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Provision and Use of Navy Medicine Primary Care: Empirical Background for Optimization

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Summary

The purpose of this research memorandum is to report and comment on the findings of an analysis of Navy Medicine Primary Care (NMPC) to members of the Primary Care Product Line (PCPL) Advisory Board (the Board) and to the Bureau of Medicine and Surgery (BUMED). This report is part of the support that the Center for Naval Analyses (CNA) is providing to the product line. It analyzes Ambulatory Data System (ADS) records of visits made to Navy Medical Treatment Facilities (MTFs) during FY 2000, as well as data from two Department of Defense (DOD) surveys that provide information on the satisfaction of users of NMPC. Its intent is to provide empirical information as background to the Board's and BUMED's optimization activities.

We based our work on a conceptual definition of primary care adopted from a recent Institute of Medicine report by the Committee on the Future of Primary Care and accepted by the Board:

> Primary Care is the provision of integrated, accessible health care services by clinicians who are accountable for addressing a large majority of personal health care needs, developing a sustained partnership with patients, and practicing in the context of family and community.

Although the following types of care are significant elements of the medical care matrix provided by Navy Medicine, for purposes of this report, we do not consider them to be primary care:

- Preventive care provided to active duty personnel outside primary care settings
- Urgent medical care delivered through such venues as military sick call, Military (or Medical) Acute Care Departments, and waterfront-based Regional Service Groups.

We adopted the approach that **NMPC is what primary care providers (PCPs) do in Navy MTF primary care clinics,** and we developed an empirical definition that allowed us to distinguish between NMPC visits and non-primary-care (non-PC) visits in the ADS data set. We analyzed this data set at the visit level and developed a protocol for aggregating visits up to the patient level for a subset of NMPC users who received care in the Tidewater, Virginia, area during FY00. We added a measure of visit resource intensity to each visit record—resource-based Relative Value Units (RVUs)—by adapting a protocol developed for the Health Care Financing Administration, and we used RVUs to indicate the relative amount of resources used during a visit. We made extensive use of a clinical classification scheme contained in the ADS visit record—Ambulatory Patient Groups (APGs)—to examine the clinical content of NMPC. Finally, we identified relevant items in the DOD surveys that allowed us to estimate satisfaction with NMPC and to assess the impact of various demographic and health plan factors on satisfaction.

In brief, we found that:

- A small number of APGs (37 of the almost 300) largely delineate the clinical content of NMPC.
- NMPC is driven primarily by medical as opposed to procedural activities.
- The line between NMPC and non-PC is not sharply defined by activities exclusively performed by PCPs in PC clinics.
- NMPC is distinguished more by its treatment of established patients than by what that treatment is.
- Exclusively preventive medicine visits make up a very small proportion of NMPC.
- NMPC mean per-visit RVUs are generally lower by visit type than is true for corresponding non-PC visits.
- The nature of primary care delivered at different types of Navy MTFs and by different types of PCPs varies significantly.

- There is some variation in how and for what clinical reasons different types of users use NMPC; however, within different types of users, there is concentrated use of NMPC, with some users consuming disproportionate amounts of care.
- A high percentage of patients who receive care in Navy MTFs receive only non-PC over a year's time.
- Users of NMPC are more likely than comparison groups to be satisfied with their ability to get a personal provider of choice and are more likely to rate this provider highly, but are less likely to be satisfied with access to care.
- Those who see their own PCMs are more likely to be satisfied with most aspects of their care in Navy MTF PC clinics, but access remains a dissatisfier.
- The ADS data set contains many records having incomplete, inconsistent, or missing data.

Based on these findings, we recommend to the PCPL Advisory Board and BUMED that:

- Navy Medicine adopt RVUs and resource-adjusted visits (RAVs) as metrics for measuring, monitoring, and managing NMPC performance and productivity. This will allow Navy Medicine to more accurately monitor NMPC and thereby make better decisions regarding resource allocation and needed corrective actions than basing such decisions solely on visit-based metrics.
- Navy Medicine continue to emphasize Primary Care Manager By Name and continuity of care. Our analysis shows that both contribute to increased efficiency and satisfaction.
- Navy Medicine continue to explore ways to increase access to NMPC. Our analysis revealed that access is an issue in need of attention for NMPC users. Our analysis suggests that better managing the demand of high utilizers is one likely way to improve access.
- Because good data make good policy, Navy Medicine should stress the importance of accurately and fully completing ADS

forms. Without the good data that ADS can supply, policy-making will be uninformed and not evidence based.

- To the extent that good data are available, they should be maximally used to support policy development and the optimization of NMPC. We recommend that an ad hoc analysis capability be developed to help achieve this goal.

Introduction

Purpose and background

The purpose of this research memorandum is to report and comment on the findings of an analysis of Navy Medicine Primary Care (NMPC) to members of the Primary Care Product Line (PCPL) Advisory Board (the Board) and to the Bureau of Medicine and Surgery (BUMED), Code 03, Health Care Operations. Our intent is to provide empirical information as background to the Board's and BUMED's optimization activities and to encourage and assist their work to be evidence based. We conducted the research for this report during February through July 2001 and based it on data initially collected during FY99-00.

Navy Medicine created several product lines in recent years to assist its effort in response to the Military Health System (MHS) Optimization Plan. As stated on the Navy Medicine Optimization website [1]:

> The MHS optimization plan...supports the development of a comprehensive and integrated health services delivery system. By increasing prevention and delivering the right care by the right person at the right time, we will increase health, decrease utilization, and expand direct care system access to our active duty and other beneficiaries.

The MHS exists to provide care for active duty persons during times of war and conflicts other than war, for active duty during other times to maintain service readiness, and, as resources permit, for non-active-duty eligibles of the Defense Health Program (DHP), including active duty family members, retirees and retiree family members and survivors, and various other legislatively defined eligibility categories. As a part of the MHS, Navy Medicine operates shore-based Military Treatment Facilities (MTFs) to serve eligible Navy and Marine Corps beneficiaries, as well as beneficiaries from other services and eligibility categories.

TRICARE, implemented between 1995 and 1998, is the health plan through which both active duty and non-active-duty DHP eligibles receive their health care. TRICARE offers essentially two plans:

- A managed care plan known as TRICARE Prime in which eligibles enroll and select a Primary Care Manager (PCM) who supervises their care within the MHS or within provider networks established by commercial health plans that contract with TRICARE to provide care.
- A point-of-service plan, which offers a preferred provider option (TRICARE Extra) with lower out-of-pocket costs for care provided in the MHS or the contract network, and an indemnity option (TRICARE Standard) with higher out-of-pocket costs for care provided outside the MHS or network.

All active duty (with a few exceptions) must receive their health care within the MHS at an MTF through TRICARE Prime, whereas non-active-duty eligibles can choose Prime or Standard/Extra and receive care at an MTF, from the contract network, or from other providers.

The MHS optimization initiative is designed to optimize the effectiveness and efficiency of care provided within MTFs to: (1) provide and manage cost-effective care to those who receive their health care within MTFs, (2) manage the demand for and use of care, especially by their Prime enrollee populations through population health principles that stress prevention, (3) optimize the efficient use of limited MHS resources to better serve both its readiness and peacetime missions, and (4) expand the capacity of the MHS to recapture patients from the network to the MTF where the optimized MHS can provide care more effectively and efficiently.

Navy Medicine's product line initiative seeks to assist the Navy and the MHS to achieve optimization. The Primary Care Product Line in particular can contribute to this goal through developing and championing opportunities to improve the delivery of NMPC, which is the backbone of a managed care delivery system. The PCPL Advisory Board received the following direction from BUMED at its first meeting in September 2000:

The overall goal of the Primary Care Product Line is to enhance the implementation of the MHS Optimization plan. This includes assisting with PCM By Name, Demand Management, Capacity Management, Condition Management, and Outcomes Measurement. Specific Goals include:

1. Improve the continuity and coordination of health care provided to our beneficiaries.

2. Improve the interface between Primary Care Providers and other Health Care Providers.

3. Assist with the development and implementation of preventive care and wellness interventions.

4. Promote decreases in practice variation through use of disease management, evidence based medicine, and clinical practice guidelines.

5. Improve utilization of case management services.

6. Recapture eligible patients currently receiving primary care outside of the MTFs.

7. Increase the efficiency of Primary Care Clinics.

The Board, composed of the specialty leaders of Navy Medicine primary care provider communities plus representatives of operational medicine, Fleet Marine Corps medicine, case management, and pharmacy, accepted this direction, and sees its mission as serving "as advocates for primary care providers, advisors to BUMED for issues involving primary care, and liaison between BUMED and primary care providers."[1]

This report is in service of the Board's mission and work. In it, we have sought to provide the basic information regarding the provision and use of primary care in Navy Medicine that the Board, and BUMED, would find useful in their future optimization efforts.

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1. This quotation is from the Goal statement developed by the PCPL Advisory Board at its March 2001 meeting.

Scope of the report

This report represents a significant portion of the support that the Center for Naval Analyses (CNA) provided to the PCPL Advisory Board and MED-03 during FY01. It analyzes both ambulatory primary care visits made to Navy MTFs during FY00 (1 October 1999 to 30 September 2000), and items from surveys of MTF patients and DHP beneficiaries relevant to evaluating their satisfaction with NMPC. In this report, we describe what NMPC is, based on what primary care providers (PCPs) do in Navy MTF primary care (PC) settings, and identify how and to what extent the content and nature of NMPC varies by provider and setting. This approaches NMPC from the supply side—what care is provided, by whom, and where. Its focus is not on *how much* care is provided (e.g., number of visits) but rather on the *nature and distribution* of that care (e.g., percentage of visits by clinical content and provider type).

We also describe how people use NMPC and look for commonalities and variation among user types. This approaches NMPC from the demand side—what care is used, by whom, and in what way. Again, the focus is more on the nature and relative distribution of use than on the amount of use. In addition, we present some information on how users of NMPC feel about that care and how it's provided (i.e., their perception of and satisfaction with access and quality).

We also present the conclusions we draw from this analysis and recommendations for NMPC that we believe flow from and are supported by this analysis. Several of these recommendations include suggestions for using some of the metrics developed for this report as indicators of NMPC performance and as inputs to primary care demand forecasting, resource utilization, and asset allocation models.

Sources of data

Data for this report come from three DOD sources. All health care provided through MTFs is documented through one of several data systems set up to capture information on the nature and content of the care encounter and characteristics of both the care provider and recipient. Primary care is fundamentally an ambulatory service and is

thus best captured in DOD's Ambulatory Data System (ADS) through the Standard Ambulatory Data Record (SADR) for each ambulatory health care encounter at all MTFs worldwide. We selected ADS/SADR as the primary data set for this study, and requested and received these data from the Naval Medical Information Management Center (NMIMC) for the 12-month period ending 3 months before our initial data request in early January 2001. We built in this 3-month delay because it typically takes that long for all encounters in a given time period to be entered into ADS with cleaned, completed records. This 12-month period fortuitously coincided with FY00 (1 October 1999 to 30 September 2000), allowing our analysis to be confined to that single fiscal year. NMIMC provided ADS data records from the All Region Server (ARS) Bridge by creating "an identical copy of the MHS 'golden standard' data tape for SADR_FY00" [2]. We received data records for all ambulatory encounters at MTFs occurring during FY00 that resided on the ARS Bridge as of the date NMIMC transferred the data to CNA (6 February 2001).

The ADS data file provides a reasonably accurate picture of all ambulatory encounters occurring at MTFs;[2] however, not all such encounters are captured in the ADS and the records for some encounters that are captured are either not complete or contain inconsistent data. It is not possible to further clean this data set, or to estimate the extent of measurement error contained in it, because it already represents the MHS "golden standard." We would need an independent "even more golden" standard on which to base any such cleaning or estimates, and this independent standard does not exist. Thus, the

2. Note that the ADS contains records of ambulatory encounters at MTFs only. ADS contains no record of ambulatory care received outside an MTF by DHP eligibles. This, however, is **not** a limitation of ADS for the purposes of this study because we are only interested in analyzing NMPC (provided through Navy MTFs) and not all primary care received by Navy and Marine Corps beneficiaries, including that received at civilian facilities and paid for either through their TRICARE benefit, another health plan, or out of pocket. Our focus is on Navy Medicine rather than on the medical care received by Navy/Marine Corps beneficiaries.

ADS contains an undetermined level of measurement error, and our analysis of NMPC based on these data is our best estimate only.

We also used two DOD surveys to estimate customer satisfaction with NMPC. One survey is the annual *Health Care Survey of DOD Beneficiaries* conducted to respond to Congress's request for an assessment of the use of and satisfaction with the DHP benefit by all DOD eligibles regardless of whether, or the extent to which, they used the benefit. Thus, the survey population, intent, and content are all broader than our intended use of it. To compensate, we carefully selected a relevant subpopulation (Navy and Marine Corps beneficiaries who used their TRICARE benefit as their primary health plan durung the 12 months preceding the survey) and relevant survey items (those allowing us to gauge satisfaction with various aspects of primary or routine care and those describing basic background demographic characteristics of respondents) from the broader survey data file for our analysis. We used data from the 1999 survey (mailed out between September 1999 and January 2000, with the last surveys received back in March 2000). This survey, the most recent fully cleaned and ready-to-analyze data set available to CNA as of the start of our study in January 2001, overlaps at least in part the FY00 time period corresponding to the ADS data we analyzed for this report.

The second survey is the monthly customer satisfaction survey (CSS) of MTF users. Each month, DOD surveys a sample of users of selected MTF clinics regarding their satisfaction with the health care they received at those clinics [3]. We requested and received survey data from Med-82 for all primary care clinics surveyed at Navy MTFs during FY00, matching the time period for which we analyzed ADS data for the same clinics. We followed DOD's methodology for weighting results, and used the same survey items as DOD for constructing three multiple-item composite scales of patients' satisfaction with the interpersonal aspects, the quality, and the accessibility of the medical care they received at those clinics [4].

Organization of the report

In the next section, we briefly introduce the conceptual approach to primary care that we used to inform our empirical analysis. Based on

this approach, we develop a definition of Navy Medicine Primary Care and discuss its utility and limitations. We then discuss our methodology and the metrics we developed for this analysis, specifying how we empirically defined NMPC, aggregated ADS visit records into patient-level files, constructed various measures and metrics, compared PC and non-PC, made comparisons within PC, and measured and assessed patient satisfaction.

After discussing these conceptual and methodological issues, we present our results. We begin by answering the question, "What is Navy Medicine Primary Care?" We present findings regarding the kind of care that encompasses NMPC based on the clinical content and patient management characteristics of PC visits. We also present findings on the distribution of NMPC by where it's provided and by whom it's provided, as well as by appointment type and visit disposition. We present distributions of both visits and the relative resources used during those visits. We follow this analysis with an examination of how NMPC compares with non-PC in the Navy.

We next present our results regarding who uses NMPC. We present visit distributions and utilization patterns by gender and by patient status, as well as by whether the visit occurs at the MTF to which a TRICARE Prime enrollee is enrolled or at a different MTF. We follow this analysis with the results of one that aggregates the visit history of individual patients receiving care within the Tidewater (Naval Medical Center Portsmouth) service area over the 12 months of FY00. We examine the total number of NMPC visits per person over the year, as well as the per-person total relative resources consumed, looking for patterns and seeking to account for differences in the amount of use.

Our next section focuses on variations within NMPC by MTF type and provider type. We present findings on similarities and differences in visit distributions and relative resources consumed per visit by clinical content and patient management characteristics for each type of MTF and provider. We then present our assessment of patient satisfaction with NMPC based on our analysis of the two DOD surveys mentioned earlier. We look both at levels of satisfaction and for characteristics that are associated with satisfaction.

Our final section summarizes the major findings and lessons learned from the preceding analysis, identifies remaining outstanding issues and areas for future research, and presents our recommendations regarding NMPC to our study sponsors, Med-03 and the PCPL Advisory Board. Our recommendations include suggestions for incorporating some of the metrics we developed for this report into collateral work being done within Navy Medicine on monitoring care delivery, assessing productivity, and making staffing and resource allocation decisions.

The concept of primary care

The Institute of Medicine approach

In 1996, the Institute of Medicine (IOM) published a significant review of primary care in this country's emerging and evolving health care system [5]. In *Primary Care: America's Health in a New Era*, the IOM, through its Committee on the Future of Primary Care, lays out its vision of PC and the role that PC should play in the health care system of turn-of-the-century America. The IOM offers a new definition of PC to match its vision [5, p. 31]:

> Primary care is the provision of integrated, accessible health care services by clinicians who are accountable for addressing a large majority of personal health care needs, developing a sustained partnership with patients, and practicing in the context of family and community.

This definition emphasizes that PC should be provided through an integrated system of care (in the Navy's case, the MHS), and should deliver comprehensive, coordinated, and continuous personal health care services to a defined patient population for which the primary care clinician is responsible and to whom they are accountable. Primary care clinicians should also operate in the context of population health (in the Navy's case, supporting and participating in the Population Health Initiative (PHI)).

PC's core is a sustained patient-clinician relationship (in the Navy's case, with a primary care manager (PCM)). Note that this definition refers to a primary care *clinician* rather than a primary care *physician*, demonstrating the IOM's view that PC providers can be non-physicians (e.g., nurse practitioners and physician assistants). Further, the IOM sees PC being typically delivered by a team. Teams are composed of primary care clinicians and other practitioners and support staff that together are best suited to meet the range of personal health care needs of the defined patient population. The IOM report points out

that teams are seen as an extension of the patient-clinician relationship, not as an alternative to it: "Although primary care can be delivered by teams, exemplary primary care requires that one or more members of that team develop a close one-on-one relationship with the patient" [5, p .42]. Thus, primary care nurses, independent duty corpsmen (IDCs), and primary care technicians are members of the NMPC team and can be considered as providers of primary care within their scopes of practice, even if they are not PCMs. However, NMPC expects a single, identifiable clinician member of the team–the Primary Care Manager By Name (PCMBN)—to maintain this sustained, one-on-one relationship.

Finally, based on this definition, we conclude that discontinuous, episodic care for acute conditions delivered outside the context of family and community medicine, as well as noncomprehensive preventive services (such as a vaccination given in an immunization clinic or a physical given in a medical examination clinic), is not primary care. Therefore, for purposes of this report, we consider that, although the *urgent care* delivered through such venues as military sick call, Military (or Medical) Acute Care Departments (MACDs), and waterfront-based Regional Service Groups (RSGs) and the *preventive care* provided to active duty personnel outside primary care settings are significant elements of the medical care matrix provided by Navy Medicine, they are not part of primary care.

Navy Medicine Primary Care

Basing our work on the vision set out by the IOM, we developed a conceptual definition of NMPC for the use of the PCPL Advisory Board to help guide its discussions and for our use to help guide our analysis. We presented this definition and an accompanying diagram of the context of NMPC (also based on the IOM report) to the Board at its March 2001 meeting. The Advisory Board reviewed, discussed, and accepted the following definition.

> Primary Care is the provision of *integrated, accessible* health care services by *clinicians* who are *accountable* for addressing a *large majority of personal health care needs,* developing a *sustained partnership with patients,* and *practicing in the context of family and community.* It is provided through an integrated

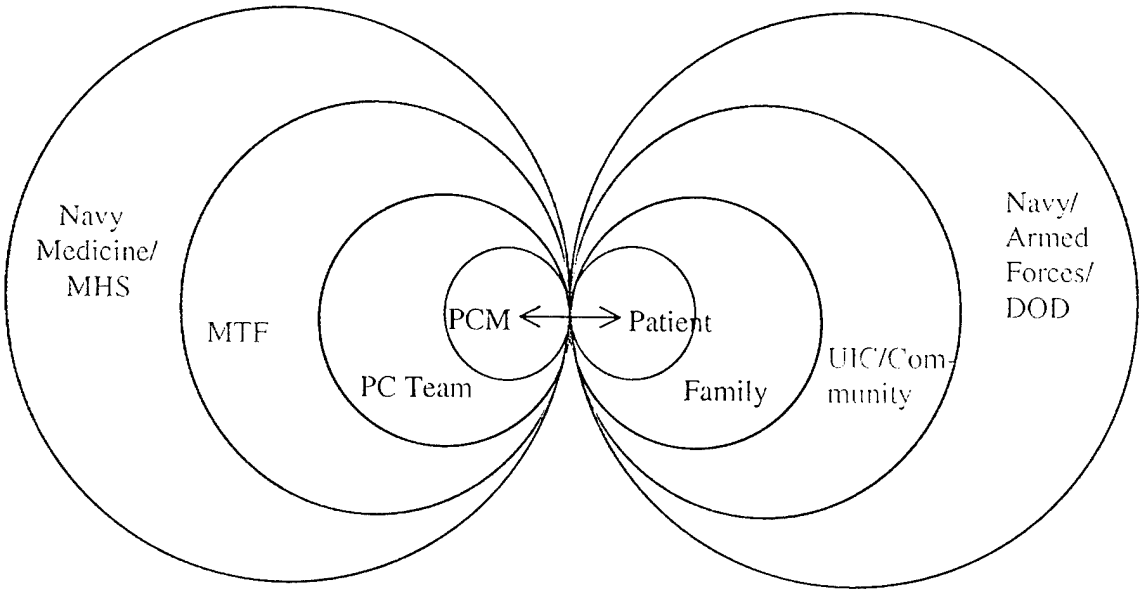
> system of care (in the Navy's case, the MHS), and delivers *comprehensive, coordinated,* and *continuous* personal health care services to a *defined patient population* (principally TRICARE Prime enrollees) in the context of family and community health. Its core is a sustained partnership characterized by a *sustained patient-clinician relationship* (in the Navy's case, with a PCMBN) supported by a *primary care team* composed of practitioners and support staff who together are best suited to meet the range of personal health care needs of the defined patient population. The team is an extension of the patient-clinician relationship, not an alternative to it. Exemplary primary care requires that one or more members of that team develop a close one-on-one relationship with the patient.
>
> According to this definition, episodic urgent medical care delivered through military sick call, an Acute Care Clinic (ACC), a Medical (or Military) Acute Care Department (MACD), and waterfront-based Regional Service Groups (RSGs) that is not appropriately communicated back to nor integrated with the care provided by the PCM—while a significant element of the medical care matrix provided by Navy Medicine—is ***not*** primary care.

NMPC is neither practiced nor provided in isolation. It is part of a broader context of military medicine. Likewise, primary care patients should not be seen in isolation; they need to be seen in the context in which they live. Figure 1 illustrates this context of NMPC. Its core, as suggested by the IOM report, is a sustained patient-PCM relationship. This core relationship is embedded on the provider side in the PC team, the MTF in which the PC is provided, and Navy Medicine and the MHS. On the patient side, this core relationship is embedded in the patient's family and community (including the Unit Identification Code (UIC) community of active duty personnel), and the broader armed forces context in which patients become eligible for treatment in a Navy MTF.

This context introduces a number of unique features to NMPC compared with civilian settings, as well as a number of unique analytic requirements, which we needed to bear in mind. These include the command structure and military settings of continental U.S. (CONUS) and outside CONUS (OCONUS) MTFs, the various relationships of active duty personnel to operational medicine versus

Claimancy 18 Navy Medicine, the health care requirements and behaviors of active duty family members—especially when active duty are deployed away from home and family for long periods of time aboard ship—and Navy Medicine and MHS policies, practices, and priorities toward active duty, active duty family TRICARE Prime enrollees, other Prime enrollees, and non-Prime (TRICARE Standard and Extra) beneficiaries.

Figure 1. The context of Navy Medicine Primary Care



The approach to NMPC shown in figure 1 emphasizes the establishment of ongoing relationships with patients and the provision of care by a PC team within a PC setting. Although episodic care of urgent conditions or immunizations and annual physicals may be provided by PCPs in PC settings, these services are likely to be qualitatively different from the same services provided in urgent care or medical exam clinic settings. The same can largely be said of PC compared with specialty care; they may provide certain services in common, but there are distinctive features in the way they provide them. PC is distinguished, then, not so much by the specific services it provides as by the manner and context in which it provides those services, and by

the ongoing relationship with—and accountability to the broad totality of health care needs of—the established patient.

These considerations led us to adopt an approach to NMPC that restricts it to **what PCPs do in Navy MTF PC clinics**. This approach most closely approximates the sense of the IOM definition as modified for use of and accepted by the PCPL Advisory Board. It is an approach that is more rather than less restrictive (or less rather than more inclusive) of what NMPC is and perhaps errs on the more conservative side of not considering some care to fall within the province of NMPC that others would include (e.g., urgent care in acute care clinic settings). It excludes care provided by non-PC providers in PC clinics, as well as care provided by PCPs in non-PC settings. Thus, it excludes care provided, for example, by a psychologist seeing a patient in a PC clinic, or by a general medical officer (GMO) seeing a patient in an acute care clinic. On the other hand, it includes the care provided by that same GMO in a PC clinic. Note also that it restricts primary care to the ambulatory care setting, defining inpatient and institutional long-term care as falling outside PC even if a PCP provides it. This, too, is in keeping with the IOM approach.

In an effort to increase specificity by reducing false positives (incorrectly classifying non-PC visits as PC), our approach may err on the side of decreasing sensitivity by creating false negatives (incorrectly classifying PC visits as non-PC). We can be fairly certain that if we refer to a visit as PC it *is* PC, but we may incorrectly refer to some PC visits as non-PC. Thus, our characterization of NMPC is likely valid, whereas a count of its quantity may not be.

Given this conservative approach to defining NMPC, we decided not to analyze and report actual numbers of NMPC and non-PC visits, but rather to report only percentage distributions. We were also careful not to make direct comparisons between the relative share of various kinds of care between PC and non-PC, but rather to compare relative distributions within PC and non-PC. In other words, we avoid such statements as "55 percent of visits in branch medical clinics are PC, whereas 45 percent are non-PC" in favor of such statements as "55 percent of all PC visits are to branch medical clinics, whereas 25 percent of non-PC visits are to this type of MTF." By this approach, even

though some PC may be classified as non-PC, we will not incorrectly compare counts of possibly undercounted PC with possibly overcounted non-PC. We will only compare relative distributions *within* PC and non-PC and not *between* them.

Empirical methods and metrics

Empirically defining NMPC

In the previous section, we conceptually defined NMPC and conservatively restricted it to "what PC providers do in Navy MTF PC clinics." In this section, we operationalize this definition in empirical terms using available data fields in the ADS/SADR. Let us consider each of the terms in this definition: *PC providers, do, Navy MTFs,* and *PC clinics.*

PC providers

We defined PCPs as those providers who are or can be PCMs in Navy MTFs as well as those other providers who function in a clinical health-care-providing role on PC teams. We took this information from the provider specialty code field in the ADS visit record. This field captures the specialty of the provider of record for a visit. We defined the following providers (with their associated ARS Bridge specialty codes) as *PC providers*:

> general medical officers (000), family practice physicians (001), family practice residents (003), general contract physicians (002), general internal medicine physicians (011), internal medicine residents (028), general pediatricians (040), adolescent medicine physicians (042), pediatric residents (052), aerospace medicine physicians (300), aerospace medicine residents (301), aerospace medicine flight surgeons/family practice physicians (302), hyperbaric/undersea physicians (322), general duty nurses (600), obstetrics/gynecology nurse practitioners (602), pediatric nurse practitioners (603), qualified primary care nurse practitioners (604), entry-level primary care nurse practitioners (605), clinical nurses/entry-level nurse practitioners (610), corpsmen/technicians (900), and physician assistants (901).

We classified all other providers as non-PC.

Note that PCPs include physicians and residents in the fields of family practice, internal medicine, pediatrics and adolescent medicine, and aerospace medicine/flight surgery and hyperbaric/undersea medicine, as well as GMOs. Some of these clinician categories (especially GMOs and the operational forces specialties—aerospace and undersea medicine) are present in both PC and non-PC settings both within and outside Claimancy 18 facilities. Some individual clinicians may even split their practice between these settings, seeing the same or different patients in Claimancy 18 PC settings and some in either Claimancy 18 non-PC settings (e.g., an acute care clinic) or non-Claimancy 18 settings (e.g., aboard ship).

We also included several types of non-physicians as PCPs, including those who can function as PCMs, such as nurse practitioners (NPs) and physician assistants (PAs), and those who provide clinical support to PCMs, such as nurses, corpsmen (especially IDCs, some of whom may function as de facto PCMs in some settings) and some primary care technicians. Unfortunately, the ARS Bridge data dictionary and the ADS records it supports classify all corpsmen and technicians into a single provider specialty code, which does not allow us to distinguish between those who act more like PCPs and those who function more as specialist technicians. Rather than eliminate this entire category (code 900) from our definition, we chose to include it under the assumption that specialist technicians are more likely to be located in non-PC than in PC settings and, thus, that patient visits to them would fall outside our definition of PC once we took clinic setting into account.

What PCPs do

We operationally defined what PCPs *do* as the type of clinical services they provide and the type of patient management they perform. We measured the former through Ambulatory Patient Groups (APGs) and the latter through Evaluation and Management (E&M) codes. The 3M Corporation developed APGs in the mid-1990s as an ambulatory patient classification system for use by the Health Care Financing Administration (HCFA) for determining ambulatory facility payments under its outpatient prospective payment system. Though never used by HCFA in this form for this purpose, APGs nevertheless provide a useful classification scheme for our purposes. They allow us

to classify visits by the primary reason for, and dominant determinant of what is done during, an outpatient visit [6, 7, 8, 9, 10].

APG codes number just under 300, and they form a more parsimonious classification scheme than the thousands of International Classification of Diseases-Clinical Modification, 9th revision (ICD9) codes and Common Procedural Terminology, 4th revision (CPT4) codes on which APGs are based. Like the Diagnosis Related Groups (DRGs) developed for the facility payment portion of inpatient care under HCFA's prospective payment system, APGs group similar kinds of visits by clinical content and typical resource consumption. However, unlike inpatient stays, which receive one and only one DRG, each ambulatory visit can receive multiple APGs depending on the clinical content of the visit. When used for payment purposes, these multiple codes and the special techniques developed for aggregating them into a single payment are necessary. When used for our analytic purpose, they are not. We modified the standard APG methodology somewhat for this study by using only a single composite code to categorize a visit.

The ADS visit file contained on the ARS Bridge lists up to 6 APG codes for each visit based on the ICD9 and CPT4 codes entered by providers into the visit record (see appendix C of the ARS Bridge Data Dictionary for a listing of the APG Version 2.0 codes). The ADS assigns APG codes by running the ICD9 and CPT4 codes associated with a visit through an APG grouper algorithm program developed by 3M. This algorithm first examines the CPT4 codes in the visit record to determine whether a significant procedure or treatment occurred. If it did, the grouper assigns a procedure/treatment code (based on CPT4) as the reason for the visit and dominant determinant of the clinical content of the visit. If the grouper detects no significant procedure/treatment, it determines whether a medical visit occurred. If it did, the grouper assigns a medical visit code based on the ICD9 diagnosis codes for the visit. Procedure codes and medical codes are mutually exclusive; a visit can have one but not both.

A visit can also have neither code. When the grouper determines that neither code applies (i.e., neither a significant procedure/treatment nor a medical visit occurred), it next examines the visit record to

determine whether an ancillary procedure occurred. If one occurred, it assigns an appropriate "ancillary only" code. The grouper can assign additional ancillary procedure codes to a visit based on other CPT4 codes in the visit record. Thus, the grouper can assign a medical, significant procedure, or ancillary procedure code as the reason for a visit, and then add one or more ancillary procedure codes to characterize the visit as well. The grouper can also assign one or more "incidental procedure" codes that receive no payment, as well as one or more "error" codes indicating that the visit was ungroupable or that its record contained inconsistent or invalid information.

We modified this approach by categorizing a visit by one and only one APG regardless of the number of APGs assigned by the grouper. We ignored ancillary procedures unless a visit was an ancillary-only visit, in which case we considered the first listed ancillary to be the reason for the visit. By using this approach, what we lose in specific visit detail we gain in simplicity and clarity of visit classification. Also, because many ADS records capture only some of the procedures performed during a visit, this approach avoids expecting more visit detail than ADS typically captures.

In addition to APGs, we also defined what PCPs do in terms of Evaluation and Management (E&M) codes. E&M codes are part of the American Medical Association's CPT coding scheme [11]; however, they refer not to specific procedures but rather to a global assessment of the nature of the medical encounter. E&M codes categorize encounters by type (e.g., office visit, hospital services, consultation, emergency and critical care, or preventive medicine) and level. Level is determined by the content of the service delivered (e.g., comprehensiveness of history and/or examination, type of medical decision making required, and degree of coordination of services called for), the nature/severity of the presenting problem (e.g., minimal, self-limited or minor, moderate, or severe), and the amount of time spent in face-to-face contact/treatment during an encounter (e.g., an office visit) where such contact is an integral part of the encounter.

For this study, we grouped the somewhat more than 120 E&M codes into six categories: office visit for a new patient, office visit for an established patient, consultation, telephone consultation, preventive

medicine visit, and all other types of visits (including emergency and critical care, various hospital services, and various long-term-care services). Because they contained the large majority of all PC visits, we further subdivided the two office visit categories into three subcategories each:

- New patient office visits
  - — Limited/minor to low intensity
  - — Moderate intensity
  - — Moderate-high to high intensity
- Established patient office visits
  - — No physician required (typically technical procedure performed)
  - — Minor to low/moderate intensity
  - — Moderate to high intensity.

See appendix A for a list of the E&M codes for each category and subcategory.

Navy MTFs

We defined the next term in our empirical definition of NMPC, *Navy MTFs,* as all facilities identified with a Defense Medical Information System (DMIS) Identification Code for an MTF and a Facility Service Code identifying it as a Navy facility. We identified 141 currently active Navy MTFs from the list of all MTFs contained in appendix D of the ARS Bridge Data Dictionary. We grouped the Navy MTFs into seven categories (see appendix B to this report). The first three categories are different types of hospitals: Naval Medical Centers (NMCs), Family Practice Naval Hospitals (FPNHs, each operating a Family Practice training program), and Naval Community Hospitals (NCHs). The fourth category is Navy MTFs that are not hospitals with

active inpatient facilities but are separate commands and are their own parent DMISs[3]; we called this category Other Commands. This category contains two facilities that are nominally hospitals (Charleston and Corpus Christi) but that do not operate as inpatient facilities. Fifth is a category of various branch clinics that are not their own commands or parent DMISs; they are branches that report to a command facility, annexes of branches, or TRICARE Prime Clinics (TPCs) within the catchment areas of and reporting through commands. The last two categories are OCONUS commands consisting of overseas hospitals or separate command clinics, and OCONUS branches consisting of overseas branch clinics reporting to an OCONUS command.

PC clinics

We defined the last term in our definition of NMPC, *PC clinics,* through the alphabetical standard account codes developed by DOD for its accounting reporting system, the Medical Expense and Performance Reporting System (MEPRS) for Fixed Military Medical and Dental Treatment Facilities. The MEPRS coding framework assigns a three-character code to each clinical and administrative activity in an MTF. The first character (or level) identifies the activity's functional category (i.e., inpatient care, ambulatory care, dental care, ancillary services, support services, special programs, and readiness). The second level identifies the summary accounts into which MEPRS divides each functional area, and the third level refines the summary accounts into subaccounts.[4] As an example, MEPRS codes outpatient medical examination clinics as "BHB" where the first "B" is the level 1 code for ambulatory care, the "H" is the level 2 code for primary

3. Each DMIS facility reports its information to the DMIS either directly or indirectly through a "parent." Separate commands are typically their own parent; branch clinics and annexes are typically "children" of a parent command.

4. MEPRS also permits a fourth level that individual MTFs can assign to identify specific units within a subaccount. This level is optional and unique to each MTF, and cannot easily be used for analyses across MTFs. For this reason, we chose not to use the fourth level in our analysis.

medical care, and the second "B" is the level 3 code within ambulatory primary care for medical examination clinics.

In keeping with our conceptual discussion and definition of primary care in the previous section, we restricted PC clinics to only ambulatory clinics (with "B" level 1 codes). We then defined the following ambulatory clinics (with their associated MEPRS codes) as *PC clinics*:

> Internal Medicine (BAA), Pediatrics (BDA), Adolescent Medicine (BDB), Well-Baby Care (BDC), Family Practice (BGA), Primary Care (BHA), Medical Examination (BHB), PRIMUS/NAVCARE clinics (BHH), Flight Medicine (BJA), and Undersea Medicine (BKA).

We classified all other clinics as non-PC.

We used this empirical definition of NMPC in the following way. First, we identified all encounters[5] recorded in the FY00 ADS data where the provider was a PCP and the encounter occurred in a Navy MTF PC clinic. Thus, we defined PC both by who provides it and where they provide it. Next, we categorized these PC encounters on the basis of their APG and E&M codes. This allowed us to describe "what PCPs do in Navy MTF PC clinics."

By contrast, we defined non-PC encounters as any of the following: those provided by a PC provider in a non-PC setting, by a non-PC provider in a PC setting, and by a non-PC provider in a non-PC setting. We believe that only care provided by PCPs in PC settings matches the sense of the term PC as we use it here; all other care typically lacks the support and environment necessary for the continuity, coordination, and comprehensiveness—as well as the sustained clinician-patient relationship—that define PC.

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5. The ARS Bridge restricts encounters to those in which a patient actually had an encounter with the MTF. Thus, it includes only encounters with appointment status codes of kept scheduled appointment, walk-in, military sick call, and telephone consultation. No-shows and appointments canceled in advance by the patient or the facility are excluded. However, encounters with disposition codes for "left without being seen" and "left against medical advice" are included because the patient-MTF encounter occurred even though the patient later aborted it.

Through this approach, we were able to classify 2,485,098 of the 7,407,026 completed encounters in Navy MTFs recoded in the FY00 ADS data set as NMPC encounters. Table 1 shows the distribution of these almost 7.5 million encounters between PC and non-PC. Note that 2,065,507 encounters occurring in Navy MTFs had unknown or missing provider specialty codes. Because our definition would classify the 1,282,985 of them that occurred in non-PC clinics as non-PC regardless of the provider type, we considered these encounters to be non-PC. On the other hand, the 782,522 Navy MTF encounters occurring in PC clinics and having an unknown provider type are ambiguous cases that cannot be definitely assigned as PC or non-PC. If the provider were a PCP, the encounter would be PC; if the provider were non-PC, the encounter would also be non-PC. We could not assign these encounters, so we considered them missing and excluded them from our analysis.

Table 1. Distribution of Navy MTF encounters by clinic type and provider type

	Provider type			
Clinic type	PC	Non-PC	Unknown/ missing	Total
PC	2,485,098	103,170	782,522	3,370,790
Non-PC	824,502	1,928,749	1,282,985	4,036,236
Total	3,309,600	2,031,919	2,065,507	7,407,026

It is likely that many of the unassignable encounters that occurred in PC clinics *are* actually PC, and that we are undercounting NMPC. We made the assumption that these undercounted cases are similar to those that we were able to classify as PC, and that their distribution among *types* of PC encounters is similar to the distribution of those encounters we were able to classify as PC. For this reason, we report only percentages of types of NMPC rather than counts (e.g., we report that X percent of PC encounters occurred at a given type of MTF rather than that Y number of encounters occurred). We also believe that the probable undercount of NMPC would misrepresent percentage comparisons *between* PC and non-PC for various types of encounters (e.g., encounters at a given type of MTF split 40 percent PC to 60 percent non-PC). For this reason, along with the reasons

discussed above in relation to conceptual considerations of PC, when comparing PC and non-PC, we report and compare only percentage distributions *within* PC and non-PC (e.g., X percent of PC encounters occurred at a given type of MTF, whereas Y percent of non-PC encounters occurred at that facility type).

Visit files and aggregated patient files

The ADS records ambulatory visits. Analyses based on ADS data files permit us to describe and draw conclusions about the providers who deliver health care services during these visits, where they occur, and what their clinical content is. They also permit us to describe and draw conclusions about the characteristics of the patients who receive the care provided—but only in terms of *visits* and not in terms of *patients.* We can report that X percent of the visits were made by men, but not that Y percent of the patients were men. Similarly, we cannot report that men had a mean number of N visits or that Z percent of men had 5 or more visits. For these person-level results, we need person level data. To get such person-level data, we need to aggregate visit-level data up to the person level, and to do that we need to be able to identify which visits belong to which unique persons. Ideally, we would do this through the use of a unique patient identifier in the ADS visit record; however, all such uniquely identifying information was omitted from the data NMIMC supplied to CNA for patient confidentiality reasons. Fortunately, the ADS data file contains sufficient other information that allows us to approximate this aggregation process for the majority of visits contained in the file.

We used data fields in the ADS record containing information on the Social Security Number (SSN) of the visit sponsor and the family member prefix (FMP) of the patient. The sponsor is the person through whom the patient making the visit is eligible for the DHP; the sponsor could be the patient himself/herself, the patient's spouse or parent, or someone else with a defined relationship to the patient. The FMP identifies what this relationship is (sponsor himself/herself, spouse of sponsor, child of sponsor, etc.). Although it is possible that sponsor and FMP status can change during the course of a year, and that sponsor SSN/patient FMP combinations might not always uniquely identify an individual, these data fields are almost always

populated with relatively valid data, whereas other fields (such as date of birth and gender) contain more missing and relatively less valid information. For purposes of this report, we matched visit records on sponsor SSN and patient FMP to aggregate the visit-level data to the person-level; we recognize that the aggregation is not perfect and that our resulting findings are approximations.

Because this was a first approximation and the aggregation process required a large amount of computer resources, we decided to use only a sample of visit records to form the aggregated person file. We could not, however, select a random sample of visits because that would defeat the visit-to-person aggregation. We also could not select a sample of persons; that would require aggregating the entire file and then drawing the sample. We decided instead to select all visits made to Navy MTFs within a significant catchment area where the Navy is the primary MHS provider, the Navy contributes the majority of DHP eligibles and MHS users, and all or almost all of the various elements of Navy Medicine are present. Both the NMC San Diego and NMC Portsmouth catchment areas fit this description; we selected the Portsmouth area based on our greater familiarity with it. We then operationally defined visits occurring in the Portsmouth catchment area as those occurring in all Navy MTFs having NMC Portsmouth as their parent DMIS (DMIS ID 0124). This includes the medical center itself, all branch clinics and TPCs in Virginia's Tidewater area, and all clinic annexes in and around the Tidewater area.

The aggregation algorithm that we used allowed us to create a person-level file containing aggregated records summarizing information about individual patients over the 12 months of the fiscal year.[6] Through this aggregation procedure, we populated the person-

6. Because we created the person-level file from the ADS visit file, a person had to have had a completed encounter with a Navy MTF in the NMC Portsmouth catchment area (parent DMIS ID 0124) to be included in the file. Further, persons included in the file who split their health care between Navy MTFs with parent DMIS ID 0124 and other military or civilian facilities during FY00 would not have all of their ambulatory visit history represented in the file—only that portion of their visit history that occurred in Navy MTFs with parent DMIS ID 0124.

level records in this file with selected demographic data, the number of PC and non-PC visits made throughout the year, and the number and per-visit mean of resource-based Relative Value Units (RVUs) (see below for a discussion of RVUs).

Metrics and methods

Resource use (RVU) metric

We modified an existing metric—HCFA's resource-based Relative Value Unit (RVU)—to allow us to estimate the relative amount of resources consumed during a given visit or consumed over the fiscal year by a given patient. HCFA developed RVUs as part of its approach to determining how much it would pay for various clinical services provided by physicians under the Medicare program. The major factor in this determination is an estimate of the relative amount of resources (the provider's time and skill/expertise, use of medical technology, facility use, practice maintenance requirements, etc.) that are required or consumed in producing a service or doing a procedure. In essence, HCFA calculates a resource-based relative value weight for each of three components (work, practice expense, and malpractice expense) associated with each of more than 10,000 physician services.[7]

HCFA codes these services through the HCFA Common Procedure Coding System (HCPCS), which includes all of the AMA's CPT codes and code modifiers along with specific codes developed by HCFA for Medicare payment purposes. A National Physician Fee Schedule[8] lists the relative resources associated with each of the three components for each physician service/procedure in the HCPCS classification system. HCFA then calculates a payment amount by discounting and adjusting the listed RVUs for overlapping or shared services/

7. In the late 1990s, HCFA, acting under the direction of Congress, began a phased-in transformation of its RVU methodology from a charge-based to a resource-based methodology for all three components.

8. See the November 2, 1999, *Federal Register* for the Fee Schedule for Physicians' Services for FY 2000.

procedures for all such services/procedures associated with a given encounter, further modifying the listed RVUs by a geographic practice-cost index reflecting the geographic variation in practice costs, then combining (summing) the adjusted RVUs to arrive at an overall RVU for the encounter, and finally multiplying the resulting total RVUs by a dollar conversion factor.

Based on the requirements and purposes of our analysis, we modified several aspects of HCFA's methodology. First, we applied RVUs to the services delivered by all providers, not just physicians. This is consistent with DOD's applying CPT codes (developed for physician services) to all ADS visit records regardless of provider type. Second, we did not adjust or modify the listed RVUs for geographic cost variation or for overlapping or shared services. These modifications are necessary for determining fair and appropriate payments, for estimating the dollar value of an encounter, or for forecasting how much it would likely cost to purchase those services outside an MTF (or how much would be saved if recaptured by an MTF). These modifications, however, are not necessary for—and may actually defeat—our analytic purposes, which require us to develop a metric that is uniform across the entire MHS and that does not vary between MTF geographic markets. This modification allows us to measure resource use with a common baseline metric (a stable, invariant yardstick) that is unaffected by geographic variation in cost or price.[9] And, of course, we did not convert the RVUs into dollars because we are using these calculations not for payment purposes but to estimate resource use.

9. The ADS contains enrollment-based capitation (EBC) cost and price dollar estimates that we could have used instead of applying our modified RVUs; however, we decided against this approach largely for the same reason. The EBC estimates in the ADS record are based on the charge master of the MTF in which a given visit occurred and thus vary from MTF to MTF depending on charge master variation, which could be affected by prevailing health care costs in the surrounding area, by overhead expenses at the various MTFs, and by other factors making the EBC estimates variant and not uniform.

We calculated a composite RVU for each visit in the ADS data file by directly applying HCFA's National Physician Fee Schedule Relative Value File (essentially, a resource-based relative value scale) to each CPT code in a visit's record and then directly summing them to arrive at the total composite RVU for that visit. Recall that the ADS record contains an E&M code for the visit, and that E&M codes are part of AMA's CPT coding system. In addition to an E&M code that is a required part of the ADS record, a provider may enter up to four additional CPT codes for procedures performed during the visit.[10]

Our composite RVU figure for a visit reflects the simple addition of the RVU associated with a visit's E&M code plus the unadjusted and unmodified RVUs associated with any of the up-to-four-procedure CPTs in a visit record. When working with the NMC Portsmouth area patient-level data file, we also aggregated the visit RVUs for each person in the file by adding the RVUs from each of their visits to an area Navy MTF during FY00 to arrive at an annual total. This also allowed us to derive a mean per-visit RVU figure for each person in the file by dividing the total RVUs by the number of visits.

HCFA's protocol for deriving RVUs requires choosing between facility-based and non-facility-based and between fully implemented and transitioned weightings. Based on conversations we had with representatives of the Air Force Medical Operations Agency (AFMOA) who

10. The ADS record limits the number of E&M codes to 1 and the number of procedure CPT codes to 4. HCFA, and many commercial insurers and health plans (including those contracting with TRICARE to provide services through managed care support contracts), allow for multiple E&Ms as well as up to 20 or more additional procedure CPTs in their billing forms. Under these payment plans, providers have an economic incentive to code each and every service and procedure associated with a visit because that determines their payment. Navy providers, on the other hand, have no such incentive. For these reasons (different number of CPT codes allowed and differing economic incentives), the RVUs we calculate from the ADS and those calculated for receiving payment from HCFA, commercial payers, or TRICARE are likely to be both different and not comparable.

developed RVU metrics for use within the Air Force,[11] we applied the transitioned facility-based RVU for the practice expense component of a visit's RVU.

Although we believe that our modified methodology better suits our analytic purposes, these modifications make direct comparison of our results and those based on more closely following HCFA's methodology somewhat tenuous. We caution against making such comparisons.

Patient (user) metrics

We used several variables to characterize the patients who use NMPC. In addition to such data supplied directly by the ADS (e.g., patient age/date of birth and gender), we constructed several patient descriptors for use in our analyses. One such descriptor, patient status, summarizes several aspects of a patient's beneficiary and active duty classification. We developed this measure to counteract the inconsistencies we found in the individual ADS data fields making up this measure. We combined and removed inconsistencies in data found in Alternate Care Value, Beneficiary Category, and FMP (see the ARS Bridge Data Dictionary for more information about these data fields) to classify patients as Active Duty TRICARE Prime (we classified *all* active duty and active guard/reserves into this category), Active Duty Dependent TRICARE Prime, Other TRICARE Prime (most of whom are under age 65 retirees and their family members or survivors), TRICARE Not Prime (i.e., Standard or Extra), and TRICARE Not Eligible (many of whom are over age 65).

We also created a metric for TRICARE Prime enrollees (which we call Enrollment DMIS versus Treatment DMIS, or E-T DMIS) to classify the relationship between where they enrolled and where they received treatment. This measure has three values:

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11. Lt Col Sean Murphy and Maj Russ Pinard of AFMOA discussed their methodology with us. They reported that the HCFA officials they had spoken with recommended this approach because facility-based practice expense RVUs better approximate the practice setting of MTF providers, and transitioned RVUs better reflect HCFA's current approach.

1. Enrollment DMIS equals treatment DMIS (the visit occurred at the same DMIS facility in which the patient enrolled)
2. Enrollment DMIS does not equal treatment DMIS
3. Active duty/no enrollment DMIS (this occurs among active duty who are all classified as TRICARE Prime but who are not enrolled to a DMIS facility for various reasons, such as being in training, enrolled aboard ship, or not completing necessary enrollment paperwork).

As an aside, we had intended to also use sponsor pay grade as a patient metric but abandoned this idea when we discovered that this data field was not well populated in the ADS data we received. Most of the blank data fields were visit records for non-active-duty persons, suggesting that either the Defense Enrollment Eligibility Reporting System (DEERS) or the support contractor appointing system was not capturing this information and that only information available visually from in-uniform active duty who showed in person at an MTF was being captured.

Satisfaction metrics

To measure the level of patient satisfaction with NMPC, we selected several survey items from the two DOD satisfaction surveys used for this report. Neither of these surveys was originally designed for this purpose; thus, we had to retrofit them to meet our purposes. From the *Health Care Survey of DOD Beneficiaries*, we identified five items that reflect satisfaction with access to general or routine care, with one's personal doctor or nurse, and with one's PCM. We analyzed responses to those items from Navy-sponsored DHP beneficiaries who used TRICARE as their primary health plan, and interpreted the results as proxy measures for satisfaction with NMPC. From the monthly *Consumer Satisfaction Survey*, we used DOD's three composite satisfaction scales (satisfaction with interpersonal, quality, and access aspects of care received) as well as two questionnaire items that measure overall satisfaction with a clinic visit for all respondents who visited a surveyed primary care clinic in a Navy MTF during FY00.

Analytic methods

To assess what NMPC is, how it's provided, who uses it, and how it's used, we primarily used percentage distributions supplemented by a variety of other techniques to enhance and extend what the distributions revealed. In addition to reviewing and comparing percentage distributions of visits and RVUs, we also calculated and compared mean per-visit RVUs. To further compare the nature of PC and non-PC, we calculated ratios of non-PC to PC mean per-visit RVUs for various categories of visits and for various categories of MTFs. We also used this technique to compare PC by type of PCP and by type of MTF. To help us better assess similarities and differences between PC practiced by each type of PCP and at each type of MTF, we compared distributions of visits using coefficients of alienation and indices of dissimilarities.

To better visualize the similarities and differences of how various categories of patients use NMPC and how various categories of PCPs and MTFs provide it, we used two techniques that plot and allow us to compare patterns of PC use and provision. Radar plots use a hub-and-spoke approach to compare the frequency of visit types for a given type of user or provider relative to a fixed center point and to one another. When two or more such distributions are plotted on the same set of hub-and-spoke axes, it is possible to discern and compare the various patterns of use or provision by user or provider type.

We used Lorenz curves, originally developed to illustrate income inequality [12], to plot the cumulative percentage of RVUs attributable to a cumulative percentage of visits (e.g., Y percent of the visits produce X percent of the RVUs). If each visit had an equal number of RVUs, X and Y would be equal (e.g., 10 percent of the RVUs would eminate from 10 percent of the visits), and the plot would become a straight 45-degree line running from 0 percent of the RVUs produced by 0 percent of the visits to 100 percent of the RVUs produced by 100 percent of the visits. In actuality, however, different visits produce differing numbers of RVUs, and X is different from Y. Lorenz curves illustrate the degree of inequality or concentration of RVUs by the degree of their curvature. When a line of equality and a Lorenz curve are displayed on the same set of axes, the area between the line and

the curve illustrates this concentration. An associated quantitative measure, a Gini Index, quantifies the area between the line and the curve. This index is 0.00 when there is no inequality (the curve is collinear with the line) and 1.00 when there is complete inequality (one visit produces 100 percent of the RVUs). When Lorenz curves for two or more categories of users or providers are plotted on the same set of axes, their relative concentration becomes visually discernible, and their associated Gini Indices allow a quantitative comparison. (We also used Lorenz curves and Gini Indices with the Tidewater area patient-level file for RVUs vs. persons rather than vs. visits.)

Finally, we also used multivariate regression. We used multivariate *linear* regression with the person-level data file to assess the relative impact of various patient characteristics on the total number of PC visits to Tidewater area Navy MTFs made during FY00, as well as to assess the relative impact of those characteristics plus the number of visits on the total number of RVUs generated by persons receiving care in those MTFs.

We used multivariate *logistic* regression with the DOD health care beneficiary survey to assess the relative impact of user demographic and utilization characteristics on patient satisfaction. Logistic regression, used when the outcome variable is binary (e.g., satisfied/not satisfied), estimates the likelihood (or *odds*) of members of one group of survey respondents to experience a particular outcome (e.g., being satisfied) relative to the likelihood of members of a different group to experience that outcome, controlling for the effects of other possibly confounding variables. The results of the analysis are expressed as an Odds Ratio (OR), or a ratio of one group's likelihood to that of the other group.

What is Navy Medicine Primary Care?

A "map" of NMPC

We begin the report of our findings with a "map" of NMPC by APGs for FY00. Table 2 presents an empirical picture, or map, of NMPC by listing the 37 APGs that empirically define NMPC in terms of volume and exclusivity of visits. The three rows in this table group APGs on the basis of volume of NMPC visits. The first row contains APGs in the top 90 percent of all NMPC visits by volume. The second row contains APGs from the next 4 percent, and the third row contains APGs from the next 5 percent after that. In all, the three rows list APGs from among those accounting for 99 percent of NMPC visits. The columns group APGs on the basis of exclusivity to NMPC. The high, moderate, and low columns contain APGs for which NMPC provided over two-thirds, between one-third and two-thirds, and less than one-third, respectively, of all the visits to Navy MTFs.

The 37 APGs that define NMPC significantly contribute to the volume of PC visits and/or are significantly high on PC exclusivity. They fall into one of three zones in table 2: (a) the pink upper left-hand cell of high volume and high exclusivity (8 APGs); (b) the two yellow cells running from high volume but moderate exclusivity (18 APGs) to moderate volume but high exclusivity (no APGs); and (c) the three purple cells running from upper right to lower left and containing APGs that are high volume but low exclusivity (4 APGs), moderate volume and moderate exclusivity (5 APGs), and low volume but high exclusivity (2 APGs). We considered the APGs falling into the three lower righthand cells as being too low in exclusivity for their level of volume to qualify for inclusion in our empirical map of NMPC.

Table 2. A map of Navy Medicine Primary Care – APGs that empirically define NPC

Volume (% of PC visits)	Exclusivity (PC visits as percentage of total visits)		
	High.(above 66%)	Moderate (33% - 66%)	Low (below 33%)
High: Top 90%	542. Flu, URI, ENT infection 701. Adult med exam 702. Well child care 572. Hypertension 502. Misc infectious diseases 561. Emphysema, chronic bronchitis, asthma 661. Urinary tract infection 562. Pneumonia	635. Skin diseases 623. Simple musculoskeletal Dx except back disorders 681. GYN Dx (including most pap tests) 464. Fracture, dislocation, sprain 704. Aftercare 545. Other simple ENT & mouth diseases 597. Other simple GI diseases 621. Back disorders 653. Simple endocrine, nutritional, & metabolic Dx except diabetes 512. Headache 651. Diabetes 503. Infectious diseases of genital orgs 533. Conjunctivitis & other simple external eye inflammation 591. Noninfectious gastroenteritis 703. Contraception/procreative mgmt 633. Cellulitis, impetigo, lymphangitis 592. Ulcers, gastritis, esophagitis 006. Simple debridement & destruction	705. Non-specific Signs & Symptoms and other health care system contacts 491. Routine prenatal care (note: but **not** routine post-partum care) 462. Minor skin & soft tissue injuries, except burns 237. Simple audiometry
Moderate: Next 4%	No APGs in this cell	574. Chest pain w/o cardiac enzymes to rule out MI 631. Diseases of the nails 501. Complex infectious disease 373. Cardiogram 595. Hemorrhoids & other anal/rectal diseases	Not NMPC: Not sufficiently exclusive for level of volume
Low: Next 5%	692. Anemia 481. Neonate & congenital anomaly	Not NMPC: Not sufficiently exclusive for Level of volume	Not NMPC: Not sufficiently exclusive for level of volume

We offer several observations based on table 2. First, only 37 APGs out of almost 300 (just over 12 percent, or about 1 of every 8) empirically define NMPC. Second, 90 percent of all NMPC visits are coded into only 30 APGs. Third, there are relatively few APGs (only 8) in the upper left (pink) cell that are both high volume and highly exclusive. Fourth, the high-volume/moderate-exclusivity cell contains the highest number of APGs (18, or nearly half of the 37 mapped), meaning that much of what NMPC does is split relatively evenly with non-PC. Fifth, there are relatively few APGs (only 10) that have high exclusivity (8 of them are also high volume, none are moderate volume, and only 2 are low volume). All of this suggests that NMPC consists of a somewhat compact set of clinical services that are not the exclusive domain of PC but are often performed by non-PC as well. What distinguishes NMPC from non-PC may be less *what* it does and more *how* it does what it does.

What NMPC is by visit type

Another approach to answering the question "what is NMPC?" is to look at the type of ambulatory visits that PCPs see and manage in PC clinics. Table 3 presents the percentage distribution of visits, mean RVUs per visit, and percentage distribution of RVUs by type of visit measured by APG category and E&M classification. Recall that there are three types of APG visits: medical, significant procedure or treatment, and ancillary only. NMPC consists almost entirely of medical visits (96 percent of all visits); very few visits are specifically for either significant or ancillary procedures/treatments. This is not to say that ancillary procedures are not a part of PC visits, but these procedures occur in the context of a medical visit (as the reason for the visit) rather than as isolated treatments on their own (as the reason for the visit). Medical visits, however, have the lowest mean RVUs relative to either procedure or ancillary visits (1.20 vs. 2.95 and 3.02, respectively). Thus, the relative share of resources and effort consumed by medical visits, measured as the percentage of total RVUs, drops to just under 91 percent, whereas the relative shares of the other two types of visits increase to almost 8 and almost 2 percent, respectively.

Table 3. Percentage distribution of NMPC visits, mean RVUs per NMPC visit, and percentage distribution of NMPC RVUs, by visit type

Type of visit	Percentage of visits	Mean RVUs per visit	Percentage of RVUs
APG			
Medical visit	96.0	1.20	90.7
Procedure visit	3.3	2.95	7.7
Ancillary only visit	0.7	3.02	1.7
Total[a]	100.0	1.27	100.0
E&M			
New patient (New Pt) office visit	24.2	1.54	31.6
Established patient (Est'd Pt) office visit	61.8	1.05	55.4
Consultation	0.8	2.87	2.0
Telephone call by the provider	7.5	0.001	0.0
Preventive medicine visit	5.4	2.30	10.6
All other visits/encounters	0.3	1.23	0.3
Total[a]	100.0	1.17	100.0
E&M office visit			
New Pt - Limited/minor to low intensity	17.6	0.99	14.7
New Pt - Moderate Intensity	5.9	1.94	9.6
New Pt - Moderate/high to high intensity	4.7	3.08	12.1
Est'd Pt - No physician req'd (procedure)	5.0	0.51	2.1
Est'd Pt - Minor to low/moderate intensity	50.1	0.87	36.7
Est'd Pt - High intensity	16.8	1.76	24.8
Total[a]	100.0	1.17	100.0

a. Reported percentages may not add to 100.0 because of rounding; total mean RVUs differ for APG type and E&M type as a result of differing number of cases with missing data dropped from the analysis.

Table 3 also presents results for visits classified by E&M type. The first set of E&M results is for the six major types of visits; the second set is for the six types of office visits (OVs). It is clear from these results that OVs with established patients most characterize NMPC, that these established patient visits are mostly for medical conditions of varying intensity rather than for procedures or treatments not requiring a physician, and that this is true regardless of whether we look at visits

or RVUs.[12] Note also that OVs by new and established patients combined account for 86 percent of visits and 87 percent of RVUs. This is not particularly unexpected given the nature of PC. What is surprising, however, is the relatively low share of visits coded as being primarily for preventive medicine (5.4 percent of visits and 10.6 percent of RVUs). We offer several possible explanations for this finding. Perhaps NMPC provides much of its preventive medicine in the context of OVs made for other reasons, perhaps PCPs miscode many preventive medicine visits, or perhaps NMPC delivers less preventive medicine than we expected to find.

We make several other observations regarding the E&M results presented in table 3. The mean per-visit RVUs follow an expected pattern: OVs lower than consultations and preventive medicine visits (skill and/or time intensive); established patient OVs lower than those for new patients (time intensive); lower intensity OVs—whether for new or established patients—lower than higher intensity OVs; and essentially no RVUs for outbound telephone calls (telcons) (low skill and time, no ancillary procedures conducted). Because of the differing mean RVUs by E&M visit type and OV type, the percentage distributions of RVUs differ from those of visits, with RVU percentages being higher whenever the mean for a category of visits is higher than the total mean, and lower whenever the category mean is lower than the total mean.

Distribution of NMPC by where it's provided and by whom

NMPC is provided in each of the various types of MTF and by each of the various types of PCP. Table 4 presents the percentage distributions of visits and RVUs by MTF type and PCP type, along with their respective mean per-visit RVUs. Less than 10 percent of all NMPC visits occur in NMCs, and fewer than 10 percent of all NMPC RVUs are generated in them. The two other types of hospitals

12. Recall, however, that we defined NMPC as what *PCPs* do in Navy MTF PC clinics. Thus, we would not have classified a visit to a PC clinic for a procedure performed by a specialized non-physician clinician (such as a physical or speech therapist, an audiologist, a clinical psychologist, or a cardiopulmonary lab technician) as an NMPC visit. This is likely to affect these results.

(FPNHs and NCHs) contribute about a quarter of all NMPC visits, and RVUs. Other commands add about one of every seven (~14 percent) visits, while branch clinics add just over four of every ten (~40 percent). Just over 10 percent of all visits and RVUs occur at the two types of OCONUS facilities, with the majority occurring at the ten commands (all but one of which are hospitals, the London clinic being the exception). Thus, while the large majority of stateside visits occur at non-hospital facilities, the opposite is true overseas.

Table 4. Percentage distribution of NMPC visits, mean NMPC RVUs per visit, and percentage distribution of NMPC RVUs, by MTF type and PCP type

Type of visit	Percentage of visits	Mean RVUs per visit	Percentage of RVUs
MTF			
Naval Medical Center (NMC)	7.7	1.27	8.4
Family Practice Naval Hospital (FPNH)	11.9	1.19	12.0
Naval Community Hospital (NCH)	14.7	1.06	13.2
Other Command	14.4	1.14	14.0
Branch Clinic	41.2	1.18	41.4
OCONUS Command	6.4	1.22	6.7
OCONUS Branch	3.8	1.33	4.3
Total[a]	100.0	1.18	100.0
PCP			
Registered Nurse (RN)	2.3	0.54	1.1
Hospital Corpsman/Technician (HM/Tech)	7.1	1.31	7.9
Physician Assistant (PA)	13.7	1.19	13.9
Nurse Practitioner (NP)	9.2	1.18	9.3
General Medical Officer (GMO)	14.7	1.23	15.4
Aerospace/Undersea Medicine Physician	3.7	1.44	4.5
Pediatrician/Adolescent Medicine Physician	15.3	1.17	15.2
Family Practice Physician (FP)	27.9	1.13	26.8
Internal Medicine Physician (IM)	6.3	1.11	5.9
Total[a]	100.0	1.18	100.0

a. Reported percentages may not add to 100.0 because of rounding.

Mean per-visit RVUs are higher for NMCs than for other types of CONUS facilities, whereas they are lowest for NCHs, all other CONUS facilities having fairly similar means. NMCs do see somewhat higher RVU-intensity PC visits than other CONUS MTFs, but not as

high as OCONUS branches, which see even higher RVU visits on average than do OCONUS commands. This is likely caused by the relative isolation of OCONUS branches, requiring them to "hold onto" many high-intensity cases that would otherwise be seen in hospitals or large command clinics stateside. It may also be the result of fewer relatively lower RVU established patient OVs and more relatively higher RVU new patient OVs in OCONUS branch sites that do not have the opportunity to establish ongoing relationships with their relatively transient client bases.

The majority of NMPC visits are attended by a physician. Just under a third of visits are attended by the combined non-physician categories of RN, HM/Tech, PA, and NP. FPs attend just over a quarter of visits themselves, making them the PCP type with the largest share of NMPC. Percentage distributions of RVUs again respond to whether a category's mean per-visit RVUs are higher than, about the same as, or less than the overall mean. Thus, RNs' share of RVUs is much lower than their share of visits, their mean per-visit RVUs being much lower than the overall mean. We will delay further discussion of variation of mean RVUs and RVU percentage distributions by PCP type until later in this report.

The distribution of NMPC by patient input and output streams

Table 5 presents results by the various ways that patients can come to an NMPC visit and the various types of dispositions that can result. By far, the most common route to an NMPC visit is a scheduled appointment, and the most common result is a discharge with no limitations. Few sick call visits are made, the large majority of them going to non-PC clinic settings (acute/urgent care clinics, military sick call clinics, or emergency clinics) or to various non-Claimancy 18 settings (sick bay aboard ship or shore-based regional service groups). Telephone consultations are somewhat more common, but are credited with no RVUs.

Table 5. Percentage distribution of NMPC visits, mean NMPC RVUs per visit, and percentage distribution of NMPC RVUs, by appointment status type and visit disposition type

Type of visit	Percentage of visits	Mean RVUs per visit	Percentage of RVUs
Appointment status			
Scheduled appointment	76.2	1.30	84.3
Walk in	14.4	1.11	13.6
Sick call	2.0	1.22	2.1
Telephone consultation	7.4	0.00	0.0
Total[a]	100.0	1.17	100.0
Visit disposition			
Discharged with no limitations	91.3	1.26	91.1
Discharged with work duty limitations	5.7	1.27	5.7
Sick at home/in quarters	2.6	1.34	2.7
All others	0.4	1.48	0.5
Total[a]	100.0	1.27	100.0

a. Reported percentages may not add to 100.0 because of rounding; total mean RVUs differ for appointment status type and visit disposition type as a result of differing number of cases with missing data dropped from the analysis.

We turn next to an examination of how NMPC compares with non-PC.

How does Navy Medicine Primary Care compare with non-primary care?

We answer the question "How does NMPC compare with non-PC?" by examining similarities and differences in terms of visit and RVU percentage distributions by APG type, by E&M and E&M OV types, by MTF type, and by appointment status and visit disposition types. We also compare mean per-visit RVUs by various visit types for non-PC visits relative to NMPC by examining the ratio of non-PC to NMPC means by various visit types. Ratios greater than 1.0 indicate a higher mean RVU for non-PC; ratios less than 1.0 indicate a higher mean for NMPC. We also present ratios for selected APGs. Lastly, we look at what non-PC attending providers do in PC clinics.

Visit distributions

Table 6 presents NMPC and non-PC percentage distributions of visits and of RVUs. Compared with NMPC, non-PC has a considerably higher percentage of procedure APG visits and RVUs, a somewhat higher percentage (but still relatively small) of ancillary APG visits and RVUs, and thus a lower percentage of medical APG visits and RVUs. The non-PC profiles by E&M type and by E&M OV type differ from that of NMPC in a number of interesting ways. Office visits and outbound telephone calls are comparatively smaller proportions of non-PC, whereas consultations and other types of visits (including emergency department and critical care visits) make up comparatively larger proportions. Neither NMPC nor non-PC deliver sizable proportions of preventive care, and their relative proportions are surprisingly similar, although NMPC's share is somewhat higher for visits and considerably higher for RVUs.

There are major differences between NPC and non-PC in relation to E&M office visit type. A large proportion of the established patient OVs seen by non-PC are procedure/treatment visits not requiring a

Table 6. Percentage distributions of visits and RVUs by visit type for NMPC and non-PC

Visit type	Visits (%)		RVUs (%)	
	NMPC	Non-PC	NMPC	Non-PC
APG				
Medical visit	96.0	66.6	90.7	50.7
Procedure visit	3.3	30.8	7.7	44.4
Ancillary only visit	0.7	2.6	1.7	4.9
Total[a]	100.0	100.0	100.0	100.0
E&M				
New patient office visit	24.2	19.0	31.6	25.5
Established patient office visit	61.8	55.6	55.4	44.3
Consultation	0.8	5.8	2.0	10.3
Telephone call by the provider	7.5	3.9	0.0	0.0
Preventive medicine visit	5.4	3.5	10.6	3.4
All Other visits/encounters	0.3	12.3	0.3	16.5
Total[a]	100.0	100.0	100.0	100.0
E&M office visit				
New Pt - Limited/minor to low intensity	17.6	9.5	14.7	7.8
New Pt - Moderate intensity	5.9	6.8	9.6	8.8
New Pt - Moderate/high to high intensity	4.7	9.3	12.1	20.0
Est'd Pt - No physician req'd (procedure)	5.0	31.0	2.1	14.4
Est'd Pt - Minor to low/moderate intensity	50.1	24.0	36.7	20.5
Est'd Pt - High intensity	16.8	19.5	24.8	28.6
Total[a]	100.0	100.0	100.0	100.0
MTF				
Naval Medical Center (NMC)	7.7	32.3	8.4	37.8
Family Practice Naval Hospital (FPNH)	11.9	15.4	12.0	14.9
Naval Community Hospital (NCH)	14.7	13.8	13.2	12.1
Other command	14.4	9.1	14.0	8.1
Branch clinic	41.2	21.3	41.4	19.0
OCONUS Command	6.4	7.4	6.7	7.7
OCONUS Branch	3.8	0.6	4.3	0.4
Total[a]	100.0	100.0	100.0	100.0
Appointment status				
Scheduled appointment	76.2	58.3	84.3	69.0
Walk In	14.4	38.1	13.6	30.6
Sick call	2.0	0.4	2.1	0.4
Telephone consultation	7.4	3.1	0.0	0.0
Total[a]	100.0	100.0	100.0	100.0
Visit disposition				
Discharged with no limitations	91.3	87.6	91.1	85.5
Discharged with work duty limitations	5.7	10.1	5.7	11.0
Sick at home/in quarters	2.6	1.0	2.7	1.6
All others	0.4	1.4	0.5	1.9
Total[a]	100.0	100	100.0	100.0

a. Reported percentages may not add to 100.0 because of rounding.

physician (this is less the case for RVUs). By contrast, the proportion of NMPC visits for minor- through moderate-intensity established-patient OVs is considerably higher (50 percent) than that for non-PC (only 24 percent), suggestive of the higher emphasis on continuity of care for routine and ongoing care. This observation holds but is somewhat attenuated for RVUs. The higher proportion of moderate- to high-intensity new-patient OVs for non-PC likely results from referrals of complex cases from PC to non-PC (and this is reflected in the RVUs), whereas the higher proportion of limited/minor- to low-intensity new-patient OVs for NMPC likely results from initial "get acquainted," routine care, or self-limited/minor acute condition visits to a newly selected PCM.

Not surprisingly, non-PC sees a considerably higher proportion of its visits and generates a considerably higher proportion of RVUs in NMCs and considerably lower proportions in branch clinics compared with NMPC. Non-PC sees a much higher proportion of walk-ins, reflecting the inclusion of acute/urgent and emergency care in non-PC. Telcons are also less prevalent in non-PC compared with NMPC. The large majority of ambulatory visits result in discharges with no limitations, whether NMPC or PC. However, work duty limitation dispositions are more common among non-PC than NMPC.

Ratios of non-PC to NMPC mean per-visit RVUs by visit type

Table 7 introduces a new analytic approach. It presents the ratio of the per visit mean RVU for non-PC to that of NMPC by various types of visits. Ratios greater than 1.0 indicate that the non-PC mean RVU is greater than that of NMPC; the larger the ratio, the more the non-PC mean exceeds the NMPC mean. Conversely, if a ratio is less than 1.0, it indicates that the corresponding non-PC mean is lower than that of NMPC; the smaller the ratio, the smaller the non-PC mean relative to the NMPC mean. With the exception of visits to OCONUS branches, no ratio is below 1.0 (and, at 0.99, the OCONUS branch ratio is just barely below 1.0). Note that for all visits, this ratio is 1.76, yet for the various component visit types it rarely approaches or exceeds so high a figure. This suggests that it is the differing percentage distribution of visits (especially by E&M and OV type) that accounts for much of the difference in means for all visits.

Table 7. Ratios of non-PC to NMPC mean per-visit RVUs by visit type

Visit type	Ratio
All visits	1.76
APG	
Medical visit	1.35
Procedure visit	1.04
Ancillary-only visit	1.34
E&M office visit	
New Pt - limited/minor to low intensity	1.59
New Pt - moderate intensity	1.29
New Pt - moderate/high to high intensity	1.35
Est'd Pt - no physician req'd (procedure)	1.76
Est'd Pt - minor to low/moderate intensity	1.90
Est'd Pt - high intensity	1.61
MTF	
Naval Medical Center (NMC)	1.91
Family Practice Naval Hospital (FPNH)	1.68
Naval Community Hospital (NCH)	1.71
Other Command	1.60
Branch clinic	1.56
OCONUS command	1.77
OCONUS branch	0.99

The non-PC to NMPC ratios for medical APG visits and ancillary APG visits are moderately high; the ratio for procedure visits is very close to yet still somewhat exceeds 1.0. New-patient visits of moderate to high intensity have a smaller ratio than new-patient visits for limited/minor- and low-intensity conditions. This suggests that non-PC may too intensively treat new patients with such lower intensity conditions. We offer the same observation for the high 1.90 ratio for minor- to moderate-intensity visits by established patients.

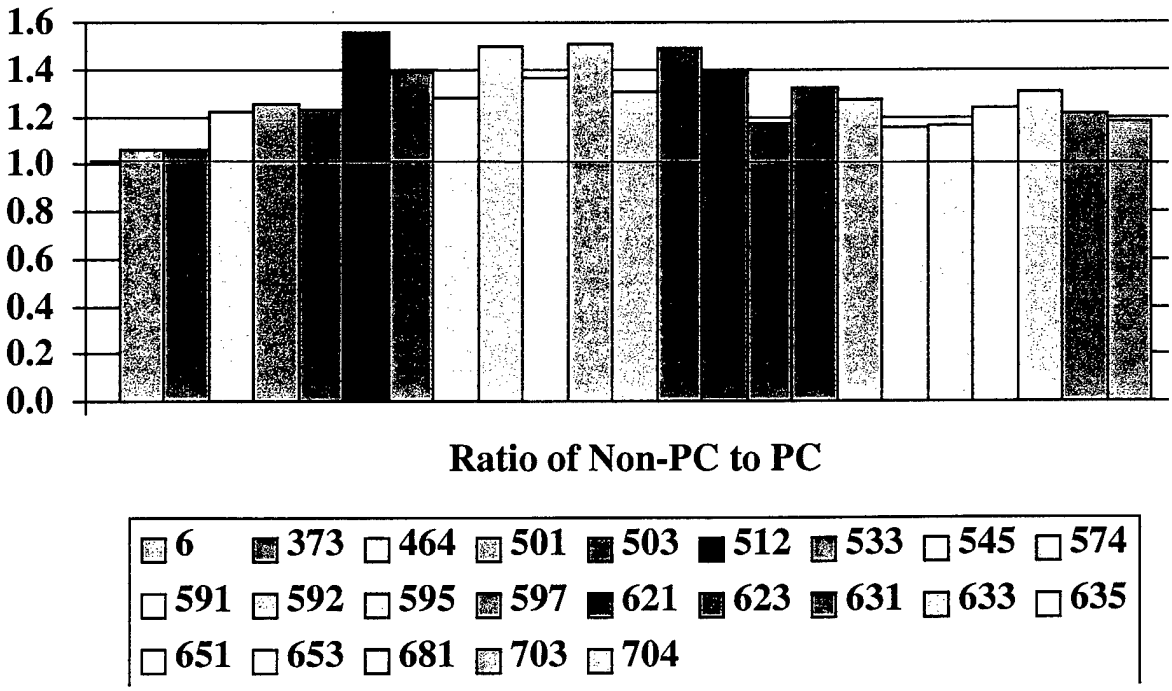
All of the ratios by MTF type are fairly high (above 1.50) with the exception of OCONUS branches. This finding is consistent with that reported in table 4 for OCONUS branch mean per-visit RVUs, and the likely explanation is the same as the one we offered in our discussion of table 4.

Ratios of non-PC to NMPC mean per-visit RVUs by selected APGs

Figure 2 extends this analysis to selected APGs. Recall that table 2 identified a set of 23 APGs that are not exclusively associated with either either NMPC nor non-PC but rather are "shared" between them. We computed non-PC to NMPC mean per-visit RVU ratios for each of these APGs and present the results in figure 2.

In all cases, the ratio exceeds the 1.0 level, identified by the horizontal line in the figure. The ratio ranges from a low of 1.06 for APG 6 (simple debridement and destruction) and APG 373 (cardiogram), to highs of 1.56, 1.51, 1.50, 1.49, and 1.39 for APG 512 (headache), APG 592 (ulcers, gastritis and esophagitis), APG 574 (chest pain without cardiac enzymes to rule out myocardial infarction), APG 597 (other simple gastrointestinal diseases), and APG 621 (back disorders), respectively.

Figure 2. Ratios of non-PC to NMPC mean per-visit RVUs by selected APGs[a]



a. A list of APG names corresponding to the numbered APGs in the figure is presented in appendix C.

Taken together, the results of table 7 and figure 2 suggest that either (a) non-PC treats the same kind of patient (indicated by equivalent visit type and/or equivalent APG) differently than NMPC does, with non-PC consistently treating patients more resource intensively (as measured by RVU), or (b) non-PC and NMPC see different combinations of patient types within visit type. To begin to better specify the more likely of these two competing explanations, we computed non-PC to NMPC mean per-visit RVU ratios by E&M OV type for selected "shared" APGs. We have put the results of this analysis in appendix D for those who wish to pursue them in detail. The results in appendix D suggest that the answer lies somewhere between the two explanations. In some instances, the ratios exceed 1.0 for the same E&M OV type for the same APG, suggesting that non-PC treats the same type of patient (measured by reason for and intensity of visit) more intensively. In other instances, the ratios fall below 1.0, suggesting that the results presented in figure 2 are caused by differing percentage distributions of visits between NMPC and non-PC, especially in relation to established vs. new patients. Because established patient OVs have lower RVUs than corresponding new patient OVs—but procedure-driven established patient OVs not requiring a physician have high mean RVUs—and because the proportions of NMPC visits and non-PC visits differ for these categories, some of the resulting findings presented in figure 2 are likely to result from differences in visit type between NMPC and non-PC rather than from differences in how intensively NMPC and non-PC treat the same kind of patient.

What non-PCP attending providers do in Navy MTF PC clinics

Our final approach to comparing NMPC and non-PC is to look at what non-PCP providers do in NMPC clinics. Recall that our definition of NMPC is what *PCPs* do in Navy MTF PC clinics. However, non-PCPs can be and are the attending provider for at least some PC clinic visits. Table 1 reports that non-PCPs attended somewhat over 103,000 (3.06 percent) of the almost 3.4 million visits to Navy MTF PC clinics during FY00. We looked at the percentage distribution of these 103,000 visits by APG and by E&M and compared these results with those for PCPs. We present our findings in tables 8 and 9.

Table 8 presents a map of what non-PCP providers do in Navy MTF PC clinics. We constructed it following the same protocol we followed to build table 2, with the following exceptions. First, we considered APGs that fell anywhere in the bottom row of the table to be of insufficient volume to list. There were just over 103,000 visits, when we ranked APGs by visit volume, so those that fell below 94 percent accounted for too few cases (under 200) to be of significance. Second, we considered APGs in the upper right cell and middle row/middle column of the table to be of insufficient exclusivity to list. We were more stringent in our requirement for exclusivity because we were looking for ways in which attending non-PCPs were different from attending PCPs in PC clinics. Note, however, that the majority of the APGs that would have been listed in the upper right cell (had we used the same exclusivity standard as in table 2) are the same APGs that appear in the top row of table 2. We interpret this as indicating that non-PCPs largely perform the same clinical activities in Navy MTF PC clinics as do PCPs.

Table 8. A map of what non-PCPs do in Navy MTF PC clinics, by APG

Volume (Percentage of non-PCP visits)	**Exclusivity (non-PCP visits as percentage of total visits)**		
	High (above 66%)	**Moderate (33% - 66%)**	**Low (below 33%)**
High: Top 90%	532. Refraction disorder	072. Echocardiography 272. Physical therapy 281. Neuropsychological testing	Not sufficiently exclusive for level of volume
Moderate: Next 4%	411. Psychotropic medication management 386. Biofeedback and other training	Not sufficiently exclusive for level of volume	Not sufficiently exclusive for level of volume
Low: Next 5%	Not sufficient volume	Not sufficient volume	Not sufficient volume

Only six APGs met our more restrictive criteria to be listed in table 8. Interestingly, three of the six are behavioral health APGs: neuropsychological testing, psychotropic medication management, and biofeedback training. This suggests that NMPC and behavioral health should consider operating in a more integrated manner.

Table 9 compares the percentage distributions of Navy MTF PC clinic visits attended by non-PCPs and by PCPs, using the same E&M categories that we used previously. By comparison with PCPs, non-PCPs see a slightly higher percentage of new-patient OVs and a somewhat smaller percentage of established-patient OVs. The distinction of new vs. established patients entails whether the same provider or another provider *of the same specialty* has seen that patient in this clinic within the past 3 years. The difference in percentage, then, is not caused by different non-PCPs in a given specialty (e.g., behavioral health) rotating through PC clinics.

Table 9. Comparison of percentage distributions of Navy MTF PC clinic visits attended by non-PCPs and by PCPs, by E&M visit type and E&M OV type

Type of visit	Percentage of visits attended by	
	Non-PCPs	PCPs
E&M		
New patient office visit	27.5	24.2
Established patient office visit	54.4	61.8
Consultation	4.3	0.8
Telephone call by the provider	11.1	7.5
Preventive medicine visit	2.1	5.4
All other visits/encounters	0.6	0.3
Total	100.0	100.0
E&M office visit		
New Pt - Limited/minor to low intensity	14.1	17.6
New Pt - Moderate intensity	11.3	5.9
New Pt - Moderate/high to high intensity	8.1	4.7
Est'd Pt - No physician req'd (procedure)	8.8	5.0
Est'd Pt - Minor to low/moderate intensity	32.5	50.1
Est'd Pt - High intensity	25.2	16.8
Total	100.0	100.0

Non-PCPs are also more likely than PCPs to be consultants on PC cases and to make phone calls concerning PC cases, whereas PCPs are more likely than non-PCPs to see preventive medicine cases.

When we break down OVs to more specific types, we find that non-PCPs are more likely to see patients with higher levels of acuity or requiring more intensive levels of care than is true for PCPs, and this finding holds whether the patient is new or established. Non-PCPs are also somewhat more likely to see patients for visits that may not require a physician, suggesting that various non-physician specialists (e.g., therapists, behavioral medicine specialists, and optometrists) provide care in Navy MTF PC clinics.

This completes our answers to the questions "What is NMPC?" and "How does it compare with non-PC?" We approached these questions from the supply side—what care does NMPC provide, where, and by whom, and how is the resulting profile of care similar to and different from that of non-PC—by looking at ambulatory visits occurring at Navy MTFs during FY00. We next turn to an examination of who uses NMPC and how they use it by looking at NMPC visits from the demand side.

Who uses Navy Medicine Primary Care?

This section focuses on the demand for primary care within Navy MTFs. We examine the distribution of visit users by selected demographic variables (gender, patient TRICARE status, and the relationship between the facility in which a Prime beneficiary is enrolled and the facility at which care is delivered). We also explore utilization patterns for the most common Ambulatory Patient Groups within categories of these demographic variables. We then use Lorenz curves and Gini indices to investigate varying concentrations of RVUs across demographic variables. To explore total annual visits and RVUs per person across demographic variables, we aggregate visit-level data to the person level for patients having ambulatory visits to Navy MTFs in the Tidewater, Virginia, area. Finally, we use multiple regression to investigate the relationship between patient characterisitcs and patient total annual visits and total annual RVUs.

The distribution of NMPC users by gender, patient status, and enrollment—DMIS versus treatment-DMIS status

Table 10 presents our findings regarding the distribution of Navy Medicine Primary Care users by patient gender, patient status, and enrollment-DMIS vs. treatment DMIS. Although we considered using several other demographic variables, limitations in the ADS data, particularly regarding missing data, led us to exclude them from our analysis for validity reasons. We believe that gender, patient status, and enrollment-DMIS vs. treatment-DMIS best describe NMPC users for purposes of our analysis, so we focus our analysis on these characteristics.

Males account for slightly more NMPC visits and RVUs than do females, likely the result of the particular nature and demographic profile of DHP beneficiaries served in MTFs. Mean per-visit RVUs are also greater for males than for females. Not surprisingly, active duty and their Prime enrollee dependents account for most (75 percent)

NMPC visits and RVUs. Other Prime enrollees and other non-Prime TRICARE eligibles account for most of the remainder of visits and RVUs, with non-eligibles accounting for less than 5 percent of them.

Table 10. Percentage distribution of NMPC visits, mean RVUs per NMPC visit, and percentage distribution of NMPC RVUs, by gender, patient status, and enrollment-DMIS vs. treatment-DMIS

Demographic variable	Percentage of visits	Mean RVUs per visit	Percentage of RVUs
Gender			
Male	50.9	1.22	53.0
Female	49.1	1.13	47.0
Patient status			
Active duty Prime	35.7	1.29	39.1
Active duty dependent Prime	39.3	1.11	37.1
All other Prime	12.0	1.06	10.9
TRICARE not Prime	9.1	1.21	9.4
TRICARE not eligible	3.9	1.05	3.5
Enrollment-DMIS vs. treatment-DMIS			
Enrollment-DMIS=treatment-DMIS	66.4	1.13	63.7
Active duty Prime not enrolled	19.6	1.26	21.0
Enrollment-DMIS not= treatment-DMIS	14.0	1.28	15.3

Prime enrollees receiving primary care at the MTF to which they are enrolled account for more visits and RVUs than the combination of active duty (required to be in Prime) who are not enrolled and Prime enrollees receiving care in an MTF to which they are not enrolled. However, Prime enrollees receiving care in their MTF of enrollment have the lowest mean RVU value of the three groups. This is likely the result of their having more continuity of care (established patient visits having lower RVUs than do new patient visits of comparable severity).

Utilization patterns by patient gender, patient status, and enrollment-DMIS versus treatment-DMIS

Our analysis of NMPC identified seven Ambulatory Patient Groups (APGs) that account for over 50 percent of the total PC visit volume:

1. Influenza, upper respiratory infection, and ear, nose, and throat (ENT) infections (APG 542)

2. Adult medical examination (APG 701)
3. Nonspecific signs and symptoms and other contacts with health services (APG 705)
4. Well-child care (APG 702)
5. Skin diseases (APG 635)
6. Simple musculoskeletal diseases, except back disorders (APG 623)
7. Gynecological care, including most Pap tests (APG 681).

Figures 3 through 5 present the percentage each of these APGs contributes to NMPC visits for each of category within the demographic variables of patient gender, patient status, and enrollment-DMIS vs. treatment-DMIS, respectively. These figures use radar plots as discussed earlier, with each of the seven spokes indicating the percentage of NMPC visits that a given APG contributes. The APG with the highest percentage for the total population (542. Flu, URI, ENT infections) is at 12:00, with APGs of descending percentages following in clockwise order. By plotting the results for each category of a given demographic variable on the same diagram, we can see similarities and differences in each category's visit profile.

The gender utilization patterns presented in figure 3 indicate that adult medical exams (APG 701) are more common among males than among females, and that gynecological care (APG 681) is gender specific. This same pattern is reflected in figure 4 for active duty, the majority of whom are male and thus share much of the male pattern of figure 3. Figure 4 also reveals that Prime active duty dependents use NMPC heavily for acute respiratory infections and well-child care (sharing the latter with TRICARE Standard and Extra patients), most likely reflecting the abundance of children and anxious parents in this group.

Figure 5 reveals the disproportionately high use of adult medical exams by nonenrolled active duty (reflecting that this group is largely recruits and new officer accessions in training status). It also reveals the heavy use of NMPC for acute respiratory infections by Prime enrollees away from their enrollment facility.

Figure 3. Primary care visits by APG and patient gender

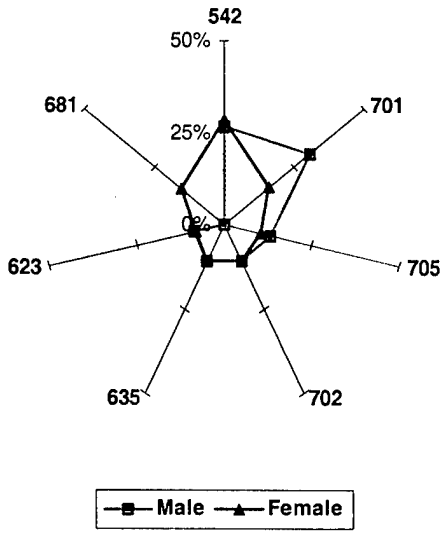


Figure 4. Primary care visits by APG and patient status

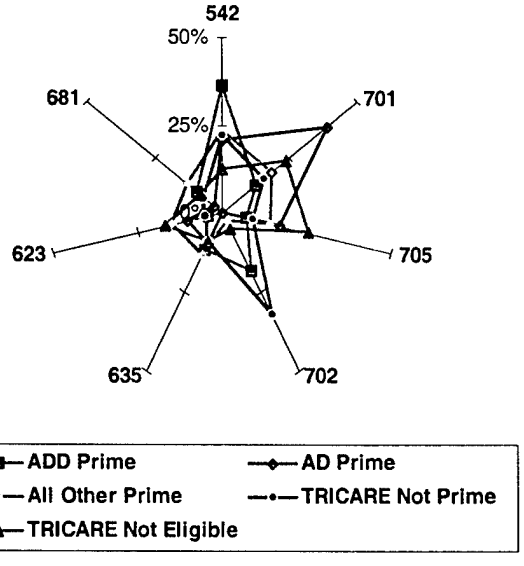
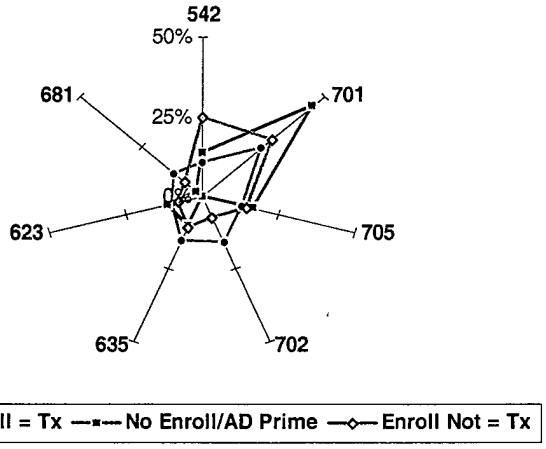


Figure 5. Primary care visits by APGs and enrollment-DMIS vs. treatment-DMIS (enroll vs. Tx)



Lorenz curves and Gini indices of RVUs and NMPC visits

The following three figures present Lorenz curves of the cumulative percentage of RVUs (in deciles) by the cumulative percentage of NMPC visits (in deciles). The degree of curvature below the "line of equality" depicts the degree of concentration of RVUs. The steeper the curvature, and the larger the accompanying Gini index, the more concentrated are RVUs among a limited number of visits.

As figure 6 illustrates, about half of all the RVUs generated by NMPC during FY00 came from only 20 percent of the NMPC visits, and roughly 75 percent came from only 50 percent of the visits. The associated Gini index of 0.2664 serves as a baseline comparison for subsequent analyses of the degree of concentration among specific NMPC user populations.

Figure 7 presents Lorenz curves and associated Gini indices by gender, whereas figure 8 presents them by patient TRICARE status. There is little difference in the curves for males and females, and their Gini indices are close to equal, indicating similar degrees of RVU concentration within visits. There is somewhat more diversity by patient status, with all three Prime categories experiencing less concentration than either of the two non-Prime/space-available categories. This suggests a higher concentration of visits requiring more resource-intensive care among non-Prime patients than among Prime enrollees, with

patients not eligible for TRICARE (predominantly Medicare-eligible over 65s) exhibiting the highest concentration.

Figure 6. Lorenz curve and Gini index for RVUs vs. NMPC visits

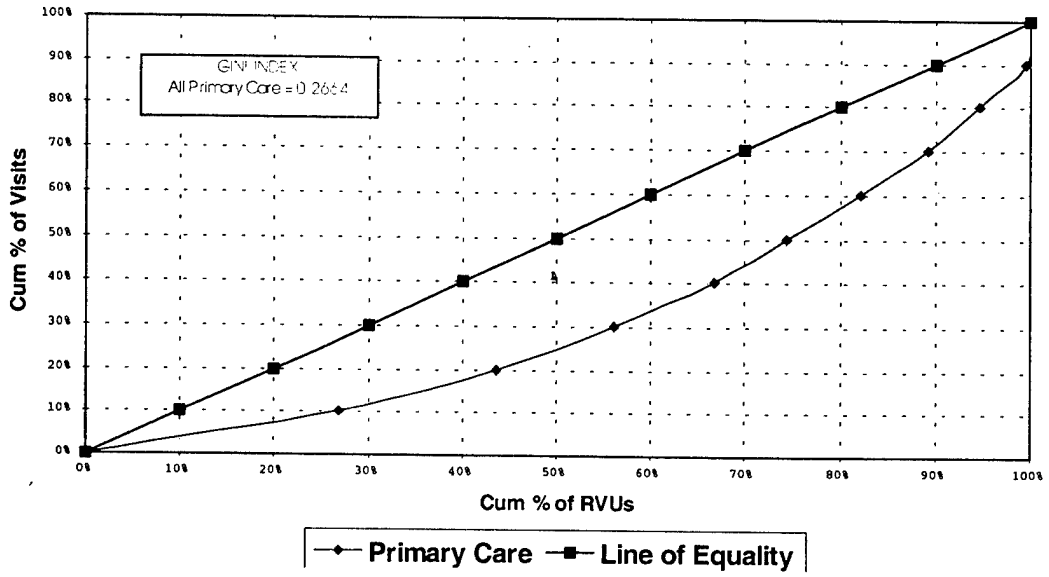


Figure 7. Lorenz curves and Gini indices for RVUs vs. NMPC visits, by patient gender

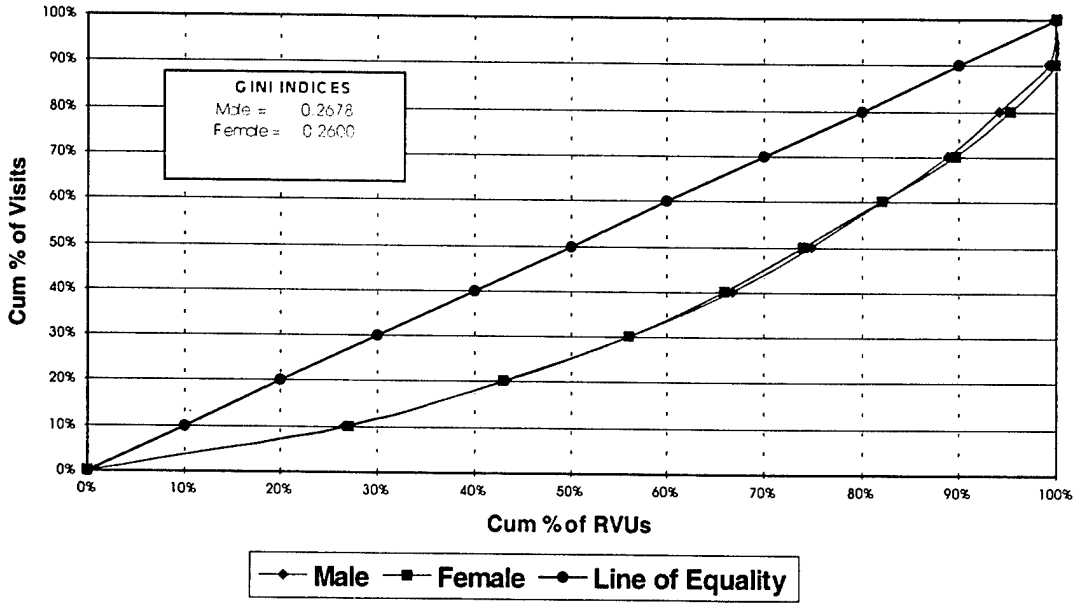
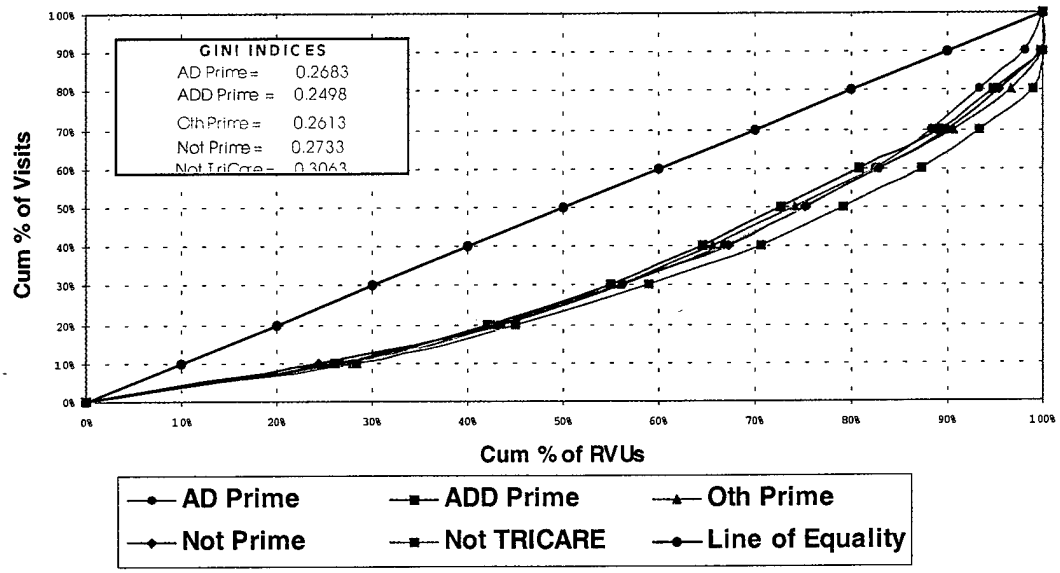


Figure 8. Lorenz curves and Gini indices for RVUs vs. NMPC visits, by patient TRICARE status



Annual utilization: a look at the Tidewater (NMC Portsmouth) catchment area

The Tidewater area of Virginia presents an opportunity to investigate a large and diverse service area containing the full spectrum of Navy MTFs. It is also home to one of the Navy's major fleet concentrations. For these reasons, we selected this area for our analysis of NMPC use by persons during FY00. We constructed a patient-level data file for the Tidewater area from the ADS visit file of FY00 visits occurring in Navy MTFs having NMC Portsmouth as their parent DMIS. We identified visits made by unique persons (identified by matching sponsor SSN and family member prefix in the ADS visit record) and aggregated information from these visits up to the person level. By aggregating all such visits—NMPC as well as non-PC—we were also able to identify persons who had non-PC visits but no NMPC visits during the year. We discuss the possible meaning and implication of such a visit history. We also explore use patterns by selected demographic characteristics.

Annual visits per person by patient demographics

Table 11 presents the percentage distributions of numbers of NMPC visits per *person*, mean per-*person* RVUs, and percentage distributions of NMPC RVUs per *person* by varying numbers of NMPC visits. We selected patient gender and patient TRICARE status as meaningful variables for this analysis. We also modified the patient status categories somewhat, collapsing its five categories into three: active duty Prime, all other Prime, and all non-Prime (TRICARE Standard and Extra plus TRICARE not eligible).

Table 11. NMPC person-level statistics by number of visits (0 to 11 or more)—Tidewater area

	Tidewater total	Gender		Patient status		
		Male	Female	AD Prime	Other Prime	Not Prime
Percentage distribution of NMPC visits per person by number of visits						
0 visits	65.6%	69.9%	59.6%	68.1%	51.2%	81.5%
1 to 2 visits	26.7%	24.1%	30.4%	25.8%	36.9%	14.1%
3 to 5 visits	6.3%	5.1%	8.0%	5.4%	9.5%	3.3%
6 to 10 visits	1.2%	0.8%	1.7%	0.7%	2.0%	0.9%
11 or more visits	0.2%	0.1%	0.3%	0.1%	0.3%	0.2%
Total sample	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%
Mean NMPC RVUs per person by number of visits						
0 visits	0.00	0.00	0.00	0.00	0.00	0.00
1 to 2 visits	0.68	0.70	0.65	0.71	0.66	0.68
3 to 5 visits	0.70	0.72	0.68	0.72	0.69	0.67
6 to 10 visits	0.71	0.72	0.71	0.75	0.70	0.70
11 or more visits	0.78	0.73	0.80	0.78	0.79	0.72
Percentage of total NMPC RVUs by number of visits						
0 visits	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
1 to 2 visits	77.0%	79.7%	74.2%	80.3%	74.7%	76.3%
3 to 5 visits	18.7%	17.2%	20.4%	17.3%	20.1%	17.6%
6 to 10 visits	3.6%	2.7%	4.5%	2.3%	4.3%	5.0%
11 or more visits	0.7%	0.3%	0.9%	0.2%	0.8%	1.1%
Total sample	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%

Over 65 percent of those with at least one ambulatory visit of any kind (PC or non-PC) to a Tidewater Navy MTF during FY00 did *not* have *any* NMPC visits. Males are somewhat more likely than females to exhibit this utilization pattern, whereas non-Prime users are

considerably more likely to exhibit it than Prime users. Very few of any kind of patient had more than five NMPC visits, and not many had over two. Mean per-person NMPC RVUs increased as the number of NMPC visits increased, especially among females and Prime users. Of course, those with no NMPC visits generated no NMPC RVUs. Within visit category, males had higher mean RVUs than did females for lower visit categories but not for higher visit categories. Active duty generally had the highest means. The results for NMPC RVUs reflect the relative distributions for NMPC visits and the mean per-person NMPC RVUs for each visit category.

The large percentage of persons with no NMPC visits, and hence no NMPC RVUs, skews the RVU distributions. Table 12 addresses this situation by eliminating the category of zero NMPC visits.

Table 12. NMPC person-level statistics by number of visits (1 to 11 or more)—Tidewater area

		Gender		Patient status		
	Tidewater total	Male	Female	AD Prime	Other Prime	Not Prime
Percentage distribution of NMPC visits per person by number of visits						
1 to 2 visits	77.7%	80.0%	75.3%	80.7%	75.7%	76.6%
3 to 5 visits	18.3%	17.0%	19.8%	17.0%	19.5%	17.7%
6 to 10 visits	3.4%	2.7%	4.2%	2.1%	4.1%	4.9%
11 or more visits	0.5%	0.3%	0.7%	0.2%	0.7%	0.9%
Total	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%
Mean NMPC RVUs per person by number of visits						
1 to 2 visits	0.68	0.70	0.65	0.71	0.66	0.68
3 to 5 visits	0.70	0.72	0.68	0.72	0.69	0.67
6 to 10 visits	0.71	0.72	0.71	0.75	0.70	0.70
11 or more visits	0.78	0.73	0.80	0.78	0.79	0.72
Percentage of total NMPC RVUs by number of visits						
1 to 2 visits	77.1%	79.7%	74.3%	80.3%	74.7%	76.6%
3 to 5 visits	18.7%	17.3%	20.4%	17.3%	20.1%	17.5%
6 to 10 visits	3.6%	2.7%	4.5%	2.3%	4.3%	5.0%
11 or more visits	0.6%	0.3%	0.9%	0.2%	0.8%	0.9%
Total	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%

Table 12 results show that over three-fourths of persons having at least one NMPC visit at a Tidewater area Navy MTF had only one or two

visits,[13] with males and AD Prime users experiencing this in higher proportions. The same is largely true for RVU distributions. Although differences between visit and RVU distributions are slight, they all follow a common pattern: RVU percentages tend to be slightly lower than visit percentages for persons with one or two visits, and slightly higher for most other visit categories.

Lorenz curves and Gini indices of RVUs and primary care visits

Figure 9 presents the Lorenz curve and Gini index for NMPC for the Tidewater population as a whole. Note that the unit of analysis on the vertical axis changed from "visits," as in the visit-level analyses, to "persons" for this person-level analysis. As figure 9 shows, 10 percent of Tidewater NMPC users consume nearly one-third of the NMPC RVUs, and 20 percent consume nearly half, with a Gini index of 0.3098. This indicates a somewhat higher concentration of RVUs than that found for the visit-level data (with a Gini index of 0.2664). This higher Gini index is likely to result both from aggregating visit data to the person level and from differences between the Tidewater area (where the Navy is highly concentrated and Navy Medicine is the predominant provider of MHS direct care) and other areas. All of the Gini indices in figures 10 and 11 for Tidewater area person-level data are also higher than the corresponding visit-level indices reported in figures 7 and 8.

Figure 10 shows that RVUs are less concentrated for male than for female NMPC users in the Tidewater area. The Gini index is 0.2953 for males and 0.3252 for females. Figure 11 displays an interesting pattern of NMPC RVU concentration by patient TRICARE status. This concentration is lowest among active duty (Gini = 0.2916) and active duty dependent Prime users of NMPC (Gini = 0.3105), highest among non-TRICARE eligible NMPC users (Gini = 0.3596), and intermediate among TRICARE Standard and Extra users of NMPC (Gini = 0.3192) and other Prime NMPC users (Gini = 0.3320). This pattern is likely the result of at least two factors:

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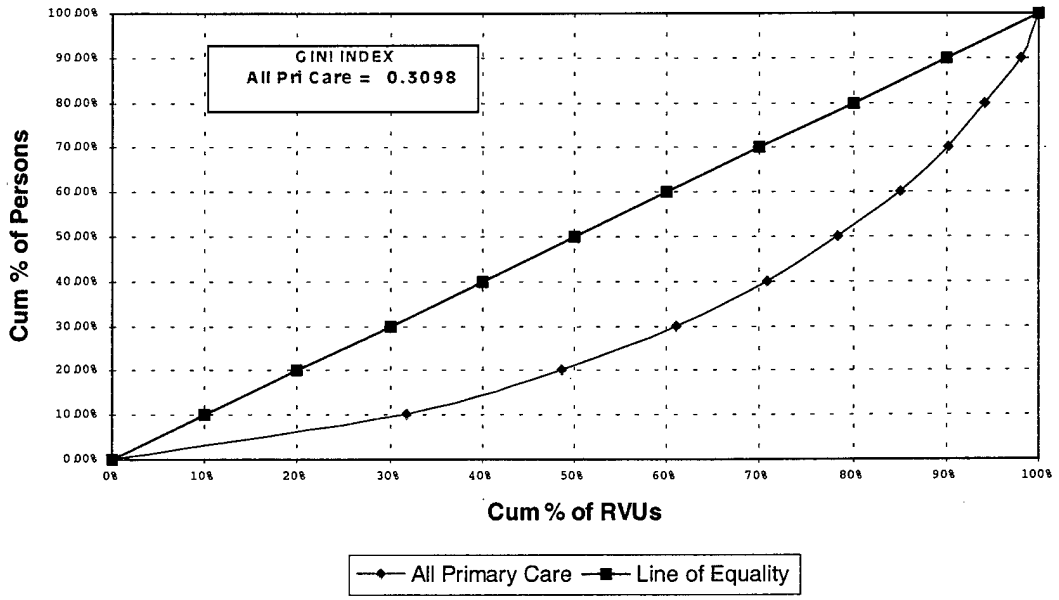
13. This result, and the corresponding finding in table 11, may be to some extent an artifact of the method used to build the patient-level file.

- The continuity of care available through Prime
- Differences in utilization patterns within the various patient eligibility categories, which are at least somewhat driven by age and relative health.

Figure 9. Lorenz curve and Gini index for RVUs vs. persons with NMPC visits—Tidewater area



The combination of the continuity of care afforded by Prime plus the relatively young and healthy active duty and active duty dependent populations may tend to "even out" NMPC RVU consumption within these populations, reducing RVU concentration within them. By contrast, the non-TRICARE-eligible population does not have a continuous managed care relation with a PCM and is composed of many age 65 and older NMPC users, whom we expect would have a wider range of health needs and use intensities than would be true of the younger Prime populations. Of the two intermediate user categories, one lacks the continuity of care afforded by Prime but is not composed of high proportions of older users (TRICARE not Prime/Standard and Extra users), whereas the other (Prime who are retirees and their dependents and survivors) has the continuity of Prime but also comprises users with a wider range of health needs and use intensities than younger Prime populations.

Figure 10. Lorenz curves and Gini indices for RVUs vs. persons with NMPC visits, by patient gender—Tidewater area

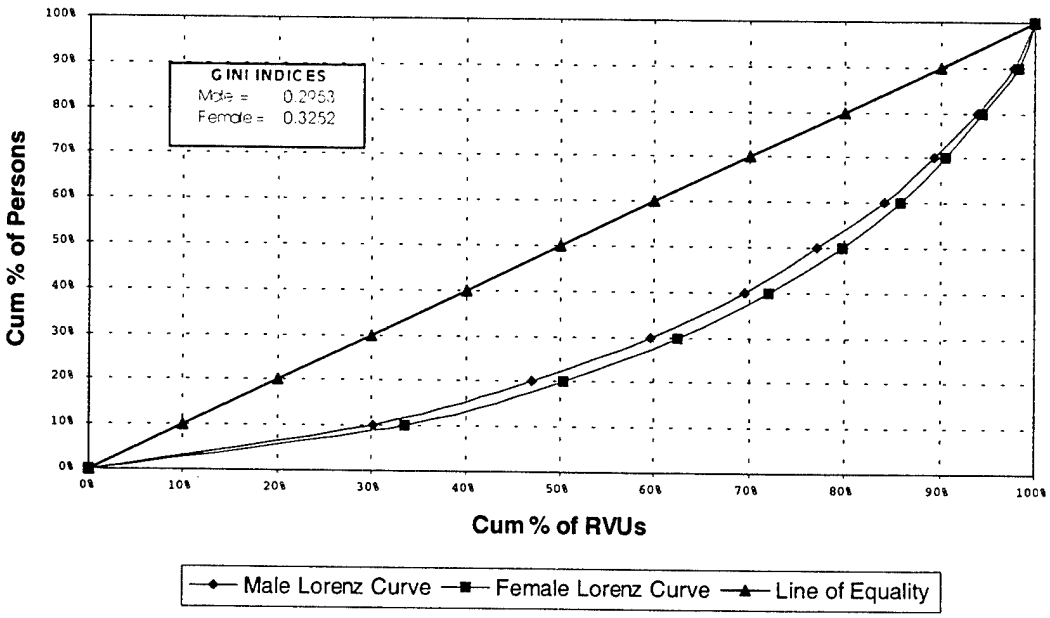
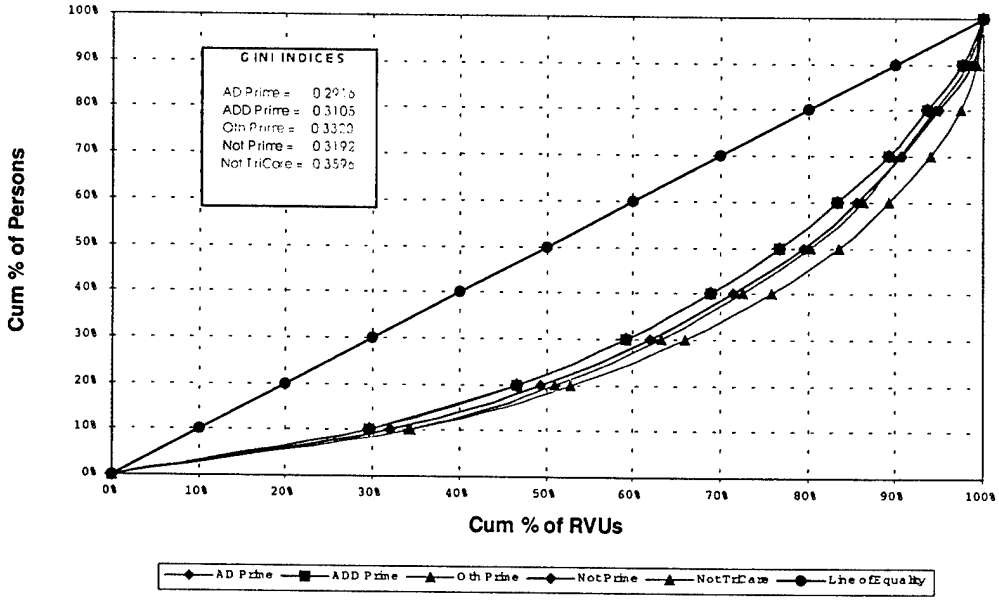


Figure 11. Lorenz curves and Gini indices for RVUs vs. persons with NMPC visits, by patient status—Tidewater area



Figures 12 through 14 demonstrate another way to analyze the person-level Tidewater area data. These figures substitute resource-adjusted visits (RAVs) for RVUs along the horizontal axis of the Lorenz curves. We formed person-level RAVs by adjusting the count of a person's annual NMPC visits by the number of RVUs generated by those visits. We hypothesized that RAVs, due to their combining of visit and RVU information, would provide a more robust metric for our analyses than either simple RVUs or raw, unadjusted visits. Comparison of the findings reported in figures 9 through 11 with those in figures 12 through 14 tests the first part of our hypothesis (RVUs), whereas comparison of figures 12 through 14 with those of figures 15 through 17 tests the second part (unadjusted visits).

Figure 12 presents the baseline results for our Tidewater area NMPC RAV analysis. As expected, the RAV Gini index (0.3825) is higher than that for RVUs (0.3098, see figure 9), thus confirming our hypothesis.

Figure 12. Lorenz curve and Gini index for RAVs vs. persons with NMPC visits—Tidewater area

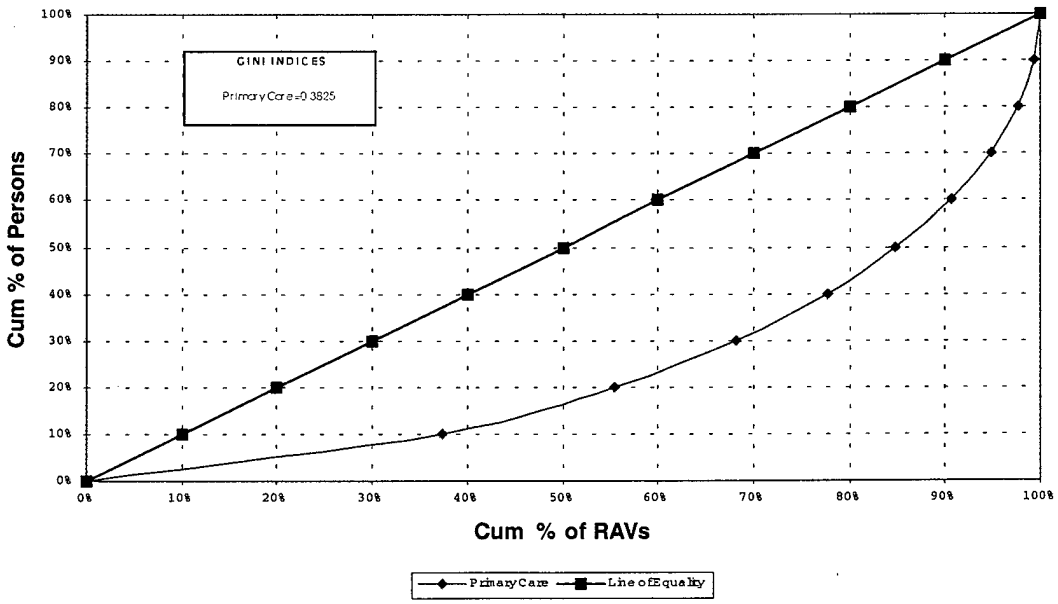


Figure 13. Lorenz curves and Gini indices for RAVs vs. persons with NMPC visits, by patient gender—Tidewater area

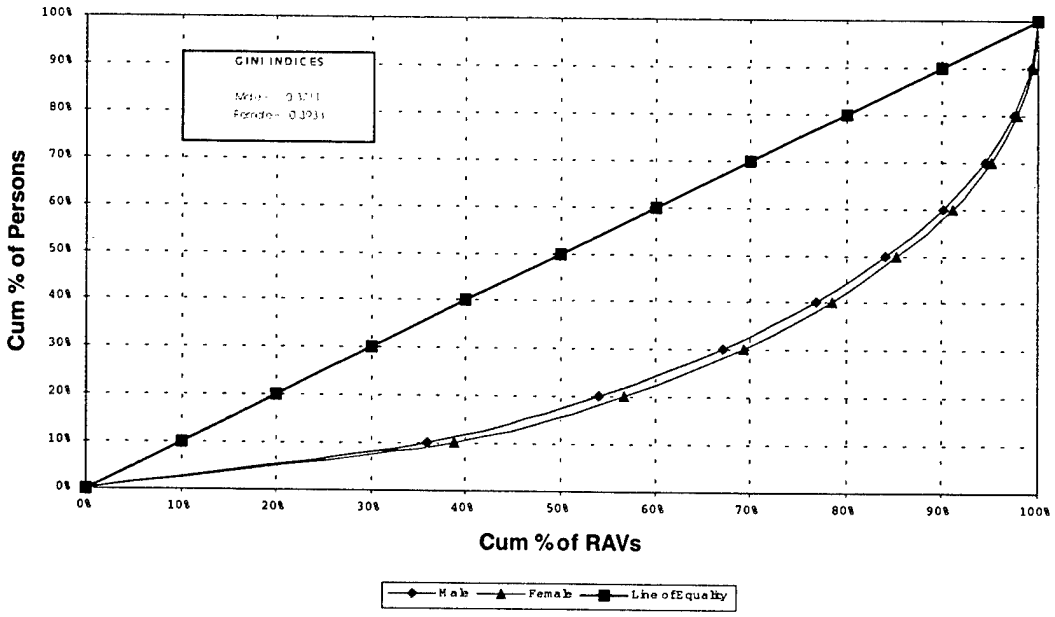
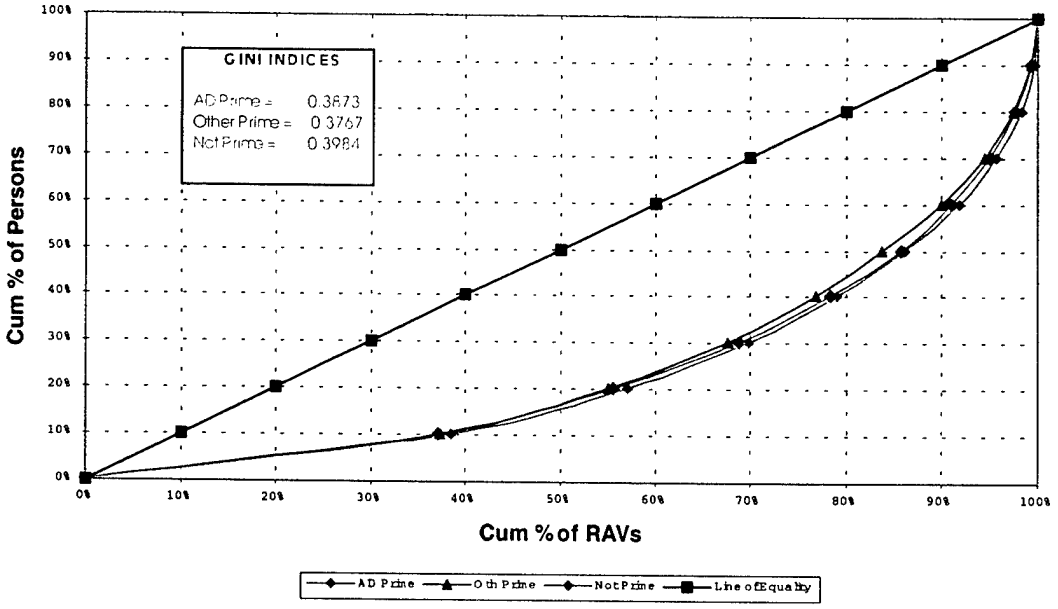


Figure 14. Lorenz curves and Gini indices for RAVs vs. persons with NMPC visits, by Prime patient status—Tidewater area



Patient gender distribution differences become more evident using the resource–adjusted visit method, as presented in figure 13. Within the Tidewater area, the degree of concentration in cumulative RAVs by NMPC user is greater among female patients than male patients (Gini indices of 0.3933 and 0.3711, respectively) and both of these concentrations are greater than those for the corresponding concentration of RVUs (0.3252 and 0.2953, respectively, see figure 10). This again bears out our expectations.

In figure 14, we show results for active duty Prime, other Prime, and not Prime. The Lorenz curves and associated Gini indices for other Prime and for not Prime are most dissimilar (Gini = 0.3767 and 0.3984, respectively), with active duty Prime falling midway between them (Gini = 0.3873). The degree of dissimilarity between other Prime and not Prime is more pronounced. Again, this may be a product of the same factors we discussed earlier in relation to RVUs: sustained patient-provider relationship and continuity of care for Prime enrollees, and the relative range of NMPC health care needs and use intensity. Although the change of category definition prohibits a direct comparison of these results with the corresponding analysis reported by figure 11, we note that the three Gini indices reported here for figure 14 are all higher than any of the Gini indices reported for figure 11.

Comparing results for unadjusted and adjusted (RAV) visits

Figures 15 through 17 present our final set of Lorenz curve analyses of the patient-level Tidewater data. These figures contrast findings for unadjusted and adjusted (RAV) visits for each of the three Prime patient status categories depicted in figure 14. Figure 15 presents results for active duty Prime; figures 16 and 17 present results for other Prime and not Prime, respectively. As expected, the RAV metric appears to be more sensitive and robust than unadjusted visits. In each instance, the curve is steeper and the Gini index is larger for RAVs than for unadjusted visits. These results support our hypothesis and provide evidence of the potential utility of RAVs as a robust metric for Navy Medicine to use in assessing the use of NMPC (and non-PC) across a number of important patient and systemic variables.

Figure 15. Lorenz curves and Gini indices for unadjusted and adjusted (RAV) visits for active duty Prime persons with NMPC visits—Tidewater area

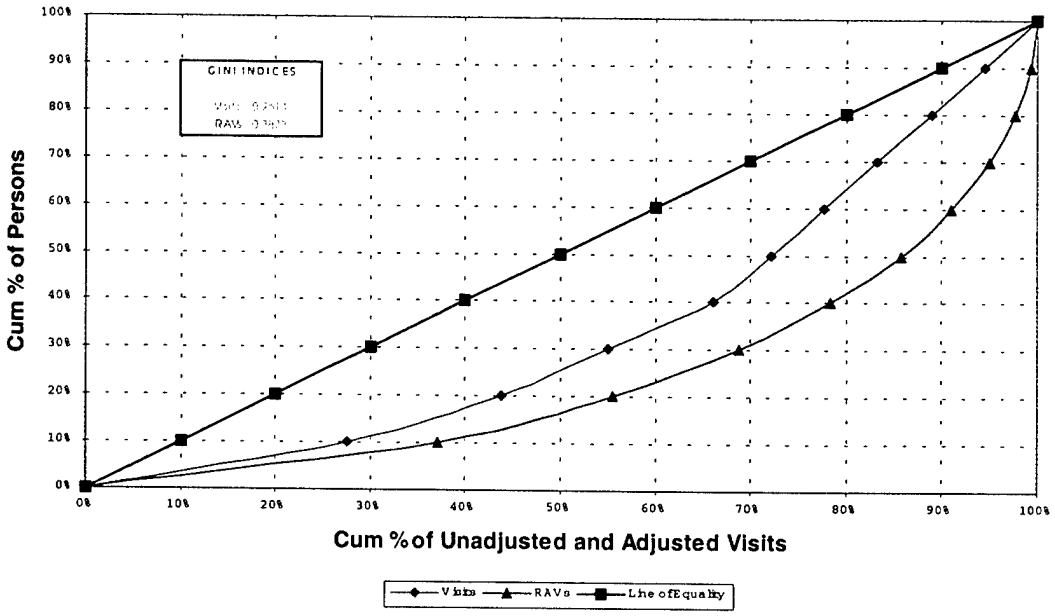


Figure 16. Lorenz curves and Gini indices for unadjusted and adjusted (RAV) visits for non-active duty Prime persons with NMPC visits—Tidewater area

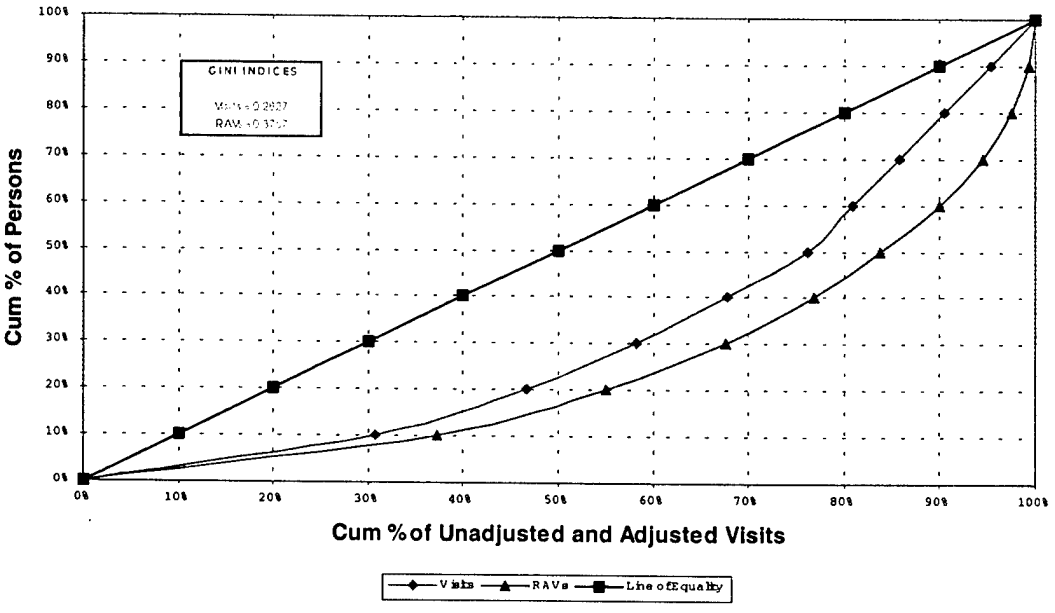
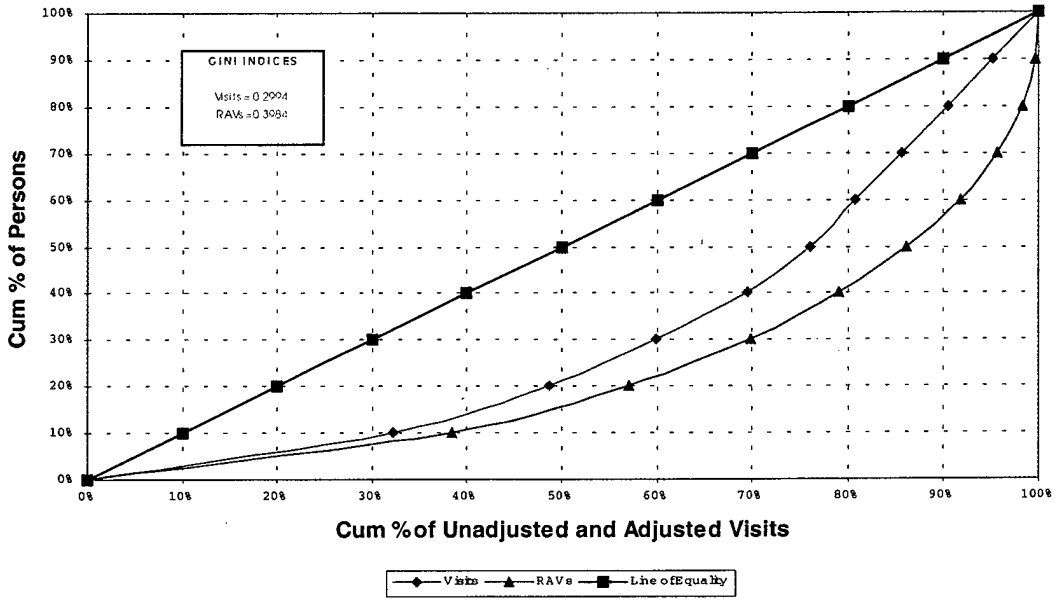


Figure 17. Lorenz curves and Gini indices for unadjusted and adjusted (RAV) visits for non-Prime persons with NMPC visits—Tidewater area



Accounting for annual NMPC visits and RVU consumption

To account for annual NMPC visits and annual NMPC RVUs for persons using NMPC in Tidewater area Navy MTFs, we performed a linear regression analysis. Table 13 displays the summary results. The top two sections of the table report results for persons with *any* visit (PC or non-PC), and the bottom two sections report results for persons with at least one PC visit. This mirrors the approach we took above in tables 11 and 12. We selected three patient characterisitics to use as explanatory, independent variables: Prime status, age, and male gender.[14] We also included number of PC visits as an independent variable to help account for number of PC RVUs.

14. We created two binary dummy variables for this analysis. We bifurcated patient status into *Prime* (1) and *Not Prime* (0). We made gender into a dummy variable by assigning a value of 0 to females and 1 to males. We left age as a numeric variable. Dummy variables allow us to use non-numeric indicators in a regression analysis. Results can indicate the effect on the dependent variable of the category assigned a value of 1 vs. 0.

Table 13. Linear regression analysis of annual number of NMPC visits and RVUs for persons receiving care at Navy MTFs in the Tidewater area

Dependent variable	Independent variable	R	R^2	Beta[a]
Persons with any visit (PC or Non-PC) to a Tidewater area Navy MTF, including those with no PC visits				
Annual no. of visits		0.17	0.03	
	Prime status			0.097
	Age			-0.074
	Male gender			-0.104
Annual no. of RVUs		0.84	0.71	
	Prime status			-0.007
	Age			-0.012
	Male gender			0.014
	No. of NMPC visits			0.843
Persons with at least one PC visit to a Tidewater area Navy MTF				
Annual no. of visits		0.08	0.01	
	Prime status			-0.015
	Age			0.019
	Male gender			-0.074
Annual no. of RVUs		0.77	0.60	
	Prime status			n.s.
	Age			-0.030
	Male gender			0.022
	No. of NMPC visits			0.774

a. All reported betas are statistically significant at $p < .01$; the one unreported beta (n.s.) has a $p = .132$.

Looking first at persons with any Tidewater Navy MTF visit, we found only a modest relationship (r-square = 0.03) for number of visits. Although these variables combined account for only about 3 percent of the variance in number of annual NMPC visits, and individually have only slight impacts on visits (the beta coefficients are quite small), we observe the following:

1. Although males account for slightly more NMPC visits (51 percent, see table 8), on a per-person basis males appear to have fewer annual visits than females (beta = –0.104).

2. Prime enrollees have a slightly higher per-person number of annual NMPC visits compared with non-Prime persons (beta = 0.097).

3. Age is slightly negatively related to number of annual NMPC visits per person (beta = –0.074), possibly because of the heavier use among younger active duty family members than among space-available older retirees.

The results for number of annual NMPC RVUs reveals the strong connection between visits and RVUs. Of the four independent variables in the regression on annual NMPC RVUs, only number of NMPC visits has a sizable impact (beta = 0.843). The overall relationship, supported by this strong connection, has an r-square of 0.71. The three patient characteristics have essentially no independent impact on RVUs beyond their relationship to number of visits; that is, they affect annual RVUs primarily through their effect on annual visits.

Looking next at persons with at least one PC visit at a Tidewater area Navy MTF, we find similar but attenuated results. In these regressions, with persons with no PC visits excluded, the selected independent variables have little explanatory power. Only number of NMPC visits on number of NMPC RVUs retains any explanatory power. It would appear that the demographic variables help to account for who does and doesn't have a PC visit more than they account for how many PC visits a person has.

Finally, we offer the following additional finding from a bivariate correlation analysis that we performed in support of the multivariate analysis. The number of annual NMPC visits is largely uncorrelated with the number of (1) non-PC visits, (2) total (NMPC plus non-PC) visits, and (3) total RVUs (correlation coefficients of 0.056, 0.250, and 0.095, respectively). This finding holds as well when looking at only Prime enrollees (coefficients of 0.058, 0.266, and 0.098, respectively). It appears that PC is *not* a substitute for non-PC and vice versa, and that the number of non-PC visits is more of a determinant of total visits and total RVUs (coefficients of 0.981 and 0.825, respectively) than is number of NMPC visits.

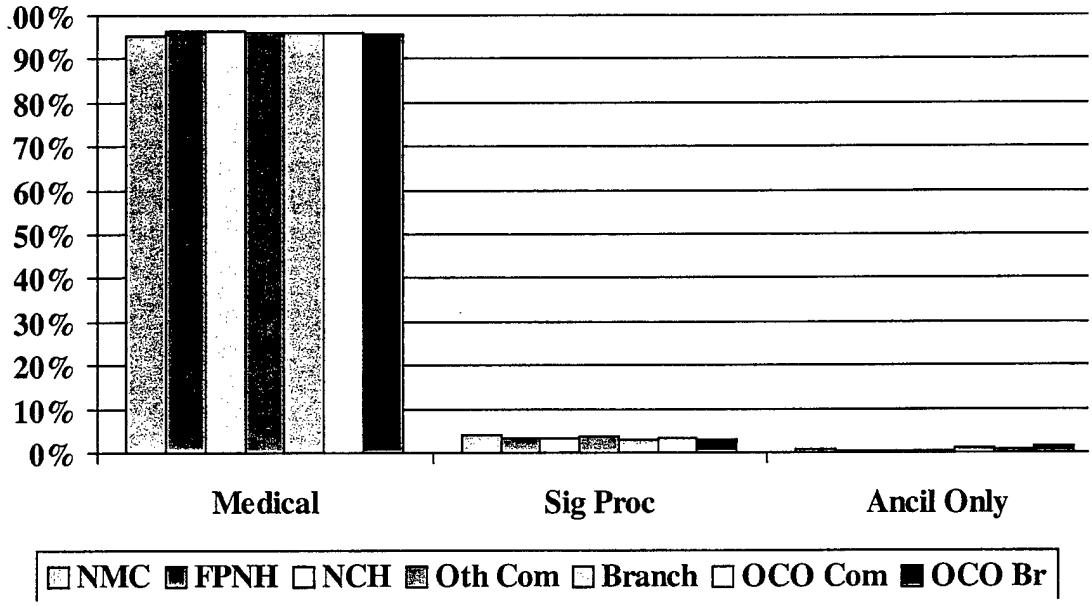
Variation in providing Navy Medicine Primary Care

In this section, we return to supply side analysis to identify variation in the provision of Navy Medicine Primary Care. We will look at variation between MTF types and between PCP types in their distributions of visits by APG and E&M, as well as in their mean per-visit RVUs.

Variation in NMPC between MTF types

We found essentially no variation between MTF types regarding the major APG types they see. Figure 18 presents the respective percentage distributions of NMPC visits by APG type for each of the seven MTF types. Medical APG visits constitute 95 percent or more of the NMPC visits that occur at each type of MTF. Medical centers see a slightly higher percentage of procedure visits relative to family practice and community hospitals and to other commands; CONUS and OCONUS branches and OCONUS commands each see the least. Very few ancillary-only PC visits occur anywhere in Navy Medicine.

Figure 18. Percentage distribution of NMPC visits by APG type and MTF type



We found more variation when we looked at individual APGs rather than these broad groupings of APGs. Table 14 presents the percentage distributions of the "top 30" NMPC APGs for each MTF type. These APGs are listed in the top row of the map of NMPC (table 2). Together, they account for 90 percent of all NMPC visits. An inspection of the distributions reveals considerable variation. For example, acute respiratory infections (APG 542) contribute only 8.2 percent to the NMPC visit load in NMCs but contribute a full 15.7 percent of the load in other commands. In addition to variation by individual APGs, MTF types vary by the total amount of their NMPC visit loads that are accounted for by these 30 APGs combined, ranging from a low of 87.1 percent for NMCs to a high of 92.5 percent for branches.

We computed coefficients of alienation for these distributions as a means of quantifying the variation observed in table 14. A coefficient of alienation is essentially the mirror image of a coefficient of correlation. Rather than measuring the degree of association between two distributions as a correlation coefficient does, coefficients of alienation measure the degree of disassociation between them (as their name suggests). They are calculated from correlation coefficients as the square root of one minus the square of the correlation coefficient ($[1 - r^2]^{1/2}$). The relative strength of a correlation coefficient is indicated by its square (r^2). One minus its square is then its relative weakness; taking the square root of that weakness converts the measure back to the same scale as the correlation coefficient. Thus, the correlation of alienation is directly comparable to the correlation coefficient but measures its opposite, which is our purpose here.

Table 15 presents the matrix of alienation coefficients calculated from the percentage distributions reported in table 14. The higher the coefficient for a given pair of distributions, the more unrelated and the less associated they are to each other. The coefficients in table 15 range from a high of 0.736 for FPNHs compared with branch clinics (most unrelated) to a low of 0.305 for NCHs compared with FPNHs (most associated). In general, the percentage distribution for NMCs has relatively high alienation coefficients with most other types of MTFs, except OCONUS commands. As stated, family practice hospitals are similar to community hospitals but different from branches. NCHs are similar to other commands and to OCONUS commands, and other

commands (except NMCs) are somewhat similar to all other MTFs. OCONUS commands are moderately similar to other MTFs, but OCONUS branches are different from stateside hospitals .

Table 14. Percentage distribution of NMPC visits by top 30 APGs and MTF type

	MTF type						
APG[a]	NMC	FPNH	NCH	Other Command	Branch Clinic	OCONUS Command	OCONUS Branch
542	8.2	14.9	15.4	15.7	14.9	14.0	11.6
701	10.8	5.1	8.7	10.5	16.8	11.8	12.2
705	8.5	2.7	3.6	7.3	7.7	4.4	5.7
702	11.3	9.2	8.8	5.1	2.9	8.4	4.2
635	4.3	5.7	6.0	5.8	5.7	6.2	6.6
623	4.2	4.0	3.6	4.5	4.5	3.5	4.3
681	2.2	4.3	4.9	4.3	3.4	3.8	5.1
464	1.1	1.8	1.9	2.9	4.5	2.5	4.6
572	7.7	3.9	3.2	3.3	2.2	3.0	1.9
502	2.2	3.2	2.8	2.9	3.5	2.3	2.9
561	3.0	3.0	3.5	3.0	2.9	3.5	1.5
704	2.2	1.8	2.6	3.3	3.3	2.8	4.4
545	2.2	3.2	3.1	3.2	2.3	3.4	2.6
597	2.2	2.8	2.9	2.5	1.8	2.9	3.2
621	1.7	1.7	1.8	2.0	1.9	1.8	1.8
653	3.4	2.9	1.9	1.8	1.2	1.5	1.2
512	1.3	1.4	1.6	1.3	1.3	1.2	1.2
651	3.5	2.3	1.5	1.3	0.6	1.4	0.9
503	0.6	1.2	1.4	1.2	1.4	1.2	1.4
491	0.5	4.2	1.3	0.2	0.4	2.8	4.8
661	1.2	1.5	1.2	1.2	1.1	1.0	1.1
533	0.7	1.4	1.1	1.2	1.1	1.0	1.2
591	0.7	0.6	0.7	1.0	1.2	0.5	0.5
462	0.2	0.7	0.6	0.9	1.1	0.6	1.1
703	0.3	0.7	1.2	0.6	0.8	0.7	1.3
237	0.8	0.1	0.6	0.6	1.2	0.4	0.3
633	0.6	0.8	0.6	0.8	0.8	0.9	1.0
592	0.9	0.9	0.9	0.7	0.7	0.7	0.6
562	0.3	0.6	0.5	0.5	0.8	0.5	0.5
006	0.3	0.7	0.5	0.6	0.5	0.7	0.7
Sum	87.1	87.3	88.4	90.2	92.5	89.4	90.4

a. A list of the clinical content of these 30 APGs appears as appendix E.

Table 15. Coefficients of alienation for comparisons of percentage distributions of NMPC visits by top 30 APGs and MTF type

	NMC	FPNH	NCH	Other Command	Branch Clinic	OCONUS Command	OCONUS Branch
NMC	---	0.698	0.622	0.634	0.696	0.470	0.726
FPNH	---	---	0.305	0.535	0.736	0.557	0.651
NCH	---	---	---	0.339	0.560	0.286	0.536
Other Command	---	---	---	---	0.341	0.421	0.415
Branch Clinic	---	---	---	---	---	0.540	0.366
OCONUS Command	---	---	---	---	---	---	0.456
OCONUS Branch	---	---	---	---	---	---	---

Tables 16 and 17 present equivalent information for comparing NMPC visits by E&M type across MTF type. Table 16 presents the respective percentage distributions of E&M visits for each type of MTF, whereas table 17 presents a quantification of the dissimilarity between these distributions. Rather than compute alienation coefficients as we did for comparing APG distributions, we compute indices of dissimilarity for this purpose. We do so because this is a more straightforward method of comparing two distributions; it avoids having to first compute a measure of association from which to compute a measure of unrelatedness. This was not possible for the APG distributions, which were not complete (they included only some APGs and thus did not sum to 100 percent), but it is possible with the E&M distributions. An index of dissimilarity measures the overall percentage of cases in one distribution that would need to change categories (e.g., from "new patient *low*-intensity OV" to "new patient *high*-intensity OV") for that distribution to be the same as another distribution.[15] The index ranges from 0.0 (no cases need to change places, the two percentage distributions are exactly the same) to 100.0 (all cases need to change places, the two distributions are completely dissimilar).

15. The index is calculated as one-half the sum of the absolute values of the differences between the percentage of cases in each category in one distribution and the percentage in the respective category in the other distribution: *Index of Dissimilarity* = $1/2\ Sum|\ \%_X - \%_Y\ |$.

Table 16. Percentage distribution of NMPC visits by E&M type and MTF type

E&M type	MTF type						
	NMC	FPNH	NCH	Other Command	Branch Clinic	OCONUS Command	OCONUS Branch
New Pt OV Lo	5.8	5.8	11.0	17.6	21.3	10.2	9.8
New Pt OV Med	5.6	2.2	2.3	4.8	7.3	2.2	4.7
New Pt OV Hi	3.6	3.3	2.0	1.9	5.7	3.4	6.1
Est Pt OV No Phys	5.6	2.3	5.3	5.5	4.1	3.3	2.8
Est Pt OV Lo	37.1	49.9	40.9	47.2	43.2	34.1	39.6
Est Pt OV Hi	20.0	17.7	14.0	9.3	11.7	25.4	25.2
Consultation	2.3	1.2	0.7	1.5	0.2	1.3	1.0
Outbound TelCon	10.4	8.3	15.9	5.1	3.5	13.3	8.9
New Pt Prev Visit	3.8	1.7	4.4	2.0	0.7	3.9	0.1
Est Pt Prev Visit	5.2	6.8	2.7	4.4	1.5	2.4	0.4
Other Prev Visit	0.4	0.2	0.5	0.7	0.4	0.3	0.8
All Other Visits	0.2	0.5	0.2	0.2	0.4	0.2	0.5
Total	100.0	100.0	100.0	100.0	100.0	100.0	100.0

Table 17. Indices of dissimilarity for comparisons of percentage distributions of NMPC visits by E&M type and MTF type

	NMC	FPNH	NCH	Other Command	Branch Clinic	OCONUS Command	OCONUS Branch
NMC	---						
FPNH	14.7	---					
NCH	15.2	18.9	---				
Other Command	22.1	18.6	18.2	---			
Branch Clinic	25.7	25.0	21.5	12.6	---		
OCO Command	12.8	20.6	13.4	27.9	28.7	---	
OCO Branch	14.9	18.6	18.6	24.5	20.7	11.6	---

For this analysis, we used 12 categories of E&M codes: the three types of new patient OVs, the three types of established patient OVs, consultations, outbound TelCons, three types of preventive visits, and all other visits. As was the case for APGs, there is considerable variation in the distributions of E&M types by MTF type. For example, in the first row of table 16, new patient low-intensity OVs contribute only 5.8 percent to the NMPC visit load at both NMCs and FPNHs, but contribute 21.3 percent to that of branches and 17.6 percent to that of other commands.

The indices of dissimilarity in table 17 quantify the variation we observed. Based on these results, we see that branches are moderately dissimilar from all other types of MTFs (except other commands), that NMCs are more similar to other CONUS hospitals and all OCONUS facilities than they are to non-hospital CONUS facilities, that the same is largely true for FPNHs and NMCs, and that OCONUS branches are more similar to OCONUS commands than they are to any type of CONUS facility.

Variation in NMPC between PCP types

We follow the same analysis plan as just described to examine variation in NMPC by PCP type: APG type, top 30 APGs (percentage distribution and alienation coefficients), and E&M (percentage distributions and indices of dissimilarities). Figure 19 reveals that medical APGs are uniformly the predominant form of NMPC visit regardless of PCP type, but that a small amount of variation exists when comparing hospital corpsmen/technicians and operational medicine providers (aerospace and undersea medicine) and all other types of PCPs. Both of these types of PCPs see a somewhat smaller percentage of medical APG visits and a somewhat higher percentage of procedure and ancillary APG visits. With this as the only exception, there is essentially no other variation present in figure 19.

Figure 19. Percentage distribution of NMPC visits by APG type and PCP type

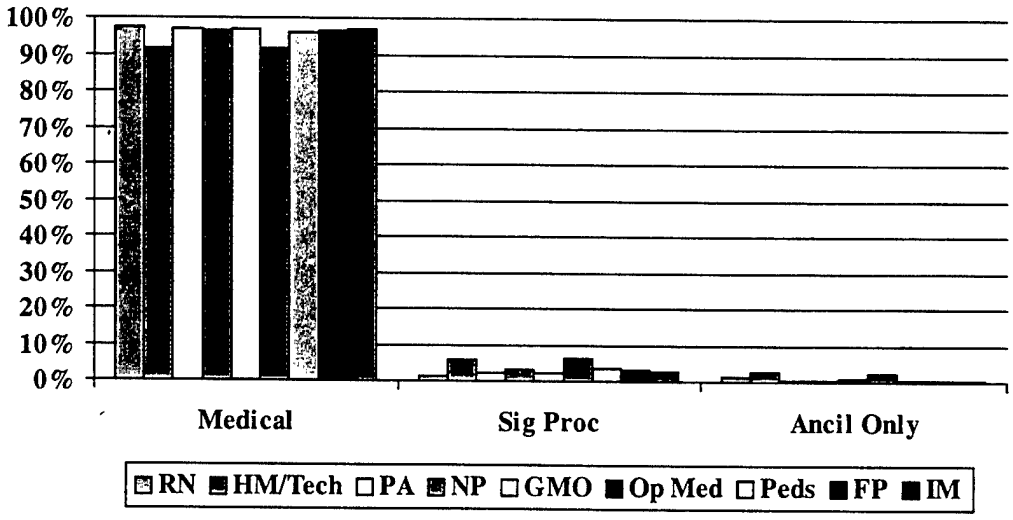


Table 18 shows considerably more variation in visit distributions by individual APGs than for APG type. A visual inspection of this table reveals, in particular, that RNs appear to differ from other forms of PCPs by having a considerably larger percentage of their NMPC visit load devoted to nonspecific signs and symptoms and other contacts with the health care system (APG 705) than is true for other PCPs, and a correspondingly lower percentage devoted to the remaining APGs. Pediatricians, not surprisingly, see high percentages of acute respiratory infections (APG 542) and well-child care (APG 702) visits. Corpsmen and operational medicine (aerospace and undersea medicine) providers see a larger percentage of adult medical exams (APG 701) than is true of other PCPs. These top 30 APGs contribute only 82.5 percent of the NMPC visit load of IM physicians and 84.6 percent of that of RNs, but 92.2 percent of the NMPC visit load of operational medicine physicians and 92.1 percent of that of physician assistants.

The alienation coefficients in table 19 allow us to quantify the variation that we can only qualitatively observe in table 18. RNs are quite different from all other types of PCPs based on this metric. Their alienation coefficients are all above 0.90, except for that with IM, where it is still a relatively large 0.76. Corpsmen/technicians and PAs are different from NPs, pediatricians, and internists, but relatively similar to each other and to GMOs and operational medicine physicians. NPs are relatively similar to all other types of PCPs, likely because of the wide range of NPs in Navy Medicine (OB/GYN, pediatric, primary care, and psychiatric). GMOs are similar to RNs and other types of nonoperational physicians, whereas FPs, pediatricians, and IMs are similar to each other.

Variation between PCP types in E&M visit distributions is considerable as well. Table 20 presents these distributions, and table 21 presents their indices of dissimilarity. Based on these tables, we observe once again that RNs are considerably dissimilar from other types of PCPs in Navy Medicine. Compared with other PCP types, RNs see considerably more established patients for OVs that require no physician. These visits are likely for simple procedures or for activities associated with a nurse clinic. RNs also make considerably more outbound calls and handle more "other preventive medicine" visits. We also observe the following: (a) Corpsmen/technicians are

dissimilar from NPs and most types of physicians, (b) PAs are most similar to GMOs and somewhat similar to operational medicine physicians, (c) NPs are most similar to GMOs, pediatricians, and FPs, (d) GMOs and operational medicine physicians are more like each other and less like other types of physicians, and (e) Pediatricians and FPs are more similar to each other than either is to IMs.

Table 18. Percentage distribution of NMPC visits by top 30 APGs and PCP type

	PCP type								
APG[a]	RN	HM/Tech	PA	NP	GMO	OpMed	Peds	FP	IM
542	3.5	12.8	14.2	16.0	12.7	10.2	24.9	12.7	4.8
701	5.3	24.9	15.4	7.5	17.4	27.7	5.7	9.6	7.1
705	38.1	9.9	6.2	3.7	6.7	11.2	2.6	4.3	13.4
702	2.2	0.0	1.4	13.1	0.8	0.3	19.1	4.6	0.1
635	1.4	5.3	6.5	6.0	5.1	4.3	7.1	5.9	2.6
623	0.5	4.1	6.0	3.1	5.7	4.3	1.1	4.8	4.6
681	3.2	0.3	4.5	9.1	2.8	1.4	0.4	5.9	1.8
464	0.5	6.0	4.9	1.9	4.8	4.5	1.3	2.5	1.5
572	3.2	0.4	2.1	2.1	3.2	1.2	0.3	4.5	13.5
502	0.9	3.1	3.4	3.5	4.5	2.1	3.9	2.3	0.8
561	1.1	1.5	2.7	2.5	2.7	1.2	5.1	3.0	3.8
704	7.2	3.6	3.4	2.0	3.7	3.8	2.2	2.5	2.8
545	1.1	1.6	2.7	2.9	2.3	1.8	3.5	3.1	2.1
597	0.6	1.7	2.0	2.6	2.2	1.2	2.8	2.6	2.2
621	0.5	2.1	2.2	1.3	2.6	2.9	0.2	2.2	1.7
653	3.0	0.1	1.3	1.7	2.0	0.9	0.5	2.4	5.6
512	0.3	0.9	1.5	1.1	1.7	1.1	0.6	1.7	1.6
651	2.7	0.0	0.5	0.8	1.2	0.2	0.1	1.8	7.5
503	0.6	1.6	1.7	1.8	1.2	1.1	0.8	1.4	0.4
491	2.3	0.0	0.1	0.4	0.2	0.2	0.1	4.1	0.1
661	0.3	0.6	1.4	1.6	1.1	0.7	0.7	1.5	0.9
533	0.2	1.1	1.1	1.4	0.9	0.6	1.9	1.1	0.3
591	0.1	1.3	1.2	0.6	1.0	1.3	1.3	0.7	0.3
462	0.3	1.6	1.2	0.7	0.9	0.8	0.8	0.7	0.2
703	4.6	0.6	0.8	1.4	0.6	0.5	0.1	1.1	0.2
237	0.3	2.2	0.6	0.3	0.7	5.0	0.7	0.2	0.3
633	0.2	1.0	1.0	0.7	0.8	0.6	0.8	0.7	0.3
592	0.1	0.4	0.8	0.6	0.9	0.6	0.4	0.9	1.4
562	0.1	0.5	0.8	0.4	0.9	0.3	0.9	0.5	0.4
006	0.2	1.1	0.5	0.4	0.5	0.2	0.3	0.7	0.2
Sum	84.6	90.3	92.1	91.2	91.8	92.2	90.2	90.0	82.5

a. A list of the clinical content of these 30 APGs appears as appendix E.

Table 19. Coefficients of alienation for comparisons of percentage distributions of NMPC visits by top 30 APGs and PCP type

	RN	HM/Tech	PA	NP	GMO	OpMed	Peds	FP	IM
RN	---	0.933	0.962	0.985	0.957	0.920	0.999	0.976	0.763
HM/Tech	---	---	0.388	0.836	0.291	0.165	0.843	0.656	0.907
PA	---	---	---	0.882	0.201	0.462	0.815	0.462	0.925
NP	---	---	---	---	0.922	0.937	0.610	0.711	0.993
GMO	---	---	---	---	---	0.349	0.879	0.547	0.877
OpMed	---	---	---	---	---	---	0.953	0.726	0.896
Peds	---	---	---	---	---	---	---	0.708	0.999
FP	---	---	---	---	---	---	---	---	0.903
IM	---	---	---	---	---	---	---	---	---

Table 20. Percentage distribution of NMPC visits by E&M type and PCP type

	PCP type								
E&M type	RN	HM/Tech	PA	NP	GMO	Op Med	Peds	FP	IM
New Pt OV Lo	6.3	34.2	29.2	10.3	18.3	23.6	8.8	7.0	11.6
New Pt OV Med	0.9	13.3	7.9	2.7	8.0	9.6	2.4	2.4	3.1
New Pt OV Hi	0.7	6.5	5.2	4.1	7.5	6.6	1.3	2.5	3.7
Est Pt OV No Phys	34.0	13.8	2.6	5.1	3.2	4.1	2.2	1.2	6.3
Est Pt OV Lo	8.7	20.2	38.2	47.5	41.0	29.3	50.9	54.6	28.5
Est Pt OV Hi	3.7	4.3	11.1	13.0	16.0	18.8	10.7	19.1	21.5
Consultation	3.0	0.6	0.1	0.5	0.3	0.2	1.1	0.2	5.9
Outbound Telcon	37.0	0.5	3.6	4.5	3.7	3.0	8.5	9.3	18.4
New Pt Prev Visit	0.6	1.2	0.6	4.8	0.4	1.8	6.1	0.9	0.1
Est Pt Prev Visit	1.5	2.4	0.9	6.6	1.0	2.4	7.8	2.2	0.3
Other Prev Visit	3.2	2.3	0.3	0.3	0.4	0.1	0.0	0.2	0.1
All Other Visits	0.3	0.7	0.3	0.5	0.3	0.4	0.2	0.3	0.4
Total	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0

Table 21. Indices of dissimilarity for comparisons of percentage distributions of NMPC visits by E&M type and MTF type

	RN	HM/Tech	PA	NP	GMO	Op Med	Peds	FP	IM
RN	---								
HM/Tech	60.0	---							
PA	71.2	27.7	---						
NP	66.7	47.8	25.1	---					
GMO	70.3	36.7	11.3	19.7	---				
Op Med	69.7	26.9	15.2	28.4	13.6	---			
Peds	65.4	55.9	31.0	10.6	28.1	37.8	---		
FP	66.3	58.0	31.9	18.0	24.1	32.0	14.1	---	
IM	51.0	43.4	34.8	30.6	29.1	26.0	35.9	28.9	---

Satisfaction with Navy Medicine Primary Care

This section introduces analyses based on survey data rather than ADS visit data. As we discussed earlier under sources of data, the two surveys we use are the 1999 annual *Health Care Survey of DOD Beneficiaries* and the monthly *Customer Satisfaction Survey* (CSS) for FY00.

Findings based on the 1999 *Health Care Survey of DOD Beneficiaries* (HCSDB)

The 1999 HCSDB contains responses from 84,946 respondents—a 41-percent response rate from the 205,994 beneficiaries to whom DOD administered the survey. From this population of respondents, we selected for study those who were Navy and Marine Corps beneficiaries (i.e., those with a Navy or Marine Corps sponsor) who used their TRICARE benefit as their primary health plan during the 12 months preceding the survey. We believe this selected subpopulation contains the large majority of those who use Navy MTFs for their PC plus a comparison group of those who use civilian facilities for this care.[16]

We had to weight their responses to compensate for the disproportionate oversampling that DOD performed to ensure adequate representation of key survey groups. We followed the weighting methodology used by DOD. The weighting adjustment effectively increases the survey sample size from 84,946 *actual* respondents to

16. Ideally, we would have liked to select our subpopulation on the basis of their receiving PC in Navy MTFs. The HCSDB, however, did not contain survey items that allowed us to identify such respondents. We instead used items that allowed us to identify Navy and Marine Corps beneficiaries and then to categorize them further into those who used MTFs or had military PCMs versus those who used civilian facilities or had civilian PCMs. The former group most nearly approximates users of NMPC; the latter served as a comparison group.

6,362,547 *weighted* respondents, approximating the 6.4 million adult beneficiaries in the DEERS eligibility file at the time of the survey. Of these 6.4 million weighted respondents, 3.3 million used TRICARE as their primary health plan, and, of those, 1.1 million were Navy or Marine Corps beneficiaries.

Figure 20 provides a further breakdown of these 1.1 million weighted respondents that we included in our analysis. The figure also identifies with arrows the comparisons we drew in our analysis. We used data available in the HCSDB to segment the Navy and Marine Corps beneficiaries into those who reported being TRICARE Prime enrollees and those who reported being not Prime (i.e., TRICARE Standard or Extra). We further segmented Prime enrollees into those who had a military PCM and those who had a civilian PCM. We next segmented both groups of Prime respondents and the group of non-Prime respondents on the basis of whether they reported primarily using an MTF or a civilian facility for most of their health care in the previous year. Those Navy and Marine Corps beneficiaries who primarily use an MTF for their health care bear the closest resemblance to NMPC users.[17]

To measure satisfaction with NMPC, we selected five items from the 1999 HCSDB and divided responses to them into two categories—one indicating satisfaction and the other indicating lack of satisfaction:

- Respondent reports that it was not a problem getting a personal doctor or nurse that he/she wanted *or* that it was a problem
- Respondent rates personal provider as satisfactory (8 or higher on a 10-point scale) *or* not satisfactory (7 or lower on a 10-point scale)
- Respondent did not usually have to wait for 4 or more weeks to get a well-patient visit *or* had to wait 4 weeks or more

17. Note that we dropped missing cases from our analyses. For some multivariate analyses, we also dropped respondents who reported that Prime was their primary TRICARE plan during the year but that they were not currently enrolled in Prime.

- Respondent did not usually have to wait more than 7 days for a routine visit *or* had to wait 7 days or more
- It did not usually take respondent more than 30 minutes to get to his/her primary provider *or* it did take 30 minutes or more.

Figure 20. Breakdown of 1999 HCSDB *weighted* respondents by TRICARE plan, type of PCM, and type of facility most often used

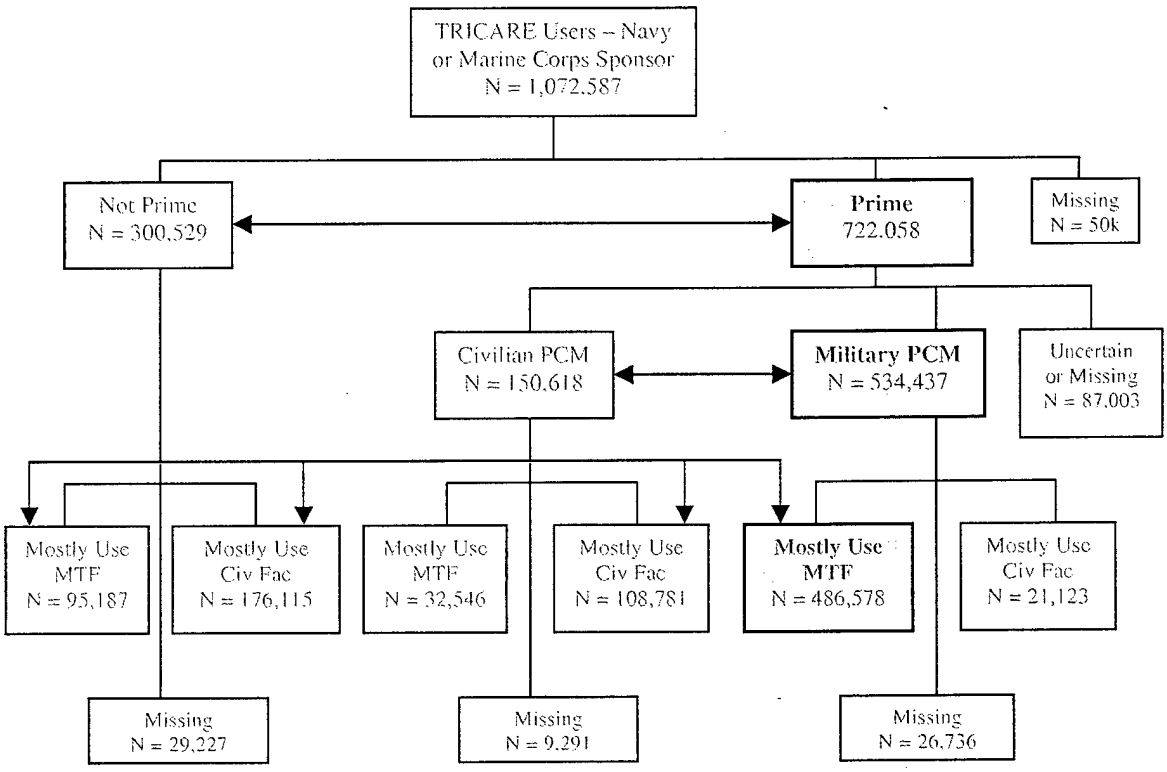


Table 22 presents the percentage of weighted respondents in each comparison group who report being satisfied with primary care on each of these five indicators. These results, unadjusted for demographic differences between groups, provide information regarding the relative likelihood of a respondent in each group being satisfied on a particular indicator. They can be compared vertically within an

indicator across categories of comparison groups, as well as horizontally within a group across indicators. Leaving the former comparisons for discussion below, we comment on the latter comparisons here. Note first that the percentage of respondents rating their provider highly is lowest of all the percentages within each comparison group, whereas the percentage reporting not usually waiting 4 or more weeks for a well-patient visit is highest. A higher percentage of respondents in groups with a military PCM report not having a problem getting a desired personal provider than report not having access problems for routine visits or getting to their primary provider; the opposite is true for respondents in groups with a civilian PCM.

Table 22. Percentage of 1999 HCSDB respondents[a] reporting satisfaction with various aspects of primary care: unadjusted results[b]

	Indicator of satisfaction				
Comparison groups	No problem getting wanted personal provider	Rate personal provider as 8 or higher on 10-point scale	Not usually wait 4 or more weeks for well-patient visit	Not usually wait more than 7 days for routine visit	Not usually more than 30 min to get to primary provider
Health plan					
Prime	82.4	69.5	87.0	78.3	77.8
Standard/Extra	75.8	71.5	84.2	79.6	77.7
PCM type					
Military	83.6	72.4	86.7	77.4	77.1
Civilian	77.5	64.0	85.8	80.5	79.2
Plan type (& PCM type if Prime)/ facility used					
Prime (military PCM)/ use MTF	85.1	74.0	87.3	77.6	77.3
Prime (civilian PCM)/use civilian facility	76.4	61.3	86.5	81.5	81.0
Standard/Extra/ use MTF	70.1	61.8	83.3	75.8	76.2
Standard/Extra/ use civilian facility	79.0	73.7	84.9	81.7	78.6

a. Results for weighted sample of Navy and Marine Corps beneficiaries who reported using TRICARE as their primary health plan.
b. Group percentages unadjusted for demographic composition.

When making these kinds of comparisons within a comparison group, differences between the demographic composition of the various groups are unimportant. However, when making comparsions between groups, demographic differences may affect results. Differences between groups can be the result of the effects of (1) the various plan, PCM, and facility differences, (2) demographic differences, (3) other systematic differences, and (4) nonsystematic, chance differences (e.g., sampling error). Table 23 presents a multivariate analysis that controls for demographic and chance differences, and assumes no significant other systematic differences.

Table 23. Results of the multivariate logistic regression analysis of satisfaction from the 1999 HCSDB: odds ratios (ORs) for comparison groups, controlling for demographic characteristics

	Indicator of satisfaction				
Comparison groups	No problem getting wanted personal provider	Rate personal provider as 8 or higher on 10-point scale	Not usually wait 4 or more weeks for well-patient visit	Not usually wait more than 7 days for routine visit	Not usually more than 30 min to get to PCP
Health Plan					
Prime[r]	---	---	---	---	---
Standard/Extra	0.71*	1.12	0.80*	0.89*	1.12
PCM type					
Military[r]	---	---	---	---	---
Civilian	0.63*	0.75*	0.98	1.32*	1.43*
Plan type (& PCM type if Prime)/ facility used					
Prime (military PCM)/use MTF	---	---	---	---	---
Prime (civilian PCM)/use civil ian facility	0.49*	0.70*	0.98*	1.27*	1.56*
Standard/Extra/ use MTF	0.51*	0.66*	0.82*	0.93*	0.98*
Standard/Extra/ use civilian facility	0.66*	0.97*	0.94*	1.52*	1.61*

[r] Reference group.
* Statistically significant at the $p < .05$ level.

Because we formed binary indicators of satisfaction (satisfied/not satisfied), we employed multivariate logistic regression as our analytic technique. We used beneficiary group, rank, perceived health status, education, gender, age, and race as demographic control variables. We report the results of this analysis in the form of Odds Ratios (ORs), which estimate the likelihood (odds) of members of a particular comparison group to be satisfied on a given measure *relative to* the likelihood of members of a reference comparison group being satisfied on that measure (expressed as a *ratio* of these odds). Values greater than 1.0 indicate that members of the comparison group are *more* likely to be satisfied than those in the reference group (or that members of the reference group are *less* likely to be satisfied). Conversely, ratios less than 1.0 indicate that those in the comparison group are *less* likely to be satisfied than those in the reference group (or that members of the reference group are *more* likely to be satisfied). The difference between an OR and 1.0 is the percentage more (or less) likely for members of the comparison group to be satisfied relative to those in the reference group.

In each comparison, we selected the group most likely to be NMPC users as the reference group and compared the other group(s) with it. Thus, when comparing health plan groups, we selected Prime as the reference and Standard/Extra as the comparison. Similarly, when comparing Prime PCM types, we selected having a military PCM as the reference and having a civilian PCM as the comparison. Finally, when comparing plan types (and if Prime, PCM types) and where one most often receives care, we selected Prime enrollees having military PCMs and using MTFs as the reference and the other three groups (Prime enrollees having civilian PCMs and using civilian facilities, being Standard/Extra and using an MTF, and being Standard/Extra and using civilian facilities) as the comparisons. In each instance, we report the OR controlling for the effects of the demographic variables, meaning that the reported OR is the result of the effects of the defining characteristic of the group (type of health plan, type of PCM, type of facility used) rather than of the demographic composition of the group.

Health plan

TRICARE Standard/Extra respondents were less likely to be satisfied than Prime enrollee respondents on all three satisfaction indicators for which the results were statistically significant at the $p < .05$ level. Results for the other two indicators are not statistically significant at this level. Thus, controlling for chance and demographics, those who use TRICARE Standard and Extra are less likely, in general, to be satisfied with primary care than are Prime enrollees.

PCM type

Among respondents who reported being Prime enrollees, those with a civilian PCM were one-third less likely than those with a military PCM to not have a problem attaining their personal provider of choice, and one-fourth less likely to rate their doctor highly. On the other hand, those with civilian PCMs are between 30 and 40 percent more likely than those with military PCMs to have better access to primary care as measured by not usually having to wait more than 7 days for routine visits and not usually taking more than 30 minutes to get to their primary provider. Thus, based on results that control for demographic factors and chance ($p < .05$), Prime enrollees with military PCMs are more likely to be satisfied with getting a wanted personal provider and rating him/her highly, whereas those with civilian PCMs are more likely to be satisfied with access to primary care.

Health plan, PCM, and facility most often used

Compared with Prime respondents with a *military* PCM and who most often used an MTF (the reference group of likely users of NMPC), respondents in all other groups were less likely to be satisfied with getting a desired personal provider or rating that provider highly, but (with a few minor exceptions) more satisfied with access to routine care and getting to their provider. Interestingly, users of Standard and Extra who receive most of their care in an MTF—presumably on a space-available basis—are less satisfied across the board on all five indicators when compared with the reference group. This group appears to be most challenged in receiving primary care. On the other hand, regardless of plan, respondents who receive most of their care in a civilian facility are more likely to be satisfied with access than

members of the reference group, suggesting access problems with NMPC.

Findings based on the DOD Monthly *Customer Satisfaction Survey* (CSS)

The next two tables present findings from the monthly DOD *Customer Satisfaction Survey* for a sample of patients who received care at a Navy MTF PC clinic during FY00. The survey did not include respondents from all such clinics nor did it draw equal sample sizes from those that it did sample. As with the HCSDB, weighting was necessary to adjust the sample to better represent the universe of MTF users, and we followed the DOD recommended protocol in doing so.

Unlike the HCSDB, which sampled *DHP eligibles*, the CSS samples *MTF users* (or adult parents or guardians of minor age users). This made it easier for us to identify the relevant population to analyze: we selected all those respondents whom the survey sampled on the basis of their having received care at a Navy MTF PC clinic. Note that the sampling plan for this survey targets a sample of visits by those who receive care at an MTF on a monthly basis. For each visit sampled, the corresponding respondent is asked to report on his/her experience regarding that particular visit rather than about his/her health care experiences in general. Our analysis, then, focuses on respondent reports of experiences getting care at Navy MTF PC clinics during specific visits in FY00. Only those receiving care at Navy MTFs were eligible for inclusion in the survey; thus, those who lacked sufficient access to such a clinic (and who presumably would be dissatisfied with their access) are excluded from the survey. This could skew responses toward greater satisfaction than exists in the general population of those eligible—and wanting—to receive care in Navy MTFs.

The CSS contains a series of items asking the respondent to rate various aspects of his/her visit, along with items on the respondent's health plan and demographic characteristics. We adopted DOD's protocol for forming three composite multi-item indices measuring satisfaction with (1) the interpersonal aspects of the clinic visit, (2) the quality of the care received, and (3) access to that care. We also

followed DOD's use of two overall summary measures of a respondent's satisfaction with a visit: overall satisfaction with the medical care received and overall satisfaction with the clinic visit. Thus, we again had five indicators of satisfaction—three composite indices and two overall metrics. As we did with the HCSDB data, we dichotomized scores on these five indicators as being satisfied or not satisfied. The composite indices are scored on a 5-point scale; we selected 4.0 as the cut point for satisfaction (4.0 or above indicating satisfaction; below 4.0 indicating lack of satisfaction). The overall metrics are scored on a 7-point scale with a cut point of 6.0.

Table 24 presents the unadjusted percentage of CSS respondents in various comparison groups who report satisfaction with each of our five measures. We classified respondents into comparison groups along several dimensions: TRICARE plan and whether Prime enrollees saw their PCM for a given visit, beneficiary group, perceived health status, main purpose for the visit, age, and gender. As with table 22, the unadjusted percentages in this table can be compared vertically or horizontally. (We delay the vertical comparisons to our discussion of the multivariate results in table 25.)

The most striking result comparing horizontally across indicators in table 24 is that the percentage of respondents scoring in the satisfied range is lowest for the composite access index in every comparison group. Without exception, there appears to be less satisfaction with access than with any other metric. With only two exceptions (other than active duty or their families and those age 45 years and over—two groups that contain many of the same respondents), less than half of the respondents in any group indicate satisfaction with access. By comparison, considerably more than half of respondents in all groups indicate satisfaction on all other indicators; most such percentages range from the mid-60s to the low 80s. Again, access to NMPC comes up as problematic.

The only other finding of note when horizontally comparing the percentages in this table is that the percentages for the other two composite indices (interpersonal relationships and quality of care) are generally lower than for the two single-item overall metrics (medical care and clinic visit). Apparently, when asked about specific aspects of

a clinic visit, respondents can be aware of elements that they are not satisfied with, and yet rate the overall medical care and overall clinic experience satisfactorily.

Table 24. Unadjusted percentage of *Customer Satisfaction Survey* respondents reporting satisfaction with care received in Navy MTF PC clincs, by respondent characteristics[a]

	Indicator of satisfaction				
	Composite satisfaction with			Overall satisfaction with	
Respondent characteristic	Interpersonal relationship[b]	Quality of care[b]	Access[b]	Medical care[c]	Clinic visit[c]
Total sample	66.1	67.6	44.7	77.9	74.2
TRICARE plan & PCM					
Prime, saw own PCM	76.6	77.5	48.0	87.3	81.5
Prime, did not see own PCM	58.1	61.4	41.4	70.8	69.0
Not Prime, no PCM	68.8	69.0	49.6	79.4	76.8
Beneficiary group					
Active duty	59.3	59.4	41.0	70.2	68.0
Active duty family member	64.2	66.8	40.6	77.8	72.9
Other than AD or ADFM	76.0	73.8	56.2	85.2	82.6
Perceived health status					
Fair/poor	61.6	60.6	42.9	70.1	67.5
Good	61.6	62.3	38.1	74.8	70.7
Very good/excellent	68.7	70.9	47.7	80.5	76.8
Main purpose of visit					
Check up/preventive care	70.2	71.8	42.9	82.2	76.3
Routine care	68.2	70.3	45.5	81.3	77.7
Urgent care	60.7	62.4	46.2	71.9	69.2
Specialty care	66.2	66.3	41.4	76.5	74.2
Age					
0-17	66.6	69.4	43.2	80.0	75.1
18-44	59.9	61.1	39.1	72.3	68.7
45 and over	77.9	77.9	58.9	85.9	84.1
Gender					
Male	66.8	67.8	47.0	78.0	74.6
Female	65.5	67.4	42.9	77.9	74.0

a. Source: DOD monthly *Customer Satisfaction Survey* data for Navy MTF PC clinics during FY 2000
b. Cut point for satisfied = 4.0 or above on a 5-point multi-item composite scale.
c. Cut point for satisfied = 6.0 or above on a 7-point single-item scale.

Table 25 completes our analysis of the CSS. It presents the multivariate odd ratios from a logistic regression analysis of the five binary satisfaction metrics, and permits us to make vertical comparisons regarding the relative likelihood (odds) that members of various comparison groups (one of which serves as the reference group for the comparison) are satisfied with various aspects of their clinic visit. Unlike table 23, where we controlled for but didn't present results for demographic characteristics, table 25 does present the results for all variables entered into the analysis. Like table 23, the results presented in table 25 are net effects on satisfaction taking into account the effects of all variables in the analysis.

Perhaps the most significant finding emerging from this table is that seeing one's own PCM during a primary care visit is a great satisfier. The odds ratios for both comparison groups to Prime enrollees who saw their own PCM (Prime/did not see own PCM and Not Prime) are significantly less than 1.0. The ratios indicate that—regardless of all other characterisitics controlled for in the analysis—members of these two comparison groups are only about half as likely as those in the reference group of Prime enrollees seeing their own PCMs to be satisfied with interpersonal relationships, quality of care, overall experience with medical care, and overall experience with the clinic. This is wholly consistent with the Institute of Medicine conception of PC, which we adopted for our analysis, and its emphasis on the centrality of a sustained patient-provider relationship marked by comprehensiveness, coordination, and continuity of care. It is also consistent with the PCM By Name program.

Note that the ORs for satisfaction with access (though still significantly favoring the reference group over the comparison groups) are 0.80 and 0.87, indicating that all three groups are closer together on this indicator than on the other indicators. Once again, access surfaces as an element in need of attention.

Active duty and their family members do not significantly differ in their satisfaction likelihood, but those who are neither active duty nor their family members are significantly more likely (by a third to a half) to be satisfied on all five indicators. It is not clear why this may be so. One possible explanation is that active duty, and frequently

their family members, have no choice in health plan (TRICARE) or possibly even provider panel, whereas other beneficiaries have more choice (through other employers or group coverage), and lack of choice may be a dissatisfier.

Table 25. Multivariae logistic regression analysis odds ratios for satisfaction with care in Navy MTF primary care clinics, by respondent characteristic[a]

	Indicator of satisfaction				
	Composite satisfaction with			Overall satisfaction with	
Respondent characteristic	Interpersonal relationship[b]	Quality of care[b]	Access[b]	Medical care[c]	Clinic visit[c]
TRICARE plan & PCM					
Prime, saw own PCM[r]	---	---	---	---	---
Prime, did not see own PCM	0.47***	0.50***	0.80***	0.38***	0.55***
Not Prime, no PCM	0.58***	0.55***	0.87***	0.50***	0.69***
Beneficiary group					
Active duty[r]	---	---	---	---	---
Active duty family member	0.95	0.98	0.97	1.01	1.06
Other than AD or ADFM	1.34***	1.48***	1.48***	1.38***	1.48***
Perceived health status					
Fair/poor	---	---	---	---	---
Good	1.16**	1.11*	0.95	1.48***	1.36***
Very good/excellent	1.93***	2.06***	1.70***	2.24***	2.22***
Main purpose of visit					
Checkup/preventive care[r]	---	---	---	---	---
Routine care	0.99	1.10**	1.20***	1.07	1.16***
Urgent care	0.80***	0.81***	1.40***	0.73***	0.83***
Specialty care	1.02	1.01	1.03	0.91	1.03
Age					
0-17[r]	1.27***	1.25***	1.14***	1.30***	1.32***
18-44	---	---	---	---	---
45 and over	2.05***	1.83***	1.95***	1.88***	2.10***
Gender					
Male[r]	---	---	---	---	---
Female	0.96	0.98	0.84***	0.92**	0.94*

a. Source: DOD monthly *Customer Satisfaction Survey* data for Navy MTF PC clinics during FY 2000
b. Cut point for satisfied = 4.0 or above on a 5-point multi-item composite scale.
c. Cut point for satisfied = 6.0 or above on a 7-point single-item scale.
[r] Reference group.
* Statistically significant at $p < .05$; **Statistically significant at $p < .01$; ***Statistically significant at $p < .001$.

Satisfaction also appears to be inversely related to perceived health status. ORs are generally somewhat larger than 1.0 for good health relative to fair/poor health, and even higher (approaching or somewhat exceeding 2.0) for very good/excellent health relative to fair/poor health. This may indicate a problem in that those with perhaps the greatest need for care (those with other than very good/excellent status) are less likely to be satisifed than those with less of a need for clinical care. We note in passing that access, once again, stands out from the other indicators. The access OR for good health relative to very good/excellent health is not significant, and the access ratio for fair/poor is considerably lower than those for the other indicator.

Another finding of note is that, although there is relatively little difference in satisfaction likelihoods between those whose main reason for the clinic visit is checkup/preventive care, routine care, or specialty care, those who visited the clinic for urgent care are significantly less likely to be satisfied with all aspects of satisfaction except access. Urgent care, with the exception of being accessible, appears not to be as satisfying an experience as regular primary care—once again making the case for the IOM primary care model and PCMBN.

Finally, we observe that parents of minor children (age 0 to 17) and patients age 45 and over are more likely to be satisfied than are patients age 18 to 44, and that there is relatively little significant difference in satisfaction likelihoods by gender. The two exceptions of note both involve access. Parents of minor children are only a little more likely to be satisfied with access (OR = 1.14), whereas their likelihood of satisfaction with other aspects of their clinic visit is higher relative to 18- to 44-year-old patients (ORs in the range of 1.25 to 1.32). Females are significantly less likely to be satisfied than males, although the reason for this is unclear.

Conclusions and recommendations

This final section presents what we believe are the major findings and lessons learned from the preceding analyses, what we see as remaining unanswered questions that are left to future research, and what recommendations we make to the PCPL Advisory Board and BUMED based on our findings.

Major findings and lessons learned

We found that it is possible to delineate the content of Navy Medicine Primary Care through a relatively limited number of Ambulatory Patient Group (APG) categories. A set of only 37 APGs encompassed over 92 percent of all visits to NMPC during FY00. These APGs define NMPC by volume and exclusivity, scoring high on either or both of these dimensions. Based on the primary, defining APG for a visit, NMPC is largely a medical rather than a procedural activity. Of the 37 APGs defining NMPC, 34 are medical; only 3 are for either a significant or an ancillary procedure or treatment. And, based on E&M codes, NMPC consists largely of office visits, with established patients accounting for the majority of such visits.

The boundary between NMPC and non-PC is not sharply defined by activities exclusively performed by PCPs in PC clinics, but rather is largely composed of activities that are performed throughout Navy Medicine. Much of what NMPC does, as defined by APG and E&M, is also done by non-PC. What is possibly more distinctive of NMPC is its higher tendency to care for patients with which providers have an established relationship. This is a defining element of PC according to the Institute of Medicine's 1996 report on the state of PC in turn-of-the-21st-century America [5]. Maintaining such relationships may be problematic, however, given the frequent reassignments requiring relocation of active duty personnel and their dependents that are characteristic of Navy careers. Also problematic is maintaining

relationships with shore-based PCPs during times of prolonged deployment.

Surprisingly, there were relatively few NMPC visits with E&M codes identifying them as purely preventive medicine visits. The percentage of such visits for NMPC was only slightly higher that for non-PC. We had expected to see more specifically preventive visits than the ADS E&M data contained. We know that NMPC delivers preventive care because adult medical exams, well-child care, and gynecological exams (including Pap tests) are among the 37 defining APGs for NMPC. Perhaps PCPs are not correctly coding preventive visits as such, or perhaps much preventive care occurs in the context of or during PC visits initiated for other, nonpreventive reasons. Or perhaps NMPC providers are not be taking sufficient advantage of their established relationships with patients to see them for preventive care (on its own terms) rather than providing it as part of sickness care. This warrants further study.

Significantly, NMPC mean per-visit RVUs are fairly consistently lower by visit type than corresponding non-PC visits. This appears to be the result of differences in both treatment protocols and E&M type. More intensive and thus higher resource utilization treatment protocols for the same type of patient (defined by APG and E&M) likely explain some portion of the lower mean per-visit RVU scores for NMPC; however, the influence of seeing more established patients is definitely a factor in keeping these scores lower. Established patient visits typically consume fewer RVUs on average than do new patient visits of equivalent acuity. And because NMPC sees more established patients, it experiences lower mean RVUs per visit. This helps support the case for continuity of care, especially through PCM By Name. It is likely that Navy Medicine could reap savings in RVUs per visit by heavily encouraging the PCMBN program. Such continuity can avoid, for example, taking redundant patient histories, repeating the same diagnostic tests, and repeating the same (or, possibly worse, conflicting) patient self-care instructions, which all consume resources unnecessarily.

There appears to be more variation in NMPC from the supply side (where it's provided and who provides it) than from the demand side (who uses it). Significantly, there is a wide range of PCP types,

including non-physician clinicians with varying expertise and training, physicians with little graduate medical training (GMOs), and PC specialist physicians. To the extent that further research demonstrates the ability of various non-physician PCPs to provide equivalent-quality care at lower mean RVUs (compared with physician PCPs), Navy Medicine may benefit from using such providers more widely. (This statement assumes that non-physician PCPs provide this care within their scopes of practice for patient visits that are equivalent to those of physician PCPs.)

We found a significant amount of concentration, or inequality, in the distribution of NMPC use by users regardless of how we measured it (unadjusted visits, RVUs, or resource-adjusted visits (RAVs)) but especially when measuring it by RAVs. We also found that the amount of concentration varies between demographic groups of users. This suggests that Navy Medicine might consider further identifying the individuals and groups that account for the greatest amount of concentration, as well as the high-use individuals within high-concentration groups, and then developing policies and protocols to effectively and efficiently manage their demand for care. Demand management initiatives may be targeted specifically at such groups and individuals in a proactive manner as part of Navy Medicine's optimization efforts.

Our analysis of annual Navy MTF health care use in the Tidewater, VA, area revealed a surprisingly high percentage of patients who used a Navy MTF in that area for at least one non-PC visit during FY00 but who did not also have at least one NMPC visit that year. This finding held for Prime enrollees as well as for other types of beneficiaries. This finding bears further analysis regarding its generalizability beyond the Tidewater area and regarding its meaning and likely impact on the health of patients and the effectiveness of NMPC in reaching its enrollees. When coupled with the finding on the relatively low proportion of strictly preventive medicine visits to NMPC, the large numbers of beneficiaries who have no PC visits suggest a need for more preventive medicine outreach efforts.

RVUs appear to be a robust metric for tracking and evaluating the performance of NMPC. RVUs are also useful for adjusting visit counts to reflect visit intensity. We found that the percentage distributions of NMPC visits shifted significantly for various categories when we compared distributions based on visit counts with distributions based on RVUs. We found these shifts in various analyses from the supply side as well as the demand side. This suggests that measuring provider, clinic, or MTF productivity using a visit metric may distort actual performance by ignoring visit intensity, and that an RVU-based metric may be preferable.[18]

Based on data from two DOD surveys, we found that satisfaction with NMPC is generally good. We found that Navy and Marine Corps TRICARE Prime enrollees—particularly those with military PCMs who also use MTFs for most of their health care (presumably the group most likely to be NMPC users)—are more likely to be satisfied than various comparison groups with getting a personal provider of choice and rating that provider highly. We also found that Prime enrollees who saw their own PCM during a PC visit were more likely to be satisifed with most aspects of that visit compared either with Prime enrollees who did not see their own PCM or with nonenrollees.

However, the survey data also uncovered accessibility issues. Navy and Marine Corps beneficiaries who used their TRICARE benefits in civilian facilities generally were less likely to report access problems than those using MTFs. And patients visiting Navy MTFs for primary care were less likely to be satisfied with access than with other aspects of their visit; this finding generally held across all patient categories. This suggests that both the PCPL Advisory Board and BUMED should further investigate barriers to NMPC access and develop procedures to increase accessibility. One possible approach under investigation

18. We recently completed a preliminary analysis of Navy MTF primary care productivity using an RVU-based metric, and reported our findings to the PCPL Advisory Board in a CNA Research Memorandum [13]. Those findings revealed generally lower than expected levels of productivity and raised questions for the Board to address.

by the Board is open, or same-day, access[19] [14, 15]. This approach is in use in varying forms in a few Navy MTF PC clinics, as well as in a growing number of civilian PC clinics. Further study appears warranted.

Our findings also suggest that there are significant differences between NMPC and civilian PC. The demographic distribution of PC use and users, as well as the volume of use, differs from that of civilian health care (as reported in various surveys of the National Center for Health Statsitics). This is possibly the result of the specific demographic composition of Navy and Marine Corps DHP beneficiaries and the coverage, access, and utilization policies and practices characteristic of military medicine in general and of Navy Medicine in particular. This makes comparisons with the civilian sector difficult. It is important to carefully control for demographics, and to take differing policies and procedures into account when attempting such comparisons.

Finally, based on our experience with ADS data, we found that this data set, although improved over past years, remains problematic. Many visit records are missing data or contain incomplete, and inconsistent data. This made it necessary to compare and adjust information throughout a record to eliminate inconsistencies and thus keep some otherwise flawed records in our analysis. Nevertheless, we had to drop many records that remained flawed despite our data-cleaning procedures. In particular, we found inconsistencies between gender and clinical content of care (e.g., males receiving gynecological diagnoses or treatment), between age and active duty status (with some active duty considerably under 17 years of age), and between patient benefit category and both active duty status and alternate care value code (e.g., active duty appearing to be ineligible for TRICARE). Considerable numbers of missing data for sponsor's paygrade caused us

19. We accompanied a member of the Board on a site visit to NMCL Patuxent River in January 2001. At the Board's March 2001 meeting, that representative gave a briefing on our visit. We also distributed a short concept piece on open access at that meeting. At its May 2001 meeting, the Board also conducted a teleconference on the use of open access systems in PC with representatives of the Mayo Clinic in Rochester, MN.

drop this variable from our analyses. Likewise, unknown codes for provider specialty prevented us from definitively classifying many visits as either NMPC or non-PC. In addition, we found at least one verifiable instance of severe underreporting of visits for a specific clinic. By happenstance we noticed that the ADS visit count for a clinic we had visited in conjunction with background research for our work with the PCPL Advisory Board[20] grossly undercounted the number of visits the clinic had reported to us. Upon further checking, we found that the large majority of visits to that clinic were not in the ADS database. We alerted the clinic to this fact and they indicated they would follow up on it. Finally, we found that clinical information often appears incomplete and we suspect that clinicians do not complete ADS forms as diligently as they might. This leads to poor data on which to base operational policy.

Unanswered questions for future research

A number of questions remain unanswered that we suggest become the subject of future research. How do the findings reported here compare with those for Army and Air Force Medicine, with previous years of Navy Medicine, and with civilian medicine? Such comparisons would provide a point of departure from which to interpret our current findings. Cross-sectional comparisons with other military and with civilian medicine would provide benchmarks against which the PCPL Advisory Board and BUMED could evaluate the performance of NMPC. Longitudinal comparisons of NMPC would provide a means of evaluating changes in this performance over time. As discussed, however, it is important to account for demographic and policy differences when comparing NMPC with civilian medicine.

To what extent are the annual NMPC utilization findings from the Tidewater area representative of and generalizable to all of Navy Medicine, OCONUS as well as CONUS? Future research can replicate the approach we used for the Tidewater sample in other health service areas in order to identify variation and commonalities in annual NMPC utilization. In addition, patient-level analysis can help identify

20. TRICARE Outpatient Clinic Virginia Beach, DMIS-ID 6214.

practice patterns, especially regarding referral patterns between PC and specialty care for various kinds of acute and chronic clinical conditions. Such patient-level analyses can also shed further light on utilization inequality, or concentration, identifying high users ("frequent flyers") by their defining demographic and clinical characteristics. Once identified, the Board and BUMED can develop policies to optimally manage the demand by these frequent users of NMPC.

Closely related, but requiring detailed enrollment data, are questions of utilization rates by various demographic and clinical groups. Utilization rate analysis requires both the utilization information for the numerator of a rate as well as information on person-years of exposure to or eligibility for such utilization for the rate's denominator. ADS can supply the numerator information, but denominator information must come from a separate data source. Because the majority of NMPC is consumed by Prime enrollees (including empanelled but not enrolled active duty), because Navy Medicine's optimization efforts are largely focused on such enrollees, and because enrollment information is captured by the Defense Enrollment Eligibility Reporting System (DEERS), DEERS data can supply the necessary denominator information for analyses of special interest to the PCPL Board and BUMED. In particular, detailed demographic information available through DEERS on monthly enrollment to MTFs and in MTF catchment areas would allow analyses of Prime enrollee utilization by MTF type, at specific MTFs, within specific catchment areas, over specific periods of time.

In a similar manner, followup analyses of productivity require detailed manpower data. Productivity is also measurable by a rate, with numerator workload information coming from ADS and denominator manpower information coming from external sources. Visits, RVUs, and RAVs can populate the numerator, whereas numbers and types of PCPs per clinic can populate the denominator. Bringing these two data sources together would allow estimates of the number of visits, RVUs, and RAVs produced per PCP and PCP type within various Navy MTF PC clinics.

Recommendations

Based on the preceding analysis, we offer the following recommendations to the PCPL Advisory Board and to BUMED. These recommendations represent our best independent and objective judgment, and we offer them to assist the Board and BUMED in their efforts to improve and optimize the performance of NMPC.

We recommend the adoption of RVUs and RAVs as metrics for measuring, monitoring, and managing NMPC performance. This should include developing methods to estimate productivity as discussed above. It should also include incorporating RVUs and RAVs into staffing and other resource allocation models. Finally, it should include using these metrics in evaluating how, where, and by whom various portions of NMPC can best be provided. As part of their optimization efforts for NMPC, the Board and BUMED should use RVU and RAV metrics to identify and assess ways to maximize efficiency through optimally utilizing appropriate types of PCPs and PC clinical settings and optimally appropriating resources (including billets) among them.

We are aware that DOD is developing a protocol for incorporating an RVU metric, and that this protocol may follow the HCFA approach more closely than our protocol does. We recommend that the Board and BUMED adopt our protocol for their internal use based on the reasons we provided in our methodology section. Briefly, we believe that *a metric developed for payment purposes may not be appropriate for use as a performance metric.* The HCFA payment methodology discounts multiple procedures performed during a single visit and adjusts for geographic variations in the cost of providing care across health services market areas. By contrast, we based our methodology on maintaining a common, invariant yardstick unaffected by (1) variations in the cost of care at either the MTF or market area level, (2) whether a given procedure occurred along with another procedure during a given visit, or (3) whether two procedures occurred during a single visit or during a given visit plus a followup.

We further recommend that the Board and BUMED continue to emphasize PCM By Name and continuity of care. In addition to being

key elements of good primary care, they have a bearing on patient/customer satisfaction and efficiency (lower mean per-visit RVUs) and offer the possibility of more effective preventive medicine outreach efforts. They may also help address any inadequacies in care experienced by those who use Navy MTFs for non-PC but don't use NMPC over a year's time.

Based on our analysis of satisfaction data, we recommend that the Board and BUMED continue to identify and evaluate ways to increase access. Open, or same-day, access programs are one way to approach this, and the Board's ongoing evaluation of them should continue. In addition, we recommend that other avenues be explored along with open access. This may include making more and better use of non-physician clinicians, as well as improving and better targeting demand management efforts.

Good policy requires good policy analysis, and good policy analysis requires good data. We recommend that the Board and BUMED stress the importance of accurately and fully completing ADS forms so that good data will be available for policy analysis purposes. We also recommend that clinicians be educated regarding the uses and usefulness of these data and the consequences of basing policy decisions on inaccurate or incomplete data. Several PCPs have informally expressed their opinion to us that they don't see any return from their efforts to fill out ADS forms and that they don't see any benefit for them to do so.

We recommend that the Board and BUMED use ADS data with PCPs in ways that they find of use to them in their practices. Feeding back a comparison of their practice patterns compared with those of a peer group of clinicians and inviting groups of providers to discuss and come to terms with differences would help convince PCPs of the usefulness and importance of ADS data, as well as likely aid Navy Medicine's optimization efforts. The adoption of RVUs and RAVs as metrics used in evaluating the performance of clinicians and commands can also help achieve this purpose. As PCPs, clinic managers, and commanding officers realize that they are being evaluated on such performance, and that incomplete or inaccurate ADS data can

negatively affect their perforance ratings, they will likely improve the quality of the data.

To the extent that good data are available, we recommend that they be maximally used to support policy development and evaluate policy outcomes. This includes both developing an ad hoc analysis-on-demand capability either inside or outside BUMED (or both), and conducting the analyses suggested in our preceding discussion of unanswered questions.

An ad hoc analysis on demand capability should be able to focus on specific subpopulations by user demographics, geographic area, provider or facility type, time period, and so on. It should also be able to respond to analysis requests from the Board and throughout BUMED, as well as from regional and facility commands, provider communities, other product line boards, and TRICARE Management Activity/DOD. As a start to developing this capability, we offer our data set (as cleaned, coded, and formatted for this project) and our analytic services toward responding to early requests for information—essentially a "have data set, will travel" approach that fields and processes approved information requests and then prepares short customized reports targeted to the needs of the requestor. We would act under the direction of the Board and BUMED, and in conjunction with similar efforts within BUMED. Eventually, this capability would be transitioned over to BUMED where it would be internally housed and operated.

Appendix A: Evaluation and management (E&M) codes grouped into categories

Visit/encounter category	E&M codes
New patient office visit	99210- 99205
Limited/minor to low intensity	99201-99202
Moderate intensity	99203
Moderate high to high intensity	99204-99205
Established patient office visit	99211-99215
No physician required (procedure)	99211
Minor to low/moderate intensity	99212-99213
Moderate to high intensity	99214-99215
Consultation	99241-99275
Telephone calls by the provider	99371-99373
Preventive medicine visits	99381-99429
All other visits/encounters	99217-99239; 99281-99296; 99301-99362; 99374-99379; 99431-99499

Appendix B: Facility categories for Navy MTFs

DMIS ID	DMIS facility name	Region	State	Facility city name	Parent DMIS
Naval Medical Centers (NMC)					
0029	NMC SAN DIEGO	09	CA	SAN DIEGO	0029
0067	NNMC BETHESDA	01	MD	BETHESDA	0067
0124	NMC PORTSMOUTH	02	VA	PORTSMOUTH	0124
Family Practice Naval Hospitals (FPNHs)					
0024	NCH CAMP PENDLETON	09	CA	CAMP PENDLETON	0024
0038	NCH PENSACOLA	04	FL	PENSACOLA	0038
0039	NCH JACKSONVILLE	03	FL	JACKSONVILLE	0039
0126	NCH BREMERTON	11	WA	BREMERTON	0126
Naval Community Hospitals (NCHs)					
0028	NCH LEMOORE	10	CA	LEMOORE	0028
0030	NCH TWENTYNINE PALMS	09	CA	TWENTYNINE PALMS	0030
0056	NCH GREAT LAKES	05	IL	GREAT LAKES	0056
0091	NCH CAMP LEJEUNE	02	NC	CAMP LEJEUNE	0091
0092	NCH CHERRY POINT	02	NC	CHERRY POINT	0092
0104	NCH BEAUFORT	03	SC	BEAUFORT	0104
0127	NCH OAK HARBOR	11	WA	OAK HARBOR	0127
Other Commands					
0026	NACC PORT HUENEME	09	CA	PORT HUENEME	0026
0035	NAVAMBCARECEN GROTON	01	CT	GROTON	0035
0100	NAVAMBCARECEN NEWPORT	01	RI	NEWPORT	0100

0103	NCH CHARLESTON	03	SC	CHARLESTON	0103
0118	NCH CORPUS CHRISTI	06	TX	CORPUS CHRISTI	0118
0297	NACC NEW ORLEANS	04	LA	NEW ORLEANS	0297
0321	NAVAMBCARECEN PORTSMOUTH NH	01	NH	PORTSMOUTH	0321
0337	NACC KINGS BAY	03	GA	KINGS BAY	0337
0068	NMCL PATUXENT RIVER	01	MD	PATUXENT RIVER	0068
0280	NMCL PEARL HARBOR	12	HI	PEARL HARBOR	0280
0306	NMCL ANNAPOLIS	01	MD	ANNAPOLIS	0306
0385	NMCL QUANTICO	01	VA	QUANTICO	0385
Branch Clinics					
0382	NBMC DAM NECK	02	VA	VIRGINIA BEACH	0124
0384	NBMA ARLINGTON ANNEX	01	VA	ARLINGTON	0067
1657	BRMCL CAMP DELMAR MCB	09	CA	CAMP PENDLETON	0024
1659	BRMCL SAN ONOFRE MCB	09	CA	CAMP PENDLETON	0024
1662	BRMCL CAMP GEIGER MCB	02	NC	CAMP LEJEUNE	0091
1663	BRMCL CAMP JOHNSON MCB	02	NC	CAMP LEJEUNE	0091
1664	BRMCL COURTHOUSE BAY MCB	02	NC	CAMP LEJEUNE	0091
1670	BRMCL OCS BROWN FIELD	01	VA	QUANTICO	0385
1671	BRMCL THE BASIC SCHOOL	01	VA	QUANTICO	0385
1975	BRMCL CORCEN MCB	09	CA	CAMP PENDLETON	0024
1992	BRMCL BLDG 15 MCB CAMP LEJEUNE	02	NC	CAMP LEJEUNE	0091
1994	BRMCL CORFAC MCB CAMP LEJEUNE	02	NC	CAMP LEJEUNE	0091
1995	BRMCL FRENCH CREEK MCB	02	NC	CAMP LEJEUNE	0091
7278	NBMC COLTS NECK EARLE PIERSIDE	01	NJ	SOUTH COLTS NECK	0067
0107	BMC NSA MEMPHIS	04	TN	MILLINGTON	0038
0208	BRMCL MCB CAMP PENDLETON	09	CA	CAMP PENDLETON	0024
0209	NBMC BARSTOW	09	CA	BARSTOW	0024
0210	BRMCL EDSON RANGE ANNEX	09	CA	CAMP PENDLETON	0024
0212	BRMCL NAVWPNCEN CHINA LAKE	09	CA	CHINA LAKE	0030

0217	BRMCL NAS POINT MUGU	09	CA	POINT MUGU	0026
0230	NBMC MCRD SAN DIEGO	09	CA	SAN DIEGO	0029
0231	NBMC NAS NORTH ISLAND	09	CA	CORONADO	0029
0232	NBMC NAS MIRAMAR	09	CA	SAN DIEGO	0029
0233	NBMC CORONADO	09	CA	CORONADO	0029
0260	BRMCL NAS PENSACOLA	04	FL	PENSACOLA	0038
0261	NBMC MILTON WHITING FIELD	04	FL	MILTON	0038
0262	NAVAL AVIATION TECH - PENSACOLA	04	FL		0038
0265	BRMCL NAVCOASTSYSC PANAMA CITY	04	FL	PANAMA CITY	0038
0266	BRMCL NAS JACKSONVILLE	03	FL	JACKSONVILLE	0039
0269	NBMC YUMA	09	AZ	YUMA	0024
0275	NBMC ALBANY	03	GA	ALBANY	0039
0276	NBMC ATHENS	03	GA	ATHENS	0039
0277	NBMC MARIETTA	03	GA	ATLANTA	0039
0281	BRMCL NAS BARBERS PT	12	HI	BARBERS POINT	0280
0284	BRMAX NAVCAMS EASTPAC	12	HI	WAHIAWA	0280
0285	BRMCL MCAS KANEOHE BAY	12	HI	KANEOHE	0280
0299	BRMCL NAS BRUNSWICK	01	ME	BRUNSWICK	0321
0301	NBMC INDIAN HEAD	01	MD	INDIAN HEAD	0067
0316	NBMC GULFPORT	04	MS	GULFPORT	0038
0317	NBMC MERIDIAN	04	MS	MERIDIAN	0038
0319	NBMC FALLON	07	NV	FALLON	0028
0322	NBMC COLTS NECK EARLE - MAIN	01	NJ	COLTS NECK	0067
0328	NBMC BALLSTON SPA	01	NY	BALLSTON SPA	0035
0333	BRMCL MCAS NEW RIVER	02	NC	CAMP LEJEUNE	0091
0347	NBMC WILLOW GROVE	01	PA	HATBORO	0067
0348	NBMC MECHANICSBURG	01	PA	MECHANICSBURG	0067
0358	BRMCL MCRD PARRIS ISLAND	03	SC	PARRIS ISLAND	0104
0360	BRMCL MCAS BEAUFORT	03	SC	BEAUFORT	0104
0369	NBMC KINGSVILLE	06	TX	KINGSVILLE	0118

0378	NBMC LITTLE CREEK	02	VA	NORFOLK	0124
0380	NBMC NSY NORFOLK	02	VA	PORTSMOUTH	0124
0381	NBMC YORKTOWN	02	VA	YORKTOWN	0124
0386	NBMC DAHLGREN	01	VA	DAHLGREN	0067
0387	NBMC OCEANA	02	VA	VIRGINIA BEACH	0124
0397	NBMC KEYPORT	11	WA	KEYPORT	0126
0398	NBMC PUGET SOUND	11	WA	BREMERTON	0126
0401	NBMC LAKEHURST	01	NJ	LAKEHURST	0067
0405	NBMC MAYPORT	03	FL	MAYPORT	0039
0407	NBMC NTC SAN DIEGO	09	CA	SAN DIEGO	0029
0414	NBMA NALF SAN CLEMENTE	09	CA	SAN DIEGO	0029
0436	BRMCL NAS BELLE CHASE	04	LA	NEW ORLEANS	0297
0508	NBMC NAVSTA SEWELLS	02	VA	NORFOLK	0124
0511	BRMCL WPNSTA CHARLESTON	03	SC	GOOSE CREEK	0103
0513	BRMCL NAVTECHTRACEN PENSACOLA	04	FL	PENSACOLA	0038
0515	NBMA NAVSEC WASHINGTON	01	DC	WASHINGTON DC	0067
0517	NBMC KEY WEST	03	FL	KEY WEST	0039
0518	BRMAX NCTC GREAT LAKES	05	IL	GREAT LAKES	0056
0519	NBMC CHESAPEAKE	02	VA	CHESAPEAKE	0124
0522	NBMC ANDREWS AFB	01	DC	ANDREWS- AFB	0067
0528	BRMCL NSY PEARL HARBOR	12	HI	PEARL HARBOR	0280
0654	NBMA PASCAGOULA	04	MS	PASCAGOULA	0038
0656	NCHBC INGLESIDE	06	TX	INGLESIDE	0118
0701	NBMC NAVSTA SAN DIEGO	09	CA	SAN DIEGO	0029
0703	NBMC WASHINGTON NAVY YARD	01	DC	WASHINGTON DC	0067
1656	BRMCL SUBASE BANGOR	11	WA	SILVERDALE	0126
1660	BRMCL NCTC INPR GREAT LAKES	05	IL	GREAT LAKES	0056
1959	BRMCL NTC GREAT LAKES	05	IL	GREAT LAKES	0056
1987	BRMCL MCB CAMP H.M. SMITH	12	HI	CAMP H.M. SMITH	0280
1990	BRMCL NAVSUPPACT EAST BANK	04	LA	NEW ORLEANS	0297

7138	NMCL EVERETT	11	WA	EVERETT	0126
6205	PRIMARY CARE NAVCARE CAMP LEJEUNE	02	NC	CAMP LEJEUNE	0091
6207	TRICARE OUTPATIENT SAN DIEGO 1	09	CA	SAN DIEGO	0029
6214	TRICARE OUTPATIENT CL VA BEACH	02	VA	VIRGINIA BEACH	0124
6215	TRICARE OUTPATIENT SAN DIEGO 2	09	CA	SAN DIEGO	0029
6216	NAVY NAVCARE CLINIC VISTA	09	CA	CAMP PENDLETON	0024
6221	TRICARE OUTPATIENT CHESAPEAKE	02	VA	CHESAPEAKE	0124
8007	CAMP LEJEUNE - MCS-PCM	02	NC	CAMP LEJEUNE	0091
OCONUS Commands					
0615	NCH GUANTANAMO BAY	15	CU	GUANTANAMO BAY	0615
0616	NCH ROOSEVELT ROADS-CEIBA	15	PR	CEIBA	0616
0617	NCH NAPLES	13	IT	NAPLES	0617
0618	NCH ROTA	13	SP	ROTA	0618
0620	NCH GUAM-AGANA	14	GU	AGANA	0620
0621	NCH OKINAWA	14	JA	OKINAWA	0621
0622	NCH YOKOSUKA	14	JA	YOKOSUKA	0622
0623	NCH KEFLAVIK	13	IC	KEFLAVIK	0623
0624	NCH SIGONELLA	13	IT	NAS SIGONELLA	0624
8931	NMCL LONDON	13	UK	LONDON	8931
OCONUS Branches					
0625	BMC IWAKUNI	14	JA	IWAKUNI	0622
0852	BRMCL COMFLEACT SASEBO	14	JA	SASEBO	0622
0853	BRMCL NAF ATSUGI	14	JA	ATSUGI	0622
0855	BRMCL NAVSUPPO LA MADDALENA	13	IT	LA MADDALENA	0617
0861	BRMCL MCAS FUTENMA	14	JA	FUTENMA	0621
0862	BRMCL EVANS/CAMP FOSTER	14	JA	CAMP FOSTER	0621
0871	BRMCL NAVSTA GUAM	14	GU	NAVSTA	0620
0872	BRMCL NAVCAMS WESTPAC GUAM	14	GU	NAVCAMS WEST-PAC	0620

0874	BRMCL GAETA	13	IT	GAETA	0617
1153	BRMCL NAV CAPODICHINO	13	IT	PINETAMARE	0617
1179	BRMCL NAVWPNSFAC ST. MAWGAN	13	UK	RAF ST MAWGAN NEWQUAY	8931
1269	CAMP KINSER - OKINAWA	14	JA	OKINAWA	0621
7032	BMCL CAMP BUSH/COURTNEY	14	JA	CAMP COURTNEY	0621
7033	NMCL CAMP HANSEN-OKINAWA	14	JA	CAMP HANSEN	0621
7107	BRMCL CAMP SCHWAB-OKINAWA	14	JA	OKINAWA	0621
7112	BRMCL MCAS TORII STATION	14	JA	TORII STATION	0621
7288	BMA HARIO SASEBO JP	14	JA	SASEBO	0622
8935	BRCL NAF KADENA	14	JA	KADENA	0621

Appendix C: List of selected APGs "shared" by NMPC and non-PC

APG No.	APG name
006	Simple debridement and destruction
373	Cardiogram
464	Fracture, dislocation and sprain
501	Complex infectious disease
503	Infectious diseases of the genital organs
512	Headache
533	Conjunctivitis and other simple external eye inflammation
545	Other simple ear, nose, throat and mouth diseases
574	Chest pain w/o cardiac enzymes to rule out MI
591	Noninfectious gastroenteritis
592	Ulcers, gastritis and esophagitis
595	Hemorrhoids and other anal-rectal diseases
597	Other simple gastrointestinal diseases
621	Back disorders
623	Simple musculoskeletal diseases except back disorders
631	Disease of nails
633	Cellulitis, impetigo and lymphangitis
635	Skin diseases
651	Diabetes
653	Simple endocrine, nutritional & metabolic disease except diabetes
681	Gynecologic diseases
703	Contraception and procreative management
704	Aftercare

Appendix D: Mean RVUs per visit and non-PC/PC ratios of mean RVUs by type of E&M office visit and type of care for selected APGs "shared" by PC and non-PC

APG	Type of E&M OV	Type of care	Mean RVUs per visit	N	Non-PC/PC ratio of mean RVUs
Headache	New Pt OV	Non-PC	0.867	1,546	0.886
	Lo	PC	0.979	4,562	
		Total	0.951	6,108	
	New Pt OV	Non-PC	1.994	652	1.081
	Mod	PC	1.844	1,592	
		Total	1.887	2,244	
	New Pt OV	Non-PC	3.338	1,482	1.121
	Hi	PC	2.977	1,499	
		Total	3.156	2,981	
	Est Pt OV	Non-PC	0.402	366	1.404
	No Phy Req'd	PC	0.287	623	
		Total	0.329	989	
	Est Pt OV	Non-PC	0.940	2,748	1.112
	Lo	PC	0.846	14,854	
		Total	0.860	17,602	
	Est Pt OV	Non-PC	1.908	2,278	1.174
	Hi	PC	1.625	5,941	
		Total	1.703	8,219	
	Total	Non-PC	1.616	9,072	1.372
		PC	1.178	29,071	
		Total	1.283	38,143	
Other simple ENT & mouth diseases	New Pt OV	Non-PC	1.170	4,442	1.222
	Lo	PC	0.957	9,589	
		Total	1.025	14,031	

	New Pt OV	Non-PC	1.980	2,430	1.063
	Mod	PC	1.863	2,462	
		Total	1.921	4,892	
	New Pt OV	Non-PC	3.087	2,558	1.043
	Hi	PC	2.960	1,931	
		Total	3.032	4,489	
	Est Pt OV	Non-PC	0.631	10,127	2.011
	No Phy Req'd	PC	0.314	1,446	
		Total	0.592	11,573	
	Est Pt OV	Non-PC	0.956	17,099	1.124
	Lo	PC	0.851	36,268	
		Total	0.885	53,367	
	Est Pt OV	Non-PC	1.758	11,324	1.095
	Hi	PC	1.605	7,765	
		Total	1.696	19,089	
	Total	Non-PC	1.262	47,980	1.186
		PC	1.064	59,461	
		Total	1.152	107,441	
Noninfectious gastroenteritis	New Pt OV	Non-PC	1.031	981	1.049
	Lo	PC	0.983	4,054	
		Total	0.992	5,035	
	New Pt OV	Non-PC	2.037	436	1.088
	Mod	PC	1.872	1,294	
		Total	1.914	1,730	
	New Pt OV	Non-PC	2.885	820	0.952
	Hi	PC	3.031	1,327	
		Total	2.975	2,147	
	Est Pt OV	Non-PC	1.022	183	3.329
	No Phy Req'd	PC	0.307	520	
		Total	0.493	703	
	Est Pt OV	Non-PC	0.856	607	1.021
	Lo	PC	0.838	10,828	
		Total	0.839	11,435	
	Est Pt OV	Non-PC	1.643	499	0.987
	Hi	PC	1.665	2,894	
		Total	1.661	3,393	
	Total	Non-PC	1.642	3,526	1.403
		PC	1.170	20,917	
		Total	1.239	24,443	

Ulcers, gastritis, & esophagitis	New Pt OV	Non-PC	0.984	621	1.005
	Lo	PC	0.979	1,983	
		Total	0.980	2,604	
	New Pt OV	Non-PC	1.854	598	0.998
	Mod	PC	1.857	790	
		Total	1.856	1,388	
	New Pt OV	Non-PC	3.012	734	1.011
	Hi	PC	2.979	782	
		Total	2.995	1,516	
	Est Pt OV	Non-PC	0.389	288	1.263
	No Phy Req'd	PC	0.308	327	
		Total	0.346	615	
	Est Pt OV	Non-PC	0.844	2,422	1.010
	Lo	PC	0.836	9,306	
		Total	0.838	11,728	
	Est Pt OV	Non-PC	1.756	2,151	1.088
	Hi	PC	1.613	3,310	
		Total	1.670	5,461	
	Total	Non-PC	1.448	6,814	1.260
		PC	1.149	16,498	
		Total	1.236	23,312	
Other simple GI diseases	New Pt OV	Non-PC	0.932	2,160	0.939
	Lo	PC	0.992	7,579	
		Total	0.979	9,739	
	New Pt OV	Non-PC	1.844	1,984	0.991
	Mod	PC	1.861	2,214	
		Total	1.853	4,198	
	New Pt OV	Non-PC	3.010	2,007	1.006
	Hi	PC	2.991	2,254	
		Total	3.000	4,261	
	Est Pt OV	Non-PC	0.427	1,558	1.488
	No Phy Req'd	PC	0.287	975	
		Total	0.373	2,533	
	Est Pt OV	Non-PC	0.835	5,976	0.996
	Lo	PC	0.838	27,247	
		Total	0.837	33,223	
	Est Pt OV	Non-PC	1.769	5,856	1.087
	Hi	PC	1.628	10,265	
		Total	1.679	16,121	
	Total	Non-PC	1.419	19,541	1.232

		PC	1.152	50,534	
		Total	1.226	70,075	
Back disorders	New Pt OV	Non-PC	0.965	2,649	0.948
	Lo	PC	1.019	6,321	
		Total	1.003	8,970	
	New Pt OV	Non-PC	1.828	2,126	0.990
	Mod	PC	1.846	2,428	
		Total	1.838	4,554	
	New Pt OV	Non-PC	2.904	3,099	0.970
	Hi	PC	2.994	2,065	
		Total	2.940	5,164	
	Est Pt OV	Non-PC	0.379	1,953	1.258
	No Phy Req'd	PC	0.302	970	
		Total	0.354	2,923	
	Est Pt OV	Non-PC	0.807	9,493	0.964
	Lo	PC	0.837	21,267	
		Total	0.827	30,760	
	Est Pt OV	Non-PC	1.706	7,128	1.043
	Hi	PC	1.635	6,952	
		Total	1.671	14,080	
	Total	Non-PC	1.361	26,448	1.170
		PC	1.164	40,003	
		Total	1.242	66,451	
Simple musculo-skeletal diseases except back disorders	New Pt OV	Non-PC	0.995	14,230	1.091
	Lo	PC	0.911	18,533	
		Total	0.948	32,763	
	New Pt OV	Non-PC	1.850	11,352	1.001
	Mod	PC	1.849	5,085	
		Total	1.850	16,437	
	New Pt OV	Non-PC	2.973	10,943	1.027
	Hi	PC	2.893	4,851	
		Total	2.948	15,794	
	Est Pt OV	Non-PC	0.499	18,581	1.730
	No Phy Req'd	PC	0.288	2,295	
		Total	0.476	20,876	
	Est Pt OV	Non-PC	0.818	51,975	0.983
	Lo	PC	0.832	47,673	
		Total	0.825	99,648	
	Est Pt OV	Non-PC	1.653	33,327	1.016

	Hi	PC	1.627	14,334	
		Total	1.645	47,661	
	Total	Non-PC	1.243	140,408	1.109
		PC	1.121	92,771	
		Total	1.194	233,179	
Skin diseases	New Pt OV	Non-PC	0.895	20,227	0.945
	Lo	PC	0.947	22,341	
		Total	0.922	42,568	
	New Pt OV	Non-PC	1.824	6,486	0.987
	Mod	PC	1.847	6,477	
		Total	1.836	12,963	
	New Pt OV	Non-PC	2.818	4,757	0.970
	Hi	PC	2.905	4,910	
		Total	2.862	9,667	
	Est Pt OV	Non-PC	0.304	3,241	1.097
	No Phy Req'd	PC	0.277	3,064	
		Total	0.291	6,305	
	Est Pt OV	Non-PC	0.813	28,265	0.995
	Lo	PC	0.817	73,760	
		Total	0.816	102,025	
	Est Pt OV	Non-PC	1.607	10,807	1.025
	Hi	PC	1.568	13,821	
		Total	1.585	24,628	
	Total	Non-PC	1.148	73,783	1.096
		PC	1.047	124,373	
		Total	1.084	198,156	
Diabetes	New Pt OV	Non-PC	0.904	671	0.901
	Lo	PC	1.003	1,259	
		Total	0.968	1,930	
	New Pt OV	Non-PC	1.954	442	1.069
	Mod	PC	1.829	529	
		Total	1.886	971	
	New Pt OV	Non-PC	3.083	1,391	1.017
	Hi	PC	3.031	955	
		Total	3.062	2,346	
	Est Pt OV	Non-PC	0.274	4,423	0.997
	No Phy Req'd	PC	0.275	601	
		Total	0.274	5,024	
	Est Pt OV	Non-PC	0.865	3,488	1.039

	Lo	PC	0.832	14,215	
		Total	0.838	17,703	
	Est Pt OV	Non-PC	1.901	6,217	1.168
	Hi	PC	1.628	10,833	
		Total	1.727	17,050	
	Total	Non-PC	1.311	16,632	1.071
		PC	1.224	28,392	
		Total	1.256	45,024	
Simple endocrine, nutritional, & metabolic disease except diabetes	New Pt OV	Non-PC	0.801	2,792	0.803
	Lo	PC	0.998	2,627	
		Total	0.897	5,419	
	New Pt OV	Non-PC	1.834	1,418	1.008
	Mod	PC	1.820	1,165	
		Total	1.828	2,583	
	New Pt OV	Non-PC	3.011	3,576	1.012
	Hi	PC	2.975	1,286	
		Total	3.002	4,862	
	Est Pt OV	Non-PC	0.300	7,131	1.023
	No Phy Req'd	PC	0.293	1,552	
		Total	0.298	8,683	
	Est Pt OV	Non-PC	0.854	5,301	1.048
	Lo	PC	0.815	22,217	
		Total	0.823	27,518	
	Est Pt OV	Non-PC	1.688	6,610	1.055
	Hi	PC	1.600	9,135	
		Total	1.637	15,745	
	Total	Non-PC	1.246	26,828	1.133
		PC	1.099	37,982	
		Total	1.160	64,810	
Gynecologic diseases	New Pt OV	Non-PC	1.027	3,560	0.966
	Lo	PC	1.063	11,470	
		Total	1.055	15,030	
	New Pt OV	Non-PC	1.888	5,949	1.035
	Mod	PC	1.825	4,130	
		Total	1.862	10,079	
	New Pt OV	Non-PC	2.856	14,543	0.935

	Hi	PC	3.053	3,010	
		Total	2.889	17,553	
	Est Pt OV	Non-PC	0.329	5,363	1.135
	No Phy Req'd	PC	0.290	1,715	
		Total	0.319	7,078	
	Est Pt OV	Non-PC	0.888	18,173	1.030
	Lo	PC	0.863	31,944	
		Total	0.872	50,117	
	Est Pt OV	Non-PC	1.892	22,115	1.131
	Hi	PC	1.673	23,983	
		Total	1.778	46,098	
	Total	Non-PC	1.666	69,703	1.309
		PC	1.273	76,252	
		Total	1.461	145,955	
Contraception & procreative management	New Pt OV	Non-PC	0.949	1,073	1.005
	Lo	PC	0.944	3,044	
		Total	0.946	4,117	
	New Pt OV	Non-PC	1.879	632	1.027
	Mod	PC	1.830	990	
		Total	1.849	1,622	
	New Pt OV	Non-PC	3.166	1,457	1.015
	Hi	PC	3.120	648	
		Total	3.152	2,105	
	Est Pt OV	Non-PC	0.370	5,078	1.110
	No Phy Req'd	PC	0.334	1,853	
		Total	0.361	6,931	
	Est Pt OV	Non-PC	0.911	3,516	1.089
	Lo	PC	0.836	8,509	
		Total	0.858	12,025	
	Est Pt OV	Non-PC	1.899	2,415	1.137
	Hi	PC	1.671	2,118	
		Total	1.793	4,533	
	Total	Non-PC	1.164	14,171	1.111
		PC	1.048	17,162	
		Total	1.100	31,333	

Appendix E: List of "top 30" NMPC APGs in descending order of percentage of visits

APG No.	Percentage of NMPC visits	APG name
542	14.4	Influenza, URI, and ENT infections
701	12.5	Adult medical exams
705	6.3	Nonspecific signs and symptoms and other contacts with health services
702	5.7	Well-child care
635	5.7	Skin diseases
623	4.3	Simple musculoskeletal diseases except back disorders
681	3.8	Gynecologic diseases
464	3.2	Fracture, dislocation, and sprain
572	3.1	Hypertension
502	3.1	Miscellaneous infectious diseases
561	3.0	Emphysema, chronic bronchitis, and asthma
704	2.9	Aftercare
545	2.7	Other simple ear, nose, throat and mouth diseases
597	2.3	Other simple gastrointestinal diseases
621	1.8	Back disorders
653	1.8	Simple endocrine, nutritional & metabolic disease except diabetes
512	1.3	Headache
651	1.3	Diabetes
503	1.3	Infectious diseases of the genital organs
491	1.2	Routine prenatal care
661	1.2	Urinary tract infection
533	1.1	Conjunctivitis and other simple external eye inflammation
591	1.0	Noninfectious gastroenteritis
462	0.8	Minor skin and soft tissue injuries except burns
703	0.8	Contraception and procreative management
237	0.8	Simple audiometry
633	0.8	Cellulitis, impetigo and lymphangitis
592	0.8	Ulcers, gastritis, and esophagitis
562	0.6	Pneumonia
006	0.5	Simple debridement and destruction

Acronyms and Abbreviations

ADS	Ambulatory Data System
AFMOA	Air Force Medical Operations Agency
AMA	American Medical Association
APG	Ambulatory Patient Group
ARS	All Region Server
BUMED	Bureau of Medicine and Surgery; Navy Medicine
CONUS	Continental U.S.
CPT; CPT4	Common Procedural Terminology (fourth edition)
CSS	Customer Satisfaction Survey
DEERS	Defense Enrollment Eligibility Reporting System
DHP	Defense Health Program
DMIS	Defense Medical Information System
DOD	Department of Defense
DRG	Diagnosis Related Group
E&M	Evaluation and Management (a subsection of CPT codes)
EBC	Enrollment Based Capitation
ENT	Ear, Nose, and Throat
FMP	Family Member Prefix
FP	Family Practice; Family Physician; Family Practitioner
FPNH	Family Practice Naval Hospital
FY	Fiscal Year
GMO	General Medical Officer
HCFA	Health Care Financing Administration (now renamed the Centers for Medicare and Medicaid Services, or CMS)
HCPCS	HCFA Common Procedure Coding System
HCSDB	Health Care Survey of DOD Beneficiaries
HM	Hospital Corpsman

ICD9	International Classification of Diseases, Ninth Revision
ICD9-CM	International Classification of Diseases, Ninth Revision, Clinical Modifications
IDC	Independent Duty Corpsman
IM	Internal Medicine physician
IOM	Institute of Medicine
MACD	Medical (or Military) Acute Care Department
MEPRS	Medical Expense and Performance Reporting System for Fixed Military Medical and Dental Treatment Facilities
MHS	Military Health System
MTF	Military Treatment Facility
NCH	Naval Community Hospital
NMC	Naval Medical Center
NMIMC	Naval Medical Information Management Center
NMPC	Navy Medicine Primary Care
NP	Nurse Practitioner
OCONUS	Outside the Continental U.S.
OR	Odds Ratio
OV	Office Visit
PA	Physician Assistant
PC	Primary Care
PCM	Primary Care Manager
PCMBN	Primary Care Manager By Name
PCP	Primary Care Provider
PCPL	Primary Care Product Line
PCPL Adv Bd	Primary Care Product Line Advisory Board
PHI	Population Health Initiative
RAV	Resource (RVU) Adjusted Visits
RN	Registered Nurse
RSG	Regional Service Group
RVU	Relative Value Unit
SADR	Standard Ambulatory Data Record
SSN	Social Security Number

Telcon	Telephone consultation
TPC	TRICARE Prime Clinic
Tx	Treatment

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