
- a typical PRIMUS/NAVCARE visit if claimed under CHAMPUS; and
- a typical PRIMUS/NAVCARE visit if performed in an MTF.

Exhibit 2-2 provides an overview of the methodology used to develop the three estimates of government cost per visit. The exhibit illustrates that ten major steps were followed in developing unit cost estimates for the three programs. As can be seen from the exhibit, step 1 pertains to the development of PRIMUS/NAVCARE unit costs, while steps 2 through 7 relate to CHAMPUS unit costs. MTF unit costs are described in steps 8 through 10. The following paragraphs provide details for each of the ten steps outlined in the overview exhibit.

⁵All medical records were coded by the same abstractor. Coding was supervised and inspected to ensure accuracy.

⁶International Classification of Diseases, Ninth Revision, Clinical Modification. Detailed ICD-9-CM diagnoses were subsequently mapped into one of 18 diagnostic classes.

EXHIBIT 2-2: OVERVIEW OF UNIT COST METHODOLOGY



Step 1: Estimate PRIMUS/NAVCARE Unit Costs.

The government pays for PRIMUS/NAVCARE visits on a visit-by-visit basis. This payment varies according to three factors: type of service, volume of visits, and specific contractual provisions. With respect to the type of service, the government is charged less for an abbreviated visit, for example, than for a full-length visit. Most PRIMUS/NAVCARE contracts include unit cost discounts at predetermined volume thresholds, thus the number of visits provided each year plays a role in the actual unit cost of a PRIMUS/NAVCARE visit. As a result, a visit occurring late in the contract year is generally less expensive to the government than one occurring early in the year. Finally, there is considerable diversity across PRIMUS/NAVCARE contracts in the way in which services are defined and in the charges that the government and contractor agree to for such services. For the most part, physician, paraprofessional, laboratory, radiology, and pharmacy services are included in the basic per-visit charge, although some contracts deal with prescription refill and handling charges separately.

In this analysis, we used a program-wide, average cost to the government for a PRIMUS/NAVCARE visit, derived from actual FY89 utilization levels and actual FY89 contractor payments, rather than computing separate unit costs representing each of the contractual variations. This average cost -- designated by P/N_{AVG} -- is based upon the national average for the PRIMUS/NAVCARE program, providing consistency with the MTF and CHAMPUS national average costs described below in steps 3 and 10 of the methodology. Therefore, estimating PRIMUS/NAVCARE unit cost was simply a matter of dividing government

payments to PRIMUS/NAVCARE contractors by the number of visits performed. The resultant ratio provides an overall average cost per visit to the government for a PRIMUS/NAVCARE visit. The contractor services and government costs that were included in the calculation are broken out below.

CONTRACTOR SERVICES				
<u>BRANCH</u>	<u>REGULAR VISITS</u>	<u>SHORT VISITS</u>	<u>"NO-CHARGE" VISITS</u>	<u>TOTAL VISITS</u>
Army	559,680	47,888	15,814	623,382
Navy	668,591	51,867	0	720,458
Air Force	123,818	6,720	0	130,538
TOTAL	1,352,089	106,475	15,814	1,474,378

GOVERNMENT COSTS					
<u>BRANCH</u>	<u>REGULAR VISIT COSTS</u>	<u>SHORT VISIT COSTS</u>	<u>MEDICATION COSTS</u>	<u>PRO RATED START-UP COSTS</u>	<u>TOTAL COSTS</u>
Army	\$25,766,602	\$301,912	\$643,225	\$509,964	\$27,221,703
Navy	\$35,728,036	\$272,049	\$14,010	\$854,088	\$36,868,183
Air Force	\$7,071,207	\$48,109	\$2,755	\$323,085	\$7,445,156
TOTAL	\$68,565,845	\$622,070	\$659,990	\$1,687,137	\$71,535,042

Medication costs refer to contractor reimbursements for prescription dispensing and handling over and above the pharmacy expenses included in the basic visit price. As can be seen, this payment pattern is much more common in Army contracts. Start-up cost refers to a one-time payment made by the government to the contractor to cover the cost of acquiring and outfitting a facility. For this analysis, start-up costs were prorated over the five-year life of the typical PRIMUS/NAVCARE contract - i.e., the \$1.7 million figure above is one-fifth of all

start-up costs that have been paid out by the government. Given these statistics, the average unit cost to the government of a PRIMUS/NAVCARE visit in FY89 was $\$71,535,042 \div 1,474,378 \text{ visits} = \48.52 per visit .

Step 2: Decompose PRIMUS/NAVCARE Visits into Discrete Procedures.

As noted previously, a sample of PRIMUS/NAVCARE medical records was obtained to facilitate detailed unit cost analysis. All procedures reflected in a sample of medical records from PRIMUS Killeen and PRIMUS Omaha were identified and coded. As a part of this process, visit descriptions in the medical records of PRIMUS/NAVCARE patients were reviewed, breaking each visit down into its component CPT-4 procedures. During this step, the number of medications dispensed or prescribed during each visit was also noted, as was the age and beneficiary category of the patient. At the completion of this step, two listings were generated containing all CPT-4 codes that had been encountered; one for visits by patients in the pediatric age group (age < 18 years) and another for visits by adults.

Step 3: Apply CHAMPUS Charges by CPT-4 Code.

For each procedure identified in step 2, the average amount that historically has been billed to CHAMPUS was extracted from the OCHAMPUS report entitled, "CHAMPUS Outpatient Services for Care Received in Fiscal Year 1988 for All Catchment Areas Combined" (OSCR). The OSCR lists each CPT-4 code encountered during the year by the fiscal intermediaries (FIs) that process CHAMPUS claims. For each code, the OSCR reports the number of occurrences and three costs: (1) total

billed charges; (2) CHAMPUS allowable costs (i.e., the lesser of billed charges or the CHAMPUS prevailing rate); and (3) actual government-paid costs. We chose the first of these costs.⁷ The OSCR itself is not beneficiary category-specific; however, by using total charges and applying known ratios of government-to-total cost by beneficiary category from other standard OCHAMPUS reports, we were able to derive beneficiary category-specific estimates of government cost by CPT-4 code. (See step 7.)

A version of the OSCR that is confined to claims from pediatricians was used to price the CPT-4 procedure codes on our pediatric list, while a version confined to general practitioners was used to price adult procedures. Excluding specialists in this way tended to reduce average billed charges per procedure, as demonstrated below for one of the most common CPT-4 codes, 90050 ("Office Medical Services, Established Patient, Limited Service").

⁷Total billed charges tend to overestimate the true cost of a procedure -- i.e., the amount the provider actually received from all payers. A provider that agrees to "participate" in the CHAMPUS program accepts the CHAMPUS allowable amount as full payment, and any difference between this amount and the amount billed is not collected. In FY88, providers agreed to participate on 62 percent of CHAMPUS outpatient professional services claims. (CHAMPUS Statistics in Brief 1990, OCHAMPUS SA-8-90.)

All Specialties Combined		Average Billed Charges
• All Catchment Areas Combined		\$30.40
• Darnall AH Catchment Area		\$28.98
• Bergquist SH Catchment Area		\$24.72
General Practitioners Only		
• All Catchment Areas Combined		\$28.69
Pediatricians Only		
• All Catchment Areas Combined		\$28.77

As shown, average billed charges for a given procedure vary by location, as well as provider specialty. However, at the level of the individual catchment area, specialty-specific data were not available; only the "All Specialties Combined" version of the OSCR was available for individual catchment areas. Since some of the variation in charges across catchment areas may be related not only to true geographic cost differences but also to specialty-mix, we elected to use specialty-specific data for all catchment areas combined (i.e., a national average).

We adjusted the FY88 CHAMPUS procedure costs for inflation, since the PRIMUS/NAVCARE and MTF counterparts were to be derived from FY89 data. The professional medical services component of the Consumer Price Index, which in CY89 had averaged approximately 6.5%, was used as an inflation factor.

Step 4: Estimate Medication Costs of Each Visit.

The cost of each visit was adjusted to reflect additional costs associated with medications which are not reflected in the CHAMPUS OSCR data. The adjustment for the medication costs of each visit was based upon a medication unit cost of \$7.02, which is the average cost of a pharmacy procedure (i.e., prescription) derived from FY89 MEPRS data. The medication unit cost was applied to the medication count tallied for each sample visit examined. Note that government prescription costs under CHAMPUS may vary from this figure. However, many CHAMPUS patients obtain their prescription drugs from MTFs.

Step 5: Sum Procedure and Medication Costs Over Each Visit.

The procedure and medication cost estimates derived in steps 3 and 4, respectively, were totaled for each PRIMUS/NAVCARE visit in the sample. Average cost per visit was computed for pediatric and adult patients. These averages -- taken prior to the introduction of CHAMPUS claims processing costs -- were used to calculate the casemix index in step 9, since the processing cost is unrelated to case complexity.

Step 6: Estimate CHAMPUS Claims Processing Costs.

CHAMPUS fiscal intermediaries (FIs) generally receive a flat fee for each claim that they process to completion. This cost, however, does not appear in the OSCR or most standard CHAMPUS reports which reflect only benefit payments, exclusive of administrative costs. For FY89, the OCHAMPUS budget included \$73.9 million for FI administrative

costs on approximately 11.7 million claims.⁸ Thus, we estimated the average cost per claim to be \$6.34.

However, the claim is an administrative unit; not a unit of health care utilization. On average, more than one visit is reported per claim. Using the CHAMPUS Statistical Phaseback Report, we estimated that one outpatient visit generates approximately 0.66 claims for outpatient professional services or drugs. A number of factors affect the relationship between office visits and claims — most notably, the extent to which drugs and ancillary services are billed separately from physician services and the extent to which providers agree to submit claims on behalf of the beneficiary. In general, one would expect claims per visit to be smaller for primary care visits than for other visits because ancillary services and prescriptions per visit should be smaller. Since it was not possible to estimate a primary care-specific ratio, we used the overall figure of .66. Thus, we estimated average claims processing cost per visit to be a fixed value at $\$6.34 \times 0.66$, or \$4.15.

This cost was treated as an add-on after other computations had been performed. Thus, the claims processing cost was not a factor in the computation of the CMI, the government share of $CEC_{P/N}$, or the adjustment for inflation.

Summing all procedure-related costs, medication costs, and claims processing costs for a given PRIMUS/NAVCARE visit yields its total CHAMPUS-equivalent cost, or $CEC_{P/N}$.

⁸CHAMPUS Chartbook of Statistics, OCHAMPUS 5400.2-CB, OCHAMPUS, Aurora, Colorado, August 1990.

Step 7: Determine the Government's Share of the CHAMPUS-Equivalent Cost.

The government's portion of $CEC_{P/N}$ was estimated by applying historical ratios of government-to-total cost. These ratios differ by beneficiary category due to differences in CHAMPUS cost-sharing provisions and the prevalence of private health insurance. We based our ratios on medical visit costs in the CHAMPUS Cost and Workload Report.⁹ For FY89, these values were: dependent of active duty (0.756); retiree (0.579); and other (0.600). For active duty visits, we set $CEC_{P/N(G)}$ equal to $CEC_{P/N}$. Note that these ratios were not applied to the CHAMPUS claims processing cost component.

Step 8: Develop CHAMPUS-Equivalent Cost for MTF Visits.

Development of the CHAMPUS-equivalent cost for MTF visits was based upon a sample of patient records from MTF primary care and pediatric clinics. Developing CEC_{MTF} entailed essentially repeating the methodology used to create the CHAMPUS-equivalent cost for PRIMUS/NAVCARE visits, substituting MTF sample visits in steps 2, 3, 4, and 5 of the methodology outlined above.

Step 9: Develop a Casemix Index.

In order to allow for the possibility that MTF visits are of a different casemix than PRIMUS/NAVCARE visits, we developed an adjustment factor or "casemix index". The casemix index (CMI) is simply the ratio

⁹FY89 CHAMPUS Cost and Workload Report, OCHAMPUS, Aurora, Colorado.
This approach was necessitated because government costs by procedure were not available by beneficiary type.

of the average CHAMPUS-equivalent cost for MTF visits to the average CHAMPUS-equivalent cost for PRIMUS/NAVCARE visits — i.e., $CEC_{MTF}:CEC_{P/N}$, after subtracting the claims processing cost which is unrelated to complexity. If, for example, the PRIMUS/NAVCARE and MTF samples contained an identical mix of services, the ratio of costs would be 1.0. If MTF visits were typically more complex than PRIMUS/NAVCARE visits, the ratio would be greater than 1.0. Separate CMIs were developed for pediatric versus adult visits.

Step 10: Develop MTF Costs Per Visit, Adjusted for Casemix Differences.

PRIMUS/NAVCARE clinics generally cause a shifting of care from the MTF to PRIMUS/NAVCARE. The reduction in MTF costs due to the shifting a visit to PRIMUS/NAVCARE is typically less than the average MTF cost per visit because the visit is shifted at the margin. Thus, in this study, it is more appropriate to use the MTF cost of a marginal visit (i.e., the marginal cost) rather than the average cost per visit.

The marginal cost of an MTF visit was taken from the direct care cost models used in the OASD(HA) Resource Analysis and Planning System (RAPS) model. This cost reflects the estimated additional expense of providing each additional visit. RAPS marginal costs are based upon CONUS-wide MEPRS workcenter-level data (i.e., 3-character account code) using multiple linear regression models. RAPS marginal cost models for the pediatric and family practice/primary care clinics were used to estimate cost for child and adult MTF visits, respectively. Each marginal cost estimate was divided by the respective CMI developed in Step 9 to obtain the MTF's casemix-adjusted marginal cost per visit, or MTF_{CMI} . This

process was performed for patients stratified by age, with costs for adults and children being estimated separately. The final estimate of the MTF cost for providing the typical PRIMUS/NAVCARE visit was derived by computing the weighted average of the adult and child adjusted costs, using the proportions of adults and children observed in the PRIMUS/NAVCARE medical records sample as the weights.

2.2 UNIT COST ANALYSIS RESULTS

Using the methodology detailed in Section 2.1, unit costs were developed for typical care provided under the three programs:

- a typical PRIMUS/NAVCARE visit;
- a typical PRIMUS/NAVCARE visit if claimed under CHAMPUS; and
- a typical PRIMUS/NAVCARE visit if performed in an MTF.

Unit cost estimates for the latter two programs rely upon the development of CHAMPUS-equivalent costs, which are based upon a sample of patient records from the PRIMUS/NAVCARE and MTF clinics. The results of that sample provide the basis of comparison for costs between the programs and are summarized in Section 2.2.1. That discussion is followed by three subsections, each presenting the results of the unit cost analysis for the PRIMUS/NAVCARE, CHAMPUS and MTF programs, respectively. Section 2.2.5 integrates these findings and provides a discussion of the comparative unit costs.

2.2.1 MEDICAL RECORDS SAMPLING RESULTS

A sample of medical records was gathered over a two-day period in July 1990 at PRIMUS Killeen and Darnall Army Hospital, Fort Hood, as

well as at PRIMUS Omaha and Bergquist Strategic Hospital, Offutt AFB. As noted in Section 2.1.2, the MTF records were selected from the adult and pediatric primary care clinics. In total, 1,422 medical records were selected. After excluding optometry visits at PRIMUS Killeen and cases in which the SF 600 was illegible or the patient demographic information was incomplete, 1,294 usable cases remained. The composition of the usable records by facility and beneficiary type is presented in Exhibit 2-3.

For the most part, the sample consisted of medical records of patients treated at one of the four facilities on the day prior to sample collection. The records were intercepted and photocopied as they were returned to the facility's records room. While this sampling technique greatly reduced the burden on the MTFs' medical records staff, it did not necessarily result in a completely random sample, and we cannot state with certainty that our sample is representative of the casemix treated at these facilities on an annual basis. Due to the narrow time window, the sample would be especially susceptible to seasonal influences — both clinically (e.g., hay fever season) and demographically (e.g., summer trainees).

Although we have no detailed annual data upon which to base a clinical comparison, we were able to compare the beneficiary category composition of our sample with annual FY89 data for all PRIMUS clinics, which is shown below. (Comparable annual data for the MTFs were not available.

**EXHIBIT 2-3: COMPOSITION OF THE MEDICAL RECORD
SAMPLE BY BENEFICIARY TYPE**

	PRIMUS Killeen		Darnall AH		PRIMUS Omaha		Bergquist SH		Total	
Active Duty	1	0%	23	6%	44	13%	33	20%	101	8%
Dependent of Active Duty	298	80%	317	80%	232	67%	97	58%	944	77%
Retiree	20	5%	23	6%	32	9%	14	8%	89	7%
Other	54	15%	42	10%	41	12%	23	14%	160	12%
Total	373	100%	405	100%	349	100%	167	100%	1,294	100%

	<u>PRIMUS Sample</u>	<u>ALL PRIMUS/NAVCARE CLINICS: FY89</u>
Active Duty	6%	6%
Dependent of Active Duty	74%	70%
Retiree	7%	7%
Other	13%	17%
Total	100%	100%

The sample is clearly nationally representative with respect to the mix of beneficiaries.

2.2.2 PRIMUS/NAVCARE UNIT COST RESULTS

Exhibit 2-4 presents a summary of FY89 PRIMUS/NAVCARE operating statistics, including total visits provided at each clinic and the associated costs. The average expense per visit is also presented for each clinic. The exhibit depicts total PRIMUS/NAVCARE utilization including 1,352,089 full-length visits, 106,475 abbreviated visits, and 15,814 Army PRIMUS 'no-charge' visits. Included in contractor payments were \$69 million for full-length visits, \$0.6 million for abbreviated visits, \$0.7 for medication-related costs and \$1.7 million in start-up costs.

The overall average cost per visit for all PRIMUS/NAVCARE clinics is \$47.37, excluding start-up costs. As noted in the methodology section, PRIMUS/NAVCARE start-up costs were amortized over a five-year period bringing the average cost per visit to \$48.52. This is a program-wide estimate in order to maintain comparability with the CHAMPUS and MTF costs used in this analysis.

EXHIBIT 2-4: FY89 PRIMUS/NAVCARE WORKLOAD AND EXPENSE BY CLINIC

WORKLOAD				EXPENSE							
Clinic	Parent MTE	Regular Visits	Short Visits	No-Charge Visits	Total Visits	Regular Visit Costs	Short Visit Costs	Medication Costs*	Start-Up Costs*	Total Costs	Cost per Visit
PRIMUS Salinas	CA Hays AH	25,100	1,609	0	26,709	1,745,814	30,346	78,098	53,706	1,907,964	71.44
PRIMUS Savannah	GA Winn AH	55,264	0	0	55,264	2,696,841	0	12,156	70,800	2,779,797	50.30
PRIMUS Columbus	GA Martin AH	53,403	0	3,969	57,372	2,622,211	0	86,564	16,622	2,725,397	47.50
PRIMUS Fairfax	VA Dewitt AH	57,477	0	6,148	63,625	2,749,925	0	50,392	132,312	2,932,629	46.09
PRIMUS Burke	VA Dewitt AH	55,584	0	8,768	64,352	2,638,082	0	36,065	81,054	2,755,201	42.81
PRIMUS Woodbridge	VA Dewitt AH	78,678	0	6,089	84,767	3,473,108	0	44,014	81,054	3,598,176	42.45
PRIMUS Fayetteville	NC Womack AH	76,729	0	4,786	81,515	3,392,175	0	38,510	19,523	3,450,208	42.33
PRIMUS Monterey	CA Hays AH	41,449	8,376	9,746	59,571	2,170,604	157,971	92,698	41,445	2,462,718	41.34
PRIMUS Copperas Cove	TX Darnall AH	47,716	2,809	3,496	54,021	1,782,404	39,186	95,546	6,769	1,923,905	35.61
PRIMUS Killen	TX Darnall AH	68,280	5,334	2,572	76,186	2,495,438	74,409	109,182	6,679	2,685,708	35.25
Total Army PRIMUS		559,680	18,128	45,574	623,382	\$25,766,602	\$301,912	\$643,225	\$509,964	\$27,221,703	\$43.67
NAVCARE Oakland	CA NH Oakland	32,590	3,835	0	36,425	2,229,991	120	2,854	130,163	2,363,128	64.88
NAVCARE Long Beach	CA NH Long Beach	40,566	3,651	0	44,217	2,635,865	37,240	319	130,496	2,803,920	63.41
NAVCARE Oceanside	CA NH Camp Pendleton	58,451	3,040	0	61,491	3,349,940	42,013	1,261	106,022	3,499,236	56.91
NAVCARE Mayport	FL NH Jacksonville	53,019	4,750	0	57,769	3,196,205	11,700	746	8,480	3,217,131	55.69
NAVCARE San Diego	CA NH San Diego	71,848	3,896	0	75,744	3,672,058	36,467	464	100,454	3,809,443	50.29
NAVCARE Charleston	SC NH Charleston	68,264	3,858	0	72,122	3,409,922	41,203	3,138	121,594	3,575,857	49.58
NAVCARE Jacksonville	NC NH Camp Lejeune	78,131	7,147	0	85,278	4,170,198	14,977	268	10,660	4,196,103	49.20
NAVCARE South Bay	CA NH San Diego	94,535	8,319	0	102,854	4,964,769	23,627	595	61,740	5,050,731	49.11
NAVCARE Norfolk	VA NH Portsmouth	89,357	8,025	0	97,382	4,551,199	22,950	637	50,864	4,625,650	47.50
NAVCARE Virginia Beach	VA NH Portsmouth	81,830	5,346	0	87,176	3,547,889	41,752	3,728	133,615	3,726,984	42.75
Total Navy NAVCARE		668,591	51,867	0	720,458	\$35,728,036	\$272,049	\$14,010	\$854,088	\$36,868,183	\$51.17
PRIMUS Riverside	CA 22d Strategic Hospital	36,122	3,120	0	39,242	2,406,924	22,558	389	131,591	2,561,462	65.27
PRIMUS Tucson	AZ 836th Medical Group	34,471	752	0	35,223	2,012,873	5,589	1,358	86,697	2,106,517	59.81
PRIMUS Omaha	NE Bergquist SH	53,225	2,848	0	56,073	2,651,410	19,962	1,008	104,797	2,777,177	49.53
Total Air Force PRIMUS		123,818	6,720	0	130,538	\$7,071,207	\$48,109	\$2,755	\$323,085	\$7,445,156	\$57.03
Total PRIMUS/NAVCARE		1,352,089	76,715	45,574	1,474,378	\$68,565,845	\$622,070	\$659,990	\$1,687,137	\$71,535,042	\$48.52

SOURCES: US Army Health Services Command; Naval Medical Materiel Support Command; and Office of the Air Force Surgeon General

* Prescription refill and handling charges not included in the basic visit price.

° One-fifth of original start-up costs.

Exhibit 2-4 indicates that the average cost per visit varies by site, ranging from \$35 per visit at the Killeen and Copperas Cove (Fort Hood) clinics to \$71 at the Salinas (Fort Ord) clinic. However, as noted in the methodology presented in Section 2.1.3, several factors contribute to this variation, including the geographic area, type of services provided, volume of visits, and the specific contractual arrangements with each contractor. Therefore, conclusions regarding the cost-effectiveness of any individual clinic based solely upon the unit cost estimates presented here may be misleading.

2.2.3 CHAMPUS UNIT COST RESULTS

It is worth reiterating that the CHAMPUS unit cost estimate used in this analysis is not the simple average cost of CHAMPUS primary care visits. As explained in steps 2 through 7 in Section 2.1.3, the CHAMPUS unit cost estimate is the estimated cost under CHAMPUS of the services provided during the typical PRIMUS/NAVCARE visit. We estimated both the total CHAMPUS-equivalent cost ($CEC_{P/N}$) and the government's share of the total CHAMPUS-equivalent cost ($CEC_{P/N(G)}$). The derivation of the government share of the total CHAMPUS-equivalent cost is discussed in step 7 of the methodology presented in Section 2.1.3.

Summing procedure and medication costs for each visit and averaging across demographic cells yielded the CHAMPUS-equivalent cost estimate, $CEC_{P/N}$. Results are shown in the first row of exhibit 2-5. As can be seen, the average CHAMPUS cost of a typical PRIMUS/NAVCARE visit is about \$52. This is 7% above the \$49 cost of this visit under PRIMUS/NAVCARE. Note that this difference is very close to the CHAMPUS

**EXHIBIT 2-5: CHAMPUS-EQUIVALENT COSTS FOR
PRIMUS/NAVCARE VISITS**

	Child	Adult*	Total
Total Cost (CEC _{P/N})	\$46.72	\$56.84	\$51.81
Government Cost (CEC _{P/N(G)})	\$35.88	\$41.13	\$38.52

*Restricted to CHAMPUS eligibles

processing charge per visit which we estimated to be about \$4. Thus, these results show that PRIMUS/NAVCARE costs, on average, are almost exactly what civilian physicians charge for the same bundle of services. The exhibit also shows that the CEC of a child visit is almost 20% less than that of an adult visit.

As noted in step 7 of the methodology section, the values for $CEC_{P/N}$ were subsequently adjusted to reflect the government cost portion of each visit, dependent upon the patient's beneficiary status. The government cost portion of total cost is estimated using ratios derived from the FY89 CHAMPUS Cost and Workload report and presented below.

<u>Beneficiary Type</u>	<u>Government:Total</u>
Dependent of Active Duty	0.756
Retiree	0.579
Other CHAMPUS Eligibles	0.600

Applying these rates yields the government CHAMPUS-equivalent cost ($CEC_{P/N(G)}$) shown in the second row of exhibit 2-5. We found that the government cost under CHAMPUS of the typical PRIMUS/NAVCARE visit was about \$38.52. This is about \$10 less than the PRIMUS/NAVCARE cost of the same visit.

2.2.4 MTF UNIT COST RESULTS

The methodology for developing an MTF unit cost estimate (MTF_{CMI}) that is comparable to the other unit costs in this analysis is presented in Section 2.1.3, steps 8 through 10. MTF_{CMI} was developed by:

- estimating MTF marginal costs for child and adult primary care; and
- adjusting the marginal cost estimates to reflect casemix complexity.

The estimated MTF marginal costs used in this analysis were based upon FY89 RAPS marginal costs per visit. MTF care provided to children was valued using the marginal cost for the pediatrics clinic, while adult care costs were computed using the family practice/primary care marginal costs. Each marginal cost value was adjusted to reflect casemix differences between the typical MTF care and that observed in the PRIMUS/NAVCARE program. The derivation of the casemix index (CMI) is described more fully in steps 8 and 9 of the methodology section.

Exhibit 2-6 presents a summary of those steps leading to the development of MTF_{CMI} . The exhibit indicates that the total CHAMPUS-equivalent cost for a typical PRIMUS/NAVCARE primary care visit would be approximately \$42.57 for children and \$52.69 for adults. The CHAMPUS-equivalent cost of an MTF pediatric visit would be approximately \$51.59, while the adult visits would cost approximately \$69.00.

The four CHAMPUS-equivalent cost values presented in the exhibit serve as the basis for the development of the casemix index. As noted in the methodology section, this index was developed by computing the ratio of the MTF CHAMPUS-equivalent costs to the corresponding CHAMPUS-equivalent costs developed from the PRIMUS/NAVCARE sample of medical

EXHIBIT 2-6: DERIVATION OF CASEMIX-ADJUSTED MTF COST PER VISIT

	CHILD	ADULT
$CEC_{P/N}$	\$42.57*	\$52.69*
CEC_{MTF}	\$51.59*	\$69.00*
CMI	1.212	1.310
RAPS Marginal Cost per MTF Visit	\$38.84	\$46.00
MTF_{CMI}	\$32.05	\$35.12
Sample Weights	327	331
Weighted MTF_{CMI} for Children and Adults	\$33.60	

* For purposes of calculating the CMI, the \$4.15 estimate of CHAMPUS FI claims processing costs is excluded from all CHAMPUS-equivalent cost values in this exhibit.

$CEC_{P/N}$ Total CHAMPUS-equivalent cost of a PRIMUS/NAVCARE visit

CEC_{MTF} Total CHAMPUS-equivalent cost of an MTF visit

CMI Casemix Index

MTF_{CMI} Casemix-adjusted marginal cost of an MTF visit

records. The resulting CMIs are 1.212 for care to children and 1.310 for adult care. These results suggest that the typical MTF care for children is just over 20% more resource intensive than corresponding PRIMUS/ NAVCARE visits. Similarly, the adjustment for adult care at MTFs indicates over 30% additional resources are consumed per visit. These findings suggest that the average casemix at the MTFs is higher than that observed in the PRIMUS/NAVCARE program. Another possibility is that MTFs see patients with similar casemix characteristics, but treat them more intensively. Our analysis of this possibility is presented in the section that follows.

The RAPS marginal cost estimates are divided by the respective casemix indices to derive the adjusted MTF cost per visit. The results of that step of the methodology produce adjusted costs of \$32.05 for children and \$35.12 for adults. Weighing these two costs by the proportions of children and adults in the PRIMUS/NAVCARE medical record sample yields blended cost per visit of \$33.60.

2.2.5 UNIT COST COMPARISONS

The unit costs presented in the previous sections are summarized in Exhibit 2-7. As described in the methodology section, these costs represent the estimated cost that would have been incurred under PRIMUS/ NAVCARE, CHAMPUS and the direct care systems for the services provided in a typical PRIMUS/NAVCARE visit. The exhibit illustrates that, controlling for casemix differences, the estimated cost to the government for a typical PRIMUS/NAVCARE visit would be less in both the

EXHIBIT 2-7: UNIT COST COMPARISON SUMMARY

UNIT COST TYPE	AVERAGE COST	PERCENT OF PRIMUS/NAVCARE COST
P/N_{AVG}	\$48.52	100%
$CEC_{P/N}$	$\$51.81 \pm \$ 2.04$	$107\% \pm 4.2\%$
$CEC_{P/N(G)}$	$\$38.52 \pm \$ 1.43$	$79\% \pm 3.0\%$
MTF_{CMI}	$\$33.60 \pm \$ 3.36$	$69\% \pm 10.0\%$

$\pm$ values at 95% confidence level

P/N_{AVG}	Actual average government cost of a PRIMUS/NAVCARE visit
$CEC_{P/N}$	Total CHAMPUS-equivalent cost of a PRIMUS/NAVCARE visit
$CEC_{P/N(G)}$	Government share of total CHAMPUS-equivalent cost of a PRIMUS/NAVCARE visit
MTF_{CMI}	Casemix-adjusted marginal cost of an MTF visit

CHAMPUS and MTF programs. The cost difference, in both cases, is statistically significant at the 95% level of confidence.

Referring to the detailed average cost per visit presented in Exhibit 2-4, PRIMUS/NAVCARE average costs per visit range from \$35 to \$71 at the 23 sites for which aggregate data were available. At \$33.60, MTF_{CMH} not only is significantly lower than the average cost per visit for the PRIMUS/NAVCARE program as a whole, but also is significantly lower than 21 of the 23 sites, with the exceptions being the two clinics at Fort Hood.¹⁰

Interpreting the Casemix Indices

Recall that the MTF cost per visit has been adjusted to reflect casemix differences between the direct care and PRIMUS/NAVCARE programs. The question remains, however, whether the adjustment reflects the additional resources attributable to casemix or whether MTFs are treating the same type of patients, but more intensively. In order to address this question, we first aggregated the ICD-9-CM diagnoses assigned to each medical record in our sample into broader diagnostic classes. Then, we examined the distribution of PRIMUS/NAVCARE and MTF medical records by diagnostic class. The results are presented in Exhibit 2-8. It can be seen from the exhibit that the PRIMUS clinics are heavily oriented toward ENT/upper respiratory care, with 32% of PRIMUS Killeen's cases and 28% of PRIMUS Omaha's falling into that

¹⁰An individual PRIMUS/NAVCARE clinic, however, may have a significantly higher casemix than the PRIMUS/NAVCARE average. Therefore, with the exception of the two clinics studied in detail, it cannot be stated definitively that a specific PRIMUS/NAVCARE clinic is more expensive than the average MTF.

**EXHIBIT 2-8: DIAGNOSTIC CLASS DISTRIBUTION OF MEDICAL RECORD
SAMPLE BY SITE**

Diagnositc Class	PRIMUS Killeen	Damall AH	PRIMUS Omaha	Bergquist SH	Total
ENT/Upper Respiratory	32%	13%	28%	17%	23%
Health Maintenance	1%	22%	15%	10%	13%
Gynecology	16%	6%	9%	4%	9%
Other	4%	11%	7%	11%	8%
Dermatology	10%	8%	6%	10%	8%
Musculoskeletal	8%	6%	9%	10%	8%
Signs and Symptoms	7%	10%	5%	7%	7%
Gastrointestinal	3%	6%	2%	4%	4%
Lower Respiratory	3%	4%	3%	5%	4%
Miscellaneous Infections	4%	3%	5%	2%	4%
Cardiology	3%	1%	2%	6%	3%
Emergencies	3%	1%	3%	4%	3%
Genitourinary	3%	4%	1%	2%	3%
Nervous System	2%	2%	1%	5%	2%
Eye Care	2%	1%	2%	2%	1%
Immunizatons/Allergy	0%	1%	1%	0%	1%
Endocrine	0%	1%	0%	0%	0%
Hematology	0%	0%	0%	0%	0%
Total	100%	100%	100%	100%	100%

category. Conceivably, it is this ENT/upper respiratory care – consisting, in an acute care setting, largely of colds, sore throats, and ear infections – that accounts for the lower aggregate PRIMUS/NAVCARE casemix.¹¹

If the CMI is more a reflection of greater treatment intensity at MTFs than of higher casemix, the MTF's average CHAMPUS-equivalent costs within a given diagnosis should be higher than the PRIMUS/NAVCARE counterpart. In order to test this possibility, we examined the two ICD-9-CM diagnosis codes that occurred most frequently in the medical record sample – 328.9 (otitis media, unspecified) and 465.9 (upper respiratory infection (URI), site unspecified) – both of which fall into the broader ENT/upper respiratory diagnostic class discussed above.

The results of the diagnosis-specific sample of records and the associated CHAMPUS-equivalent costs (CECs) are presented in Exhibit 2-9. The exhibit shows that, when attention is focused upon a single diagnosis, the MTF CECs are no longer consistently above the PRIMUS CECs. For otitis media, the MTF CECs are actually below the PRIMUS CECs. For upper respiratory infections, the results are mixed, with one MTF having the highest CEC and another the lowest. While more in-depth testing is necessary before a firm conclusion can be reached, these results generally support the casemix-based interpretation of the CMI.

¹¹We found that, after controlling for site and demographic factors, the CEC for the typical ENT/upper respiratory visit is significantly less than the CEC for visits in the next two most frequently occurring diagnostic classes – health maintenance and gynecology.

EXHIBIT 2-9: CHAMPUS-EQUIVALENT COSTS FOR SELECTED DIAGNOSES

328.9 OTITIS MEDIA, UNSPECIFIED	<u>Sample Size</u>	<u>Mean</u>	95% Confidence Interval	
			<u>Upper Limit</u>	<u>Lower Limit</u>
PRIMUS Killeen	54	\$38.32	\$40.87	\$35.76
PRIMUS Omaha	24	38.28	44.05	32.51
Darnall AH	12	35.82	43.55	28.08
Bergquist SH	12	29.31	33.50	25.13
All Visits Sampled	102	36.96		

465.9 URI, SITE UNSPECIFIED	<u>Sample Size</u>	<u>Mean</u>	95% Confidence Interval	
			<u>Upper Limit</u>	<u>Lower Limit</u>
PRIMUS Killeen	13	\$36.63	\$40.18	\$33.08
PRIMUS Omaha	17	39.83	51.64	28.01
Darnall AH	17	48.98	79.67	18.29
Bergquist SH	6	33.12	41.84	24.4
All Visits Sampled	53	41.22		

3.0 TOTAL COST ANALYSIS

A critical component of the cost-effectiveness evaluation concerns the impact the PRIMUS/NAVCARE program has had on total costs for the MHSS. Determining the magnitude of this impact required that we integrate the unit cost analysis presented in Section 2.2.5, with an analysis of PRIMUS/NAVCARE utilization, also performed as part of the overall program evaluation.

In the utilization analysis, the 1.5 million PRIMUS/NAVCARE visits that occurred in FY89 were partitioned into one of three categories:

- those that would have been MTF visits in the absence of PRIMUS/NAVCARE;
- those that would have been paid for under CHAMPUS in the absence of PRIMUS/NAVCARE; and
- those that were essentially new visits in the MHSS.

In the total cost analysis, the visits in each of these three respective categories were assessed the following dollar values:

- the difference between P/N_{AVG} and MTF_{CHI} ;
- the difference between P/N_{AVG} and $CEC_{P/N(G)}$; or
- the full amount of P/N_{AVG} .

Thus, a visit that, in the absence of the PRIMUS/NAVCARE program, would have occurred in an MTF carries a net cost of approximately \$15

(\$49 minus \$34). A PRIMUS/NAVCARE visit that would have been claimed under CHAMPUS carries a net cost of \$10 (\$49 minus \$39).¹

PRIMUS/NAVCARE visits that would not otherwise have occurred have a net cost of \$49. Under these assumptions, the total net cost of the PRIMUS/NAVCARE program in FY89 is approximately \$44.1 million, as shown in Exhibit 3-1. At over \$32 million, the largest component of this total is attributable to new visits, due both to their high volume and high net cost per visit.

It is important to distinguish between total PRIMUS/NAVCARE program costs — \$72 million — and the net cost of the program — \$44 million. In FY89, government spending on the PRIMUS/NAVCARE program was \$72 million (1.5 million visits @ \$49). However, \$22 million of this sum was offset by decreases in MTF utilization (660,000 visits @ \$34), and \$6 million by decreases in CHAMPUS utilization (170,000 visits @ \$39). These offsets leave \$44 million in net program costs or a net cost per visit of \$29 for each of the 1.5 million PRIMUS/NAVCARE visits paid for by the government.

Sensitivity Analyses

These cost estimates are based upon a scenario in which similar patients receive similar services regardless of where the care is received. As noted earlier, it is likely that similar patients would in

¹It should be emphasized that these estimates are based on the provision of the same PRIMUS/NAVCARE services in the MTF and CHAMPUS settings. However, the PRIMUS/NAVCARE clinic is reimbursed on a fixed-unit-cost basis and operates an internal utilization review system to avoid over-utilization of resources per visit. The MTF and CHAMPUS settings are not subject to this constraint and may provide more intensive services than would PRIMUS/NAVCARE to the same patient.

**EXHIBIT 3-1: EFFECTS OF THE PRIMUS/NAVCARE PROGRAM
ON TOTAL MHSS PROGRAM COSTS**

Type of Visit	Visits	Net Cost Per Visit	Total Net Cost
Visits Shifted from MTF	660,000	\$15	\$9.8 Million
Visits Shifted from CHAMPUS	170,000	\$10	\$1.7 Million
New Visits	670,000	\$49	\$32.5 Million
Total, All Visits	1,500,000	\$29	\$44.1 Million

reality be treated more intensively under CHAMPUS than at PRIMUS/NAV CARE. Therefore, it is useful to examine some alternate scenarios in which this increased intensity under CHAMPUS is assumed.

If CHAMPUS treatment intensity is twice that of PRIMUS/NAV CARE for similar patients, then the unit cost estimate under CHAMPUS would rise to \$77. Instead of losing \$10 for every visit shifted from CHAMPUS to PRIMUS/NAV CARE, there would actually be a savings of \$28.50 per visit. The net effect is to reduce our overall PRIMUS/NAV CARE cost estimate from \$44.1 million to \$37.5 million. If CHAMPUS treatment intensity was triple that of PRIMUS/NAV CARE, the estimated overall cost of PRIMUS/NAV CARE would be reduced to \$30.9 million.

The results presented here are sensitive to assumptions regarding the shift of former CHAMPUS care into PRIMUS/NAV CARE clinics. Our analysis of PRIMUS/NAV CARE utilization suggests that, of the 840,000 PRIMUS/NAV CARE visits which potentially shifted from CHAMPUS (i.e., 1.5 million visits less the 660,000 believed to have shifted from MTFs), 20% actually shifted from CHAMPUS, while the remaining 80% were new visits. In order to test the impact of our estimate of the shift from CHAMPUS, we computed net program costs under the extreme assumption that 100% of the 840,000 PRIMUS/NAV CARE visits represented a shift from CHAMPUS. We also calculated net program costs assuming no visits had shifted from CHAMPUS. Exhibit 3-2 demonstrates that the assumption of complete shifting of CHAMPUS care to PRIMUS/NAV CARE reduces net program costs from \$44.1 million to \$18.2 million — or an average additional cost per visit of \$12. At the other extreme, no shift of care from CHAMPUS increases the net program costs to \$50.6 million — or a net cost per visit of \$34.

**EXHIBIT 3-2: IMPACT OF ALTERNATIVE ASSUMPTIONS REGARDING
SHIFT OF CHAMPUS CARE TO PRIMUS/NAVCARE**

"100 Percent Shift" Scenario

Type of Visit	Visits	Net Cost Per Visit	Total Net Cost
Visits Shifted from MTF	660,000	\$15	\$9.8 Million
Visits Shifted from CHAMPUS	840,000	\$10	\$8.4 Million
New Visits	0	\$49	\$0.0 Million
Total, All Visits	1,500,000	\$12	\$18.2 Million

"No Shift" Scenario

Type of Visit	Visits	Net Cost Per Visit	Total Net Cost
Visits Shifted from MTFs	660,000	\$15	\$9.8 Million
Visits Shifted from CHAMPUS	0	\$10	\$0.0 Million
New Visits	840,000	\$49	\$40.8 Million
Total, All Visits	1,500,000	\$34	\$50.6 Million