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Workload Trend Analysis for the Military Graduate Medical Education Program in San Antonio

Chester L. Martin, Capt, USAF, MSC

A graduate management project submitted in partial fulfillment for the requirements of the Army-Baylor program

U.S. Army-Baylor University Graduate Program in Health Care Administration

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Acknowledgments

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Disclosure

The assumptions, opinions, or assertions expressed in this publication are the private view of the author and do not reflect the official policy or position of the Army-Baylor MHA Program, Department of the Air Force, Department of Defense, or the U.S. Government

Abstract

The purpose of this research project was to assess key workload, census, and case mix trends in physician residency programs at the two military medical centers in San Antonio, Texas. The overarching hypothesis for this study was that the case mix is trending below the levels required to sustain the military GME programs in San Antonio. Workload trends were compared with baseline requirements established by the program directors and by ACGME for the residents in each individual GME program. Key GME workload indicators are generally trending downward, and the internal medicine and anesthesiology GME programs are heavily dependent on care provided for the population age 65 and over. In the indicators under study, the anesthesiology, obstetrics and gynecology, and pediatrics programs all maintained an average below that required to maintain the current number of residents in their respective programs.

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Workload Trend Analysis for the Military GME Program in San Antonio

Graduate medical education (GME) is the second phase of the medical education process in which physicians learn the practical application of medical practice in a variety of specialties and subspecialties. Medical graduates require a residency for specialized board certification and licensure. By necessity, GME is conducted in patient care settings, and managing a multi-specialty GME program can prove challenging given the demands and constraints inherent to large healthcare facilities. The primary difficulties in maintaining an effective GME program are ensuring an optimal learning environment and the balancing of education and patient care activities (Association of American Medical Colleges, 2003).

The Air Force Medical Service has determined that training specialist providers is a key part of its mission in that doing so creates an operationally ready force. By far, the Air Force's largest GME training facility is the 59th Medical Wing (Wilford Hall Medical Center), Lackland Air Force Base, San Antonio, Texas. Wilford Hall Medical Center (WHMC) hosts over 30 specialty and subspecialty GME programs and is the largest of the three major teaching hospitals in the U.S. Air Force. The Wilford Hall GME program is also one of three major residency sites in the San Antonio area and one of two local military teaching hospitals. The 59th Medical Wing, along with Brooke Army Medical Center (BAMC), and in partnership with the University of Texas at San Antonio (UTSA) make up the San Antonio Uniformed Services Health Education Consortium (SAUSHEC). This partnership is largely the result of a strategy set forth in the late 1990s by the Office of the Secretary of Defense for Health Affairs (Burkhalter, 1996) in which duplicate GME programs were consolidated in an effort to shrink the size and overall

cost of the military's GME programs. Although these initiatives achieved consolidation and greater efficiencies, military GME in San Antonio has continued to grow in size, scope, and cost.

Each of the residency programs at the three San Antonio SAUHEC sites is fully accredited by the Accrediting Council for Graduate Medical Education (ACGME). According to their website, ACGME is a private professional organization responsible for the accreditation of nearly 7800 medical residency education programs (ACGME, 2004). The ACGME organizes Residency Requirement Committees (RRC), made up of subject matter experts, that publish formal requirements for GME programs across the medical spectrum. The ACGME periodically inspects GME programs through peer-review in order to ensure compliance with RRC recommendations and to monitor overall program efficacy.

While RRCs publish their recommendations in a standardized format, the level of specificity for workload, staffing, and facility requirements varies widely between GME programs. While some programs require specific staff to resident ratios and specific facility requirements, most RRCs simply require "adequate" supervision for residents and an appropriate setting to attain clinical proficiency. Similarly, while some programs have very specific case-mix requirements addressed in the RRC, others have requirements that are more vague, simply stating that residents should attain "competency" in a particular procedure. Further review reveals that those GME programs with vague workload, acuity or case-mix requirements from the RRC often have informal but equally vital standards based on past certification board experience.

While some civilian residency programs utilize more subjective global rating forms to document resident competency, recent studies have questioned the ability of global rating forms

to address the specific competencies outlined by AGCME (Silber et al, 2004). Therefore, in order to facilitate higher pass-rates on certification boards, most of the SAUSHEC programs have adopted more objective internal matrices to monitor each resident's individual clinical experience. This ensures residents document an appropriate breadth and depth of clinical experience in a standardized format, and it facilitates improved preparedness for certification boards. These matrices may also serve as the basis for determining the number of residents the existing casemix can sustain. Further, the utilization of established residency training program assessment tools at other facilities has been shown to meet the latest ACGME guidelines (Brassel, Bragg, Simpson, & Weigelt, 2004).

Conditions that Prompted the Study

This study was initiated at the request of the Dean of the San Antonio Uniformed Services Health Education Consortium, Dr. John Roscelli, Colonel, U.S. Army. Colonel Roscelli described a general feeling among the program directors of several key GME programs that they were gradually losing workload, acuity and specific clinical procedures that were vital for achieving resident competency. Unfortunately, the problem was completely anecdotal in nature, and Colonel Roscelli suggested this study to quantitatively measure workload trends in order to better manage and advocate for his various GME programs.

The possibility of a significant decrease in the portion of GME workload provided for patients age 65 and over was the other major factor that prompted this study. TRICARE Plus is a program in which beneficiaries who are age 65 and over, but are still eligible for treatment in military facilities, can enroll in the TRICARE program for primary care services. Effective April 1, 2004, enrollment in the TRICARE Plus program at WHMC was discontinued. The letter

informing beneficiaries was sent in May 2004. The TRICARE Plus program was capped at BAMC in 2001. The capping of the TRICARE Plus program at both military medical centers in San Antonio could seriously impact a large portion of the medical procedures and workload that supports the San Antonio military GME programs. Because this hypothetical impact will happen gradually, as existing TRICARE Plus enrollees exit the primary care system by attrition, quantifying the current proportion of GME related workload provided for the population age 65 and over was vital.

Notably, beneficiaries age 65 and over continue to have access to treatment at both BAMC and WHMC under the "TRICARE For Life" program on a space available basis, but this will occur only by direct referral from civilian primary care providers and only when services are actually available. Because any hypothetical loss in the care provided to the population age 65 and over is based on these two conditional factors, both of which are beyond the scope of this study, only the actual proportion of care currently provided and the potential impact of the loss of that care will be reported and discussed in this report. Measuring the relative proportion of the existing casemix by age group will allow the GME programs to predict the impact of potential losses of workload within age groups.

Purpose

The purpose of this research project is to assess key workload, census, and case mix trends in physician residency programs at the two military medical centers in San Antonio, Texas. The trends will be compared with baseline requirements for the number of residents in each individual GME program.

Hypothesis

The overarching hypothesis for this study is that the case mix is trending below the levels required to sustain the military GME programs in San Antonio. The hypotheses for causation varies among the residency programs being reviewed. For internal medicine and anesthesiology, the hypothesis is that decline in eligibility for beneficiaries age 65 and over is or will be detrimental to the GME case mix. For Pediatrics and Obstetrics/Gynecology, the population age 65 and over has minimal impact, and other factors will be pursued.

Methodology

The methodology for this research project will vary among the GME programs reviewed based on the specificity of the ACGME RRC standards and the type of metric being measured. Some programs will require a trending of specific procedures, and others rely on admissions and census data. Therefore, each of the GME programs included in this study, along with many of the individual procedures, will have individualized methodologies incorporated into their corresponding sections and subsections of this report. All variations in methodology and the purpose for the variation will be explained as appropriate. The overarching methodology for project selection, metric selection, and data collection is as follows.

With the guidance of Colonel Roscelli, the subject matter expert for the overall military GME mission in San Antonio, seven GME programs were selected for potential study. The residency programs suggested for study were anesthesiology, clinical pathology, internal medicine, obstetrics and gynecology, pediatrics, surgery, and vascular interventional radiology. These GME programs were selected based on their being inherently sensitive to variations in case mix or workload. Of the seven programs selected, clinical pathology was eliminated from

the study due to insufficient coding data availability, and surgery and vascular interventional radiology were eliminated due to lack of participation by their respective program directors.

A meeting with the director of each of the four remaining GME programs was conducted, and, as the subject matter experts for their individual programs, the directors identified vulnerable clinical procedures or workload indicators for their residents. These procedures and indicators were selected based on specific ACGME accreditation requirements, certification board trends, or internal resident competency matrices. Further, the program directors were asked to assist in establishing a baseline for the total annual quantity of each procedure or workload indicator required to support the current number of residents in their respective GME programs. Finally, the program directors were asked to provide an anecdotal analysis for the trend of each indicator and a hypothesis for the possible cause of the current trend. These hypotheses were used to guide the specific methodology for each of the four GME programs under study. The specific methodology for individual GME programs will be discussed in greater detail in their subsequent sections of this report.

Although this report pertains to all military GME in San Antonio, and the data included in this analysis will come from both Army and Air Force medical centers, the bulk of the narrative will be presented from the Air Force perspective. The standards and matrices in place at WHMC will be used to analyze the data for BAMC in order to ensure consistency in reporting and the reliability of the results. This assumption is also appropriate because the Air Force standards are based on established guidelines, and the majority of the GME programs under study are truly joint residencies between the two facilities.

Data collection for this project was performed through the Military Health System (MHS) Management Analysis and Reporting Tool (M2). M2 is a data mart that draws data from the Medical Data Repository (MDR), which accumulates military healthcare data from a variety of sources. The M2 system was selected because the data for the two facilities under study (WHMC and BAMC) had to come from the same source in order to maximize the validity of the results. Inpatient and outpatient medical coding was identified as the most viable source of data for this study, because coding is the only mechanism by which specific medical procedures are tracked in the same manner regardless of the military treatment facility. Because many of the procedures under review are performed on both an outpatient and an inpatient basis, both Current Procedural Terminology (CPT) codes and International Classification of Diseases, Ninth Revision (ICD-9) codes were queried, and the results were combined. Other diagnoses and procedures were assessed using DRG coding data and admissions data when appropriate. The specific data collection methodology for each medical procedure or workload indicator will be outlined in their respective subsections of this report.

Applicable procedures were trended over a five-year period, from fiscal year 2000 through fiscal year 2004, in order to capture a the greatest possible sample size given data availability and to account for changes resulting from deployments due to the onset of the Global War on Terror. The decision to include results from both WHMC and BAMC was made because of the joint nature of the military GME programs in San Antonio. Any meaningful study of the GME program at one facility is meaningless absent the data from the sister medical center. Demographic data were selected for inclusion in the dataset for this study and will be utilized where applicable depending on the nature of the individual procedure being reviewed. The

proportion of services provided for patients age 65 and over is important for the internal medicine and anesthesiology programs, but would serve no purpose for the obstetrics and gynecology program or the pediatrics program.

Scope

Like the methodology, the scope of this research project will vary among the GME programs based on the nature of the procedures being reviewed. Therefore, the section of this report that corresponds with each GME program will contain a subsection describing the scope of that part of the report. Generally, each residency program will be reviewed for both WHMC and BAMC, with the exception of Obstetrics and Gynecology, which is based solely at WHMC. Each residency program will also have their respective workload indicators trended over a five-year period from the beginning of fiscal year 2000 to the end of fiscal year 2004. The data from the anesthesiology and internal medicine residency programs will be presented with demographic distribution to assess their dependence on the population age 65 and over.

Finally, the confounding effects of the Global War on Terror are not fully measurable. The five-year range of the study was chosen to cover two fiscal years before the war in order to graphically display short-term variation at the onset of the war, but the portion of each trend after fiscal year 2002 attributable to the Global War on Terror cannot be fully accounted for. This confounding factor also dictates any attempts to assign causation for post-2002 trends would be patently flawed and will therefore not be attempted.

Utility of the Results

The data presented in this study is strictly informational in nature, and although discussion and recommendations will be offered with the results, the author makes no pretense of

knowing more about the individual GME programs than their respective program directors. These data reflect general trends and are intended to support the decision making process for the Dean of SAUSHEC and the individual program directors in balancing unpredictable mission requirements against the appropriate number of residents that the current casemix at WHMC and BAMC can sustain.

The results for each of the four residency programs reviewed will be presented separately in such a way that each program director may read the section that applies to their program as a stand-alone report. Each GME program report will contain an individualized methodology, scope, recommendations, and limitations. Further, each standard or procedure will have an individualized methodology and an individualized discussion of its respective results.

Internal Medicine

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Internal Medicine

Internal Medicine is the branch of medicine that deals with diagnosis and treatment of nonsurgical diseases. Doctors of internal medicine focus on adult medicine and have special study and training focusing on the prevention and treatment of adult diseases. Unlike general practice physicians, internists do not generally perform surgeries, deliver babies, or treat children. They train to prevent, diagnose, and treat diseases that affect adults. Internists are sometimes referred to as the "doctor's doctor," because they are often called upon to act as consultants to other physicians to help solve difficult diagnostic problems (American College of Physicians, 2005).

The Internal Medicine residency program is the only program in this study that maintains two distinctly separate elements at WHMC and BAMC and is not a truly joint program. The WHMC Internal Medicine program is fully ACGME accredited and is a three-year program with authorization for 16 residents per year (48 total). The BAMC Internal Medicine program is also fully ACGME accredited and is also a three-year program with authorization for 13 residents per year (39 total). For the purposes of this study, the data for the two programs will be presented separately as well as collectively.

Program Methodology

In accordance with the overarching methodology for this project, the Program Director for the WHMC Internal Medicine GME program was interviewed and asked, as the subject matter expert, to provide a list of diagnoses or procedures for which he was concerned about maintaining adequate workload. The procedures that he listed were abdominal paracentesis, central catheter placement, joint aspiration, lumbar puncture, and thoracentesis (T. Grau,

Personal Communication, January 6, 2005). While most GME programs in SAUSHEC are joint programs, the internal medicine programs at WHMC and BAMC are independent of one another. However, for the purposes of this study and for the sake of internal consistency, the procedures and standards presented by the WHMC program director will be utilized for both GME programs.

The procedure data for internal medicine was collected from the M2 data mart utilizing ICD-9 and CPT codes. Both codes were identified for each of these procedures in order to identify all inpatient and outpatient procedures. The data collection methodology for each specific diagnosis or procedure will be discussed in greater detail in their individual subsections of this report. The procedures were then quantified by year and a threshold of required procedures was established based on internal matrices. Because the WHMC internal medicine program director cited the potential decrease in the eligible population age 65 and over as a hypothetical contributor to the perceived workload shortfall, the contribution of the population age 65 and over to overall workload was identified and quantified for this GME program. The results for each procedure will be discussed in detail below.

Abdominal Paracentesis

Abdominal paracentesis, or abdominal tap, is defined as a surgical puncture of the abdominal cavity with a trocar aspirator, or other instrument, usually to draw off an abnormal effusion for diagnostic or therapeutic purposes. Fluid can accumulate in the abdomen due to injury, infection, cancer, and pancreatic or liver disease. Laboratory tests of the withdrawn fluid help to determine why fluid is present in the abdomen (National Library of Medicine, 2005).

Methodology

Coding data were used to quantify the number of paracentesis procedures performed over the past 5 years in both the inpatient and outpatient setting. The CPT codes 49080 (abdominal paracentesis, initial) and 49081 (abdominal paracentesis, subsequent) were identified as corresponding to the paracentesis procedure. The ICD-9 code 54.91 (percutaneous abdominal drainage) was also identified as corresponding to the paracentesis procedure. Raw disposition data for these three codes were collected from the M2 database along with corresponding demographic data (Appendices E and F). The data were then compiled for fiscal years 2000-2004 in Microsoft Excel for the portions of the population that were under the age of 65 and age 65 and over. The portion of the population age 65 and over was accumulated by sorting the data with a pivot table in Microsoft Excel. Patients age 65 and over were identified by the CHCS age group indicator "H" (age 65 and over) for procedures coded by ICD-9 and by sorting by age for procedures coded by CPT.

The Program Requirements for Residency Education in Internal Medicine published by ACGME (2004) do not specify a mandatory number of abdominal paracentesis procedures for program accreditation, but instead leaves objective measurements of clinical competency to the local program directors. The WHMC internal medicine program director maintains an internal matrix for the number of specific procedures required for each intern to obtain clinical proficiency. This matrix was developed with the intent of meeting the intent of the ACGME RRC standards for internal medicine programs and for the direct purpose of properly preparing residents to excel in certification boards. The internal medicine residency matrix requires that each resident observe three abdominal paracentesis procedures before performing one. Further,

it requires that each resident perform five paracentesis procedures over the course of their residency. The annual requirement for the program was established by multiplying the number of procedures required by each resident by the total number of active residents and dividing the result by the length in years of the program. This methodology results in an average number of procedures required per year to support the internal medicine GME program.

WHMC Results

The number of abdominal paracentesis procedures has remained relatively consistent at WHMC over the past 5 fiscal years with a steady decline totaling 27% between FY 2000 and FY 2003 and an offsetting increase of 31% in FY 2004 (Figure 1). The proportion of procedures among both the over-65 population and the under-65 population have remained consistent.

At any given time, 48 internal medicine residents are underway in the WHMC program, requiring five paracentesis procedures each or a total of 240 over the course of three years, an average of 80 per year. Over the past five fiscal years, WHMC has met that guideline, averaging 90.4 procedures per year (Figure 2). However, the population age 65 and over has accounted for 38% of all abdominal paracentesis procedures between FY 2000 and FY 2004 (Figure 3). If WHMC loses a significant portion of the care provided to the population age 65 and over, the facility will fall well below the number of procedures required to maintain the current number of internal medicine residents. The underlying data for each of the figures below are presented in Appendix A. A sample of the data for this study is presented in Appendix E and Appendix F.

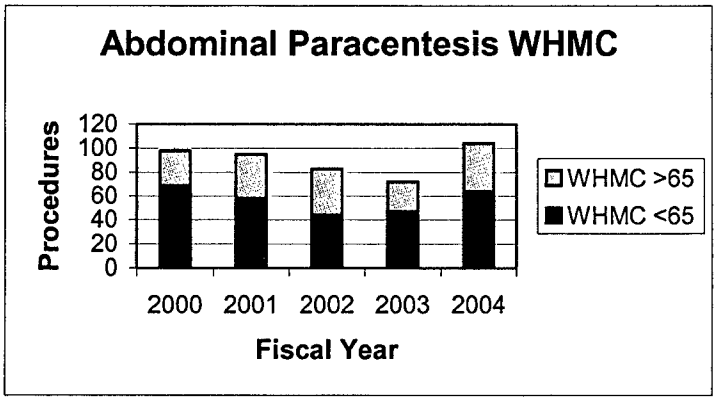

Figure 1. WHMC abdominal paracentesis for FY 00-04 by age group.

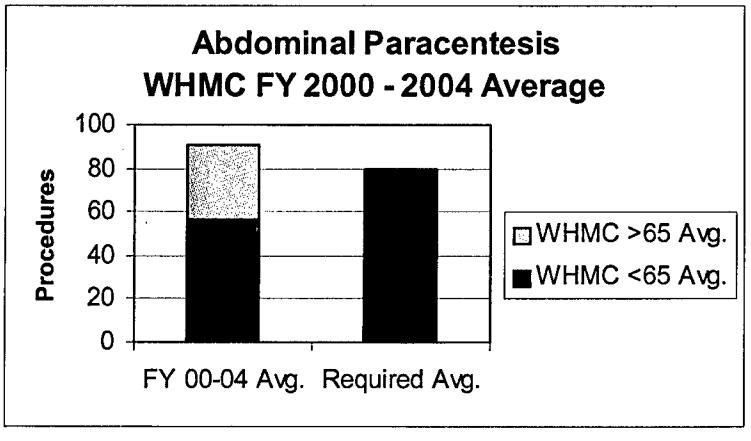

Figure 2. WHMC FY 00-04 average paracentesis procedures by age group compared to required average based on internal matrix.

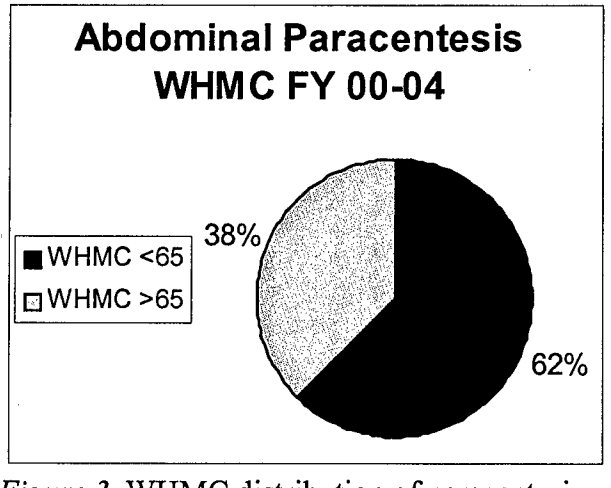

Figure 3. WHMC distribution of paracentesis procedures by age group for FY 00-04.

BAMC Results

The number of abdominal paracentesis procedures has declined at BAMC over the past 5 fiscal years from 106 coded procedures in FY 2000 to 76 procedures in FY 2004, a 29% decrease (Figure 4). While this trend is not consistently negative, it certainly represents cause for concern. The decrease in paracentesis procedures for the population age 65 and over has accounted for the majority of the overall decrease with a 38% decrease over the past 5 fiscal years.

Given the assumption that BAMC residents require the same level of clinical experience as WHMC residents, their 39 residents would require 195 procedures over a three-year period, or an average of 65 per year. Over the past five fiscal years, BAMC has met that guideline with an average of 81.4 paracentesis procedures per year (Figure 5). Because the population age 65 and over has accounted for 47% of all abdominal paracentesis procedures at BAMC between FY 2000 and FY 2004 (Figure 6), the potential loss of procedures among this population is of particular interest. If BAMC loses a significant portion of the care provided to the population age 65 and over, the facility will fall well below the number of procedures required to maintain the current number of residents. The underlying data for each of the figures below are presented in Appendix A. A sample of the raw data for this study is presented in Appendix E and Appendix F.

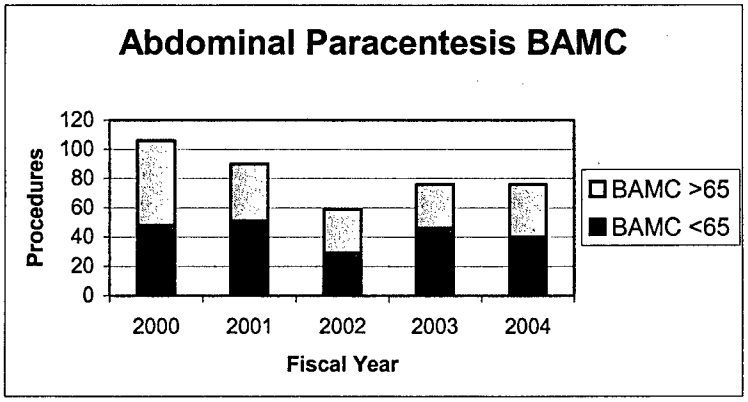

Figure 4. BAMC abdominal paracentesis for FY 00-04 by age group.

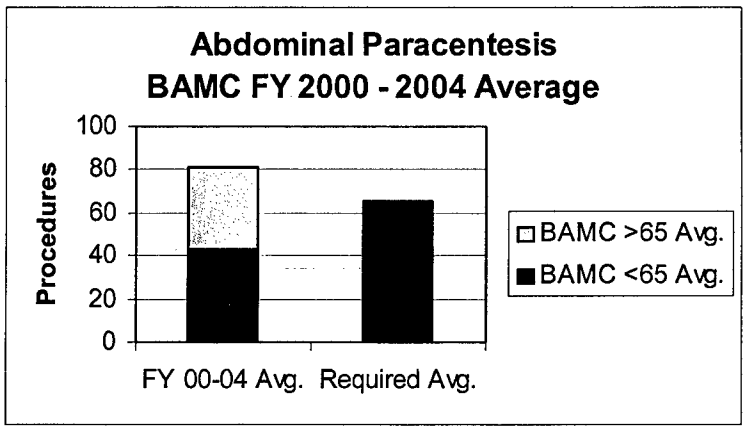

Figure 5. BAMC FY 00-04 average paracentesis procedures by age group compared to required average based on WHMC internal matrix.

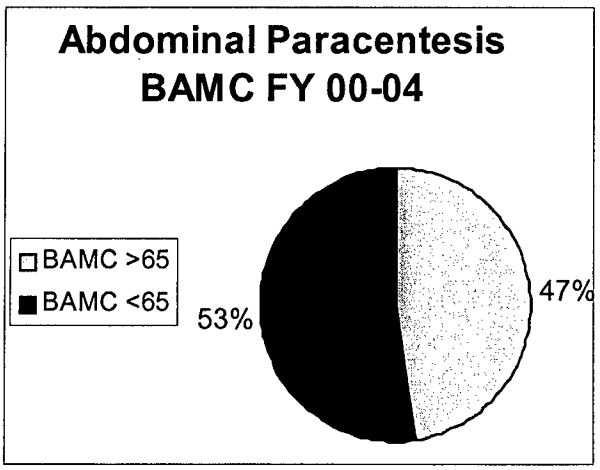

Figure 6. WHMC distribution of paracentesis procedures by age group for FY 00-04.

Combined Results

The overall negative trend in the number of paracentesis procedures supporting the San Antonio military GME programs is largely accounted for by the loss of workload at BAMC (Figure 7). The demographic breakdown for the past five fiscal years (Figure 8) is consistent with the respective sizes of the internal medicine programs at WHMC and BAMC, with the WHMC program being the slightly larger program. The underlying data for each of the figures below are presented in Appendix A. A sample of the raw data for this study is presented in Appendix E and Appendix F.

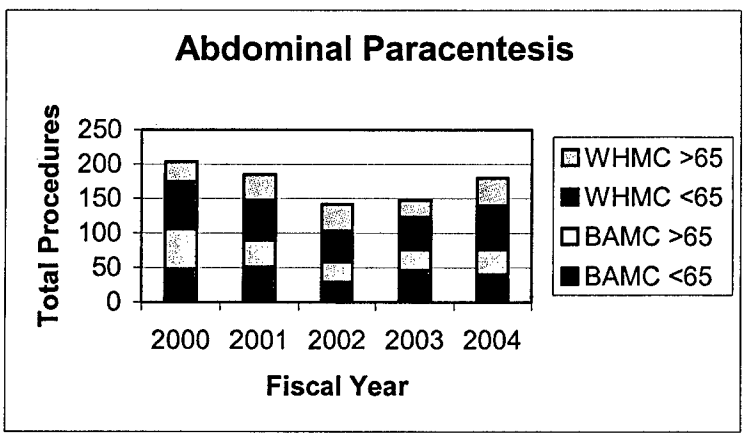

Figure 7. WHMC and BAMC abdominal paracentesis for FY 00-04 by age group.

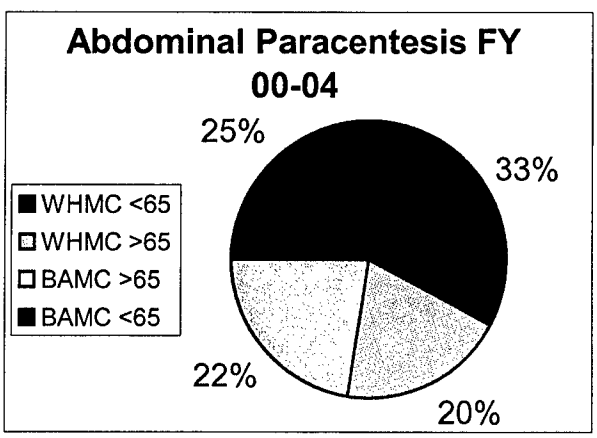

Figure 8. WHMC and BAMC distribution of paracentesis procedures by age group for FY 00-04.

Discussion

A PubMed search of recent literature revealed no articles indicating the abdominal paracentesis procedure has fallen out of favor in medical practice. If anything, the procedure could be increasing in frequency as a 2004 study at the Mayo Clinic reported that the procedure could be safely performed on an outpatient basis by gastrointestinal endoscopy assistants with proper training (Grabau, Crago, Hoff, Simon, Melton, Ott, & Kamath, 2004). The Mayo study was performed with the intention of supporting a reported large volume of paracentesis procedures. The variation and trends reported for this procedure in the San Antonio military medical centers is more likely due to changes in patient access or provider supply than they are to changes in accepted treatment regimen or demand. The trend for the past five fiscal years reveals that both BAMC and WHMC average a sufficient number of paracentesis procedures to support the current number of residents, but 42% of current workload is made up of patients over the age of 65 (Figure 8). Any significant loss in the workload provided for that population could leave WHMC and BAMC with insufficient paracentesis procedures to support their respective internal medicine residency programs.

Thoracentesis

Thoracentesis, or pleural tap, is defined as a surgical procedure to remove fluid from the space between the lining of the outside of the lungs and the wall of the chest. Normally, very little fluid is present, and an accumulation of fluid is called pleural effusion. The test is performed in order to determine the cause of the fluid accumulation. Fluid can accumulate in the pleural area due to injury, infection, cancer, heart failure, cirrhosis, kidney disease and a number

of other diagnoses. Laboratory tests are often performed on pleural effusion to determine the presence of microorganisms (National Library of Medicine, 2005).

Methodology

Coding data were used to quantify the number of thoracentesis procedures performed over the past 5 years in both the inpatient and outpatient setting. The CPT codes 32000 (puncture of pleural cavity for aspiration) and 32002 (thoracentesis with tube insertion) were identified as corresponding to the thoracentesis procedure. The ICD-9 code 34.91 (thoracentesis) was also identified as corresponding to the thoracentesis procedure. Raw disposition data for these three codes were collected from the M2 database along with corresponding demographic data. The data were then compiled for fiscal years 2000-2004 in Microsoft Excel for the portions of the population that were under the age of 65 and age 65 and over. The portion of the population age 65 and over was identified and accumulated by sorting the data with a pivot table in Microsoft Excel. Patients age 65 and over were identified by the CHCS age group indicator "H" (age 65 and over) for procedures coded by ICD-9 and by sorting by age for procedures coded by CPT.

The Program Requirements for Residency Education in Internal Medicine published by ACGME (2004) do not specify a mandatory number of thoracentesis procedures for program accreditation, but instead leaves objective measurements of clinical competency to the local program directors. The WHMC internal medicine program director maintains an internal matrix for the number of specific procedures required for each intern to obtain clinical proficiency. This matrix was developed with the intent of meeting the intent of the ACGME RRC for internal medicine programs and for the direct purpose of properly preparing residents to excel in

certification boards. The internal medicine residency matrix requires that each resident observe five thoracentesis procedures before performing one. Further, it requires that each resident perform at least ten thoracentesis procedures during the course of their residency. The annual requirement for the program was established by multiplying the number of procedures required by each resident by the total number of active residents and dividing the result by the length in years of the program. This methodology results in an average number of procedures required per year to support the internal medicine GME program.

WHMC Results

The number of thoracentesis procedures has declined steadily at WHMC over the past 5 fiscal years, with a total decrease of 38% from FY 2000 to FY 2004 (Figure 9). Procedures among the under-65 population have decreased steadily, and procedures among over-65 patients have fluctuated between fiscal years. At any given time, 48 internal medicine residents are underway in the WHMC program, requiring ten thoracentesis procedures each or a total of 480 over the course of three years, an average of 160 per year. Over the past five fiscal years, WHMC has fallen well below that requirement, averaging 102 procedures per year (Figure 10). Further, 56% of current thoracentesis procedures are provided for beneficiaries over the age of 65 (Figure 11). If WHMC loses a significant portion of the care provided to the over-65 population, the facility will fall even further below the number of procedures required to support the current number of internal medicine residents. The underlying data for each of the Figures below are presented in Appendix A. A sample of the raw data for this study is presented in Appendix E and Appendix F.

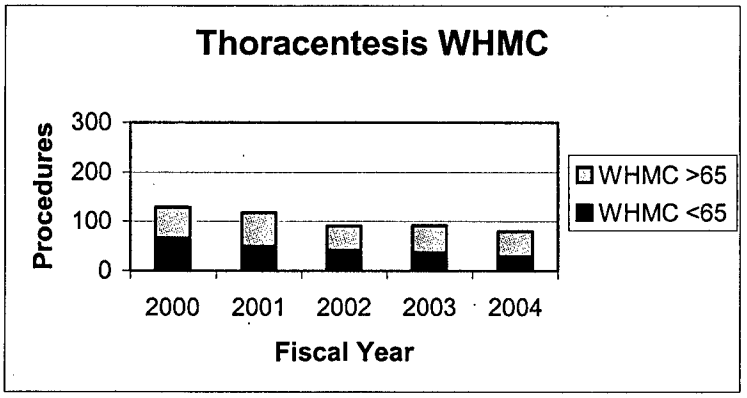

Figure 9. WHMC thoracentesis procedures for FY 00-04 by age group.

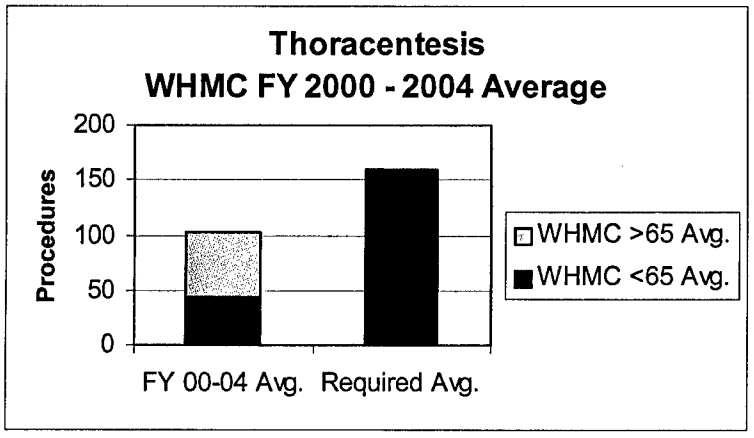

Figure 10. WMC FY 00-04 average thoracentesis procedures by age group compared to required average based on internal matrix.

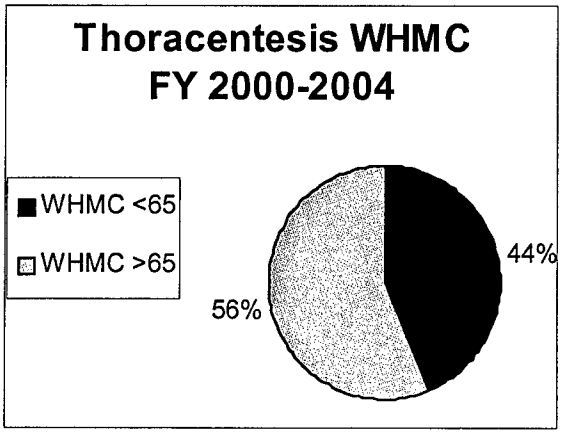

Figure 11. WHMC distribution of thoracentesis procedures by age group for FY 00-04.

BAMC Results

The number of thoracentesis procedures has remained relatively consistent at BAMC over the past 5 fiscal years with a steady increase totaling 26% from FY 2000 to FY 2004 (Figure 12). Procedures among both population age 65 and over and the population under age 65 have remained consistent. Given the assumption that BAMC residents require the same level of clinical experience as WHMC residents, their 39 residents would require 390 thoracentesis procedures over a three-year period, or an average of 130 per year. Over the past five fiscal years, BAMC has met that guideline with an average of 177 thoracentesis procedures per year (Figure 13). However, 59% of thoracentesis procedures have been provided for beneficiaries age 65 and over in the past five fiscal years (Figure 14). If BAMC loses a significant portion the care provided to the population age 65 and over, the facility could fall well below the number of procedures required to maintain the current number of internal medicine residents. The underlying data for each of the figures below are presented in Appendix A. A sample of the raw data for this study is presented in Appendix E and Appendix F.

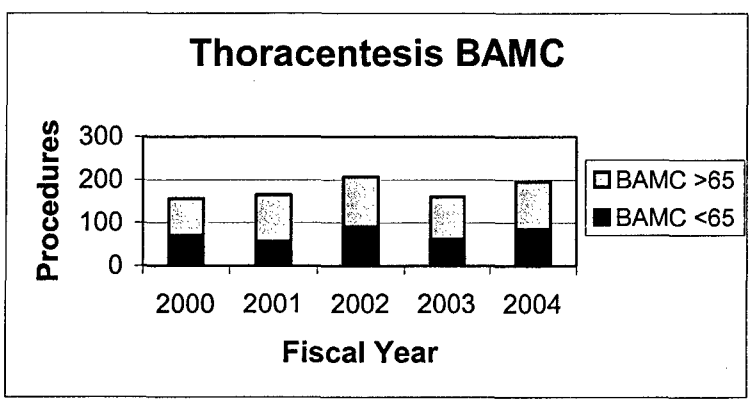

Figure 12. BAMC thoracentesis procedures for FY 00-04 by age group.

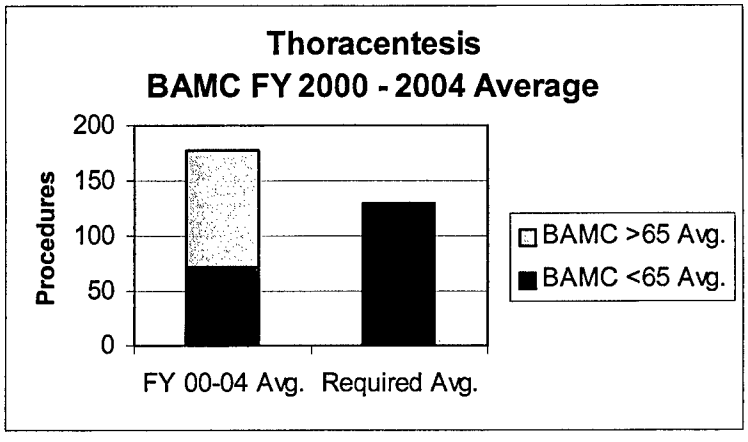

Figure 13. BAMC FY 00-04 average thoracentesis procedures by age group compared to required average based on internal matrix.

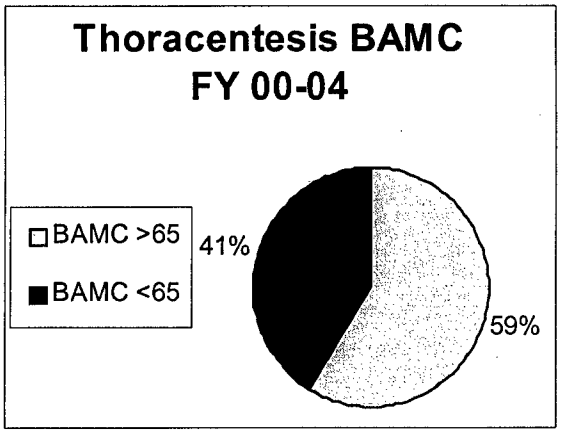

Figure 14. BAMC distribution of thoracentesis procedures by age group for FY 00-04.

Combined Results

Despite their having a slightly smaller internal medicine residency program, BAMC averaged 74% more thoracentesis procedures than WHMC over the past five fiscal years (Figure 15). Otherwise, the trend was consistent over the range of the study. A combined 58% of all thoracentesis procedures were performed for patients age 65 and over during that same time period (Figure 16). The underlying data for each of the figures below are presented in Appendix A. A sample of the raw data for this study is presented in Appendix E. Thoracentesis

procedures have remained steady overall, but are largely dependent on the population age 65 and over for workload.

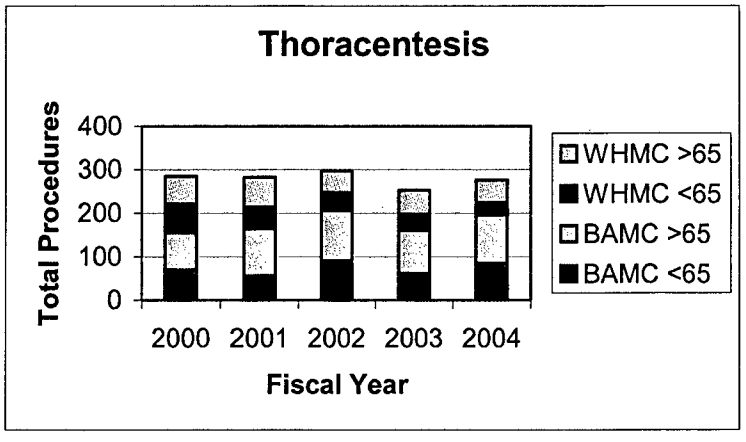

Figure 15. WHMC and BAMC thoracentesis procedures for FY 00-04 by age group.

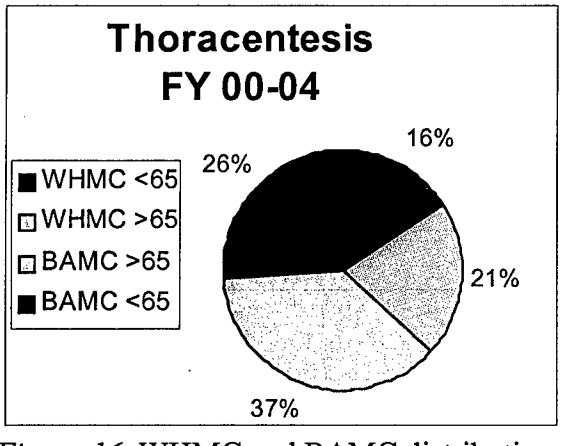

Figure 16. WHMC and BAMC distribution of thoracentesis procedures by age group for FY 00-04.

Discussion

A PubMed search of recent medical literature revealed no articles indicating that the thoracentesis procedure has fallen out of favor in medical practice. The variation and trends reported for this procedure in the San Antonio military medical centers is more likely due to changes in patient access or provider supply than they are to changes in accepted treatment regimen or demand. The trend for the past five fiscal years reveals that both BAMC and WHMC

average sufficient thoracentesis procedures to support the current number of residents, but 58% of current workload is made up of patients age 65 and over (Figure 16). Any significant decrease in the care provided for the population age 65 and over would result in neither internal medicine program being able to provide a sufficient number of thoracentesis procedures to support the current number of internal medicine residents.

Lumbar Puncture

A lumbar puncture, also called a spinal tap, is used to measure pressure in the fluid that surrounds the brain and spinal cord (cerebrospinal fluid) and to remove some of the fluid for laboratory analysis. The fluid can be tested for high levels of protein, white blood cells, and glucose, each of which can indicate infection (National Library of Medicine, 2005).

Methodology

Coding data were used to quantify the number of spinal taps performed over the past 5 fiscal years in both the inpatient and outpatient setting. The CPT code 62270 (lumbar puncture) and the ICD-9 code 03.31 (spinal tap) were identified as corresponding to the lumbar puncture procedure. Raw disposition data for these two codes were collected from the M2 database along with corresponding demographic data. The data were then compiled for fiscal years 2000-2004 in Microsoft Excel for the portions of the population that were under the age of 65 and age 65 and over. The portion of the population age 65 and over was identified and accumulated by sorting the data with a pivot table in Microsoft Excel. Patients age 65 and over were identified by the CHCS age group indicator "H" (age 65 and over) for procedures coded by ICD-9 and by sorting by age for procedures coded by CPT.

The Program Requirements for Residency Education in Internal Medicine published by ACGME (2004) do not specify a mandatory number of spinal taps for program accreditation, but instead leaves objective measurements of clinical competency to the local program directors. The WHMC internal medicine program director maintains an internal matrix for the number of specific procedures required for each intern to obtain clinical proficiency. This matrix was developed with the intent of meeting the intent of the ACGME RRC for internal medicine programs and for the direct purpose of properly preparing residents to excel in certification boards. The internal medicine residency matrix requires that each resident observe five lumbar punctures before performing one. Further, it requires that each resident perform at least eight spinal taps during the course of their residency. The annual requirement for the program was established by multiplying the number of procedures required by each resident by the total number of active residents and dividing the result by the length in years of the program. This methodology results in an average number of procedures required per year to support the internal medicine GME program.

WHMC Results

The number of spinal taps has steadily decreased at WHMC over the past 5 fiscal years with a decline totaling 30% between FY 2000 and FY 2004 (Figure 17). Procedures among the population age 65 and over have remained consistent, while procedures for the population under age 65 have decreased steadily (Figure 17). At any given time, 48 internal medicine residents are underway in the WHMC program, requiring eight spinal taps each or a total of 384 over the course of three years, an average of 128 per year. Over the past five fiscal years, WHMC has easily exceeded that guideline, averaging 554 procedures per year (Figure 18). Because the

population age 65 and over accounted for only 13% of all spinal taps between FY 2000 and FY 2004 (Figure 19), any loss of procedures among this population will have a minimal effect on the WHMC internal medicine GME program. The underlying data for each of the Figures below are presented in Appendix A. A sample of the raw data for this study is presented in Appendix E and Appendix F.

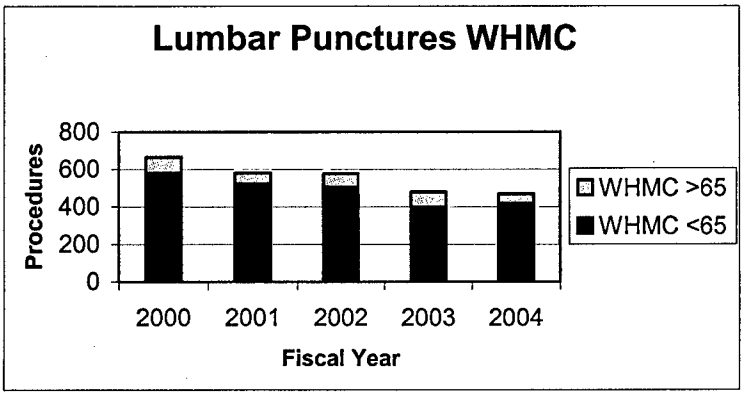

Figure 17. WHMC lumbar punctures for FY 00-04 by age group.

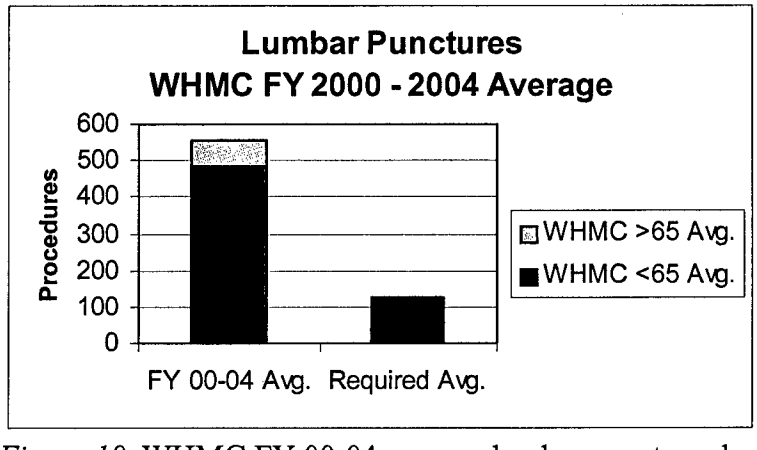

Figure 18. WHMC FY 00-04 average lumbar punctures by age group compared to required average based on internal matrix.

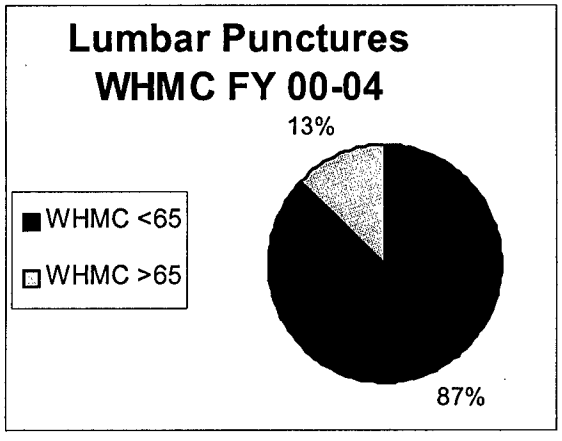

Figure 19. WHMC distribution of lumbar punctures by age group for FY 00-04.

BAMC Results

The number of lumbar punctures has remained relatively consistent at BAMC over the past 5 fiscal years with the exception of FY 2000. The data revealed an overall increase totaling 83% from FY 2000 to FY 2004 (Figure 20). Procedures among both the population age 65 and over and the population under age 65 followed a similar pattern, peaking in FY 2002.

Given the assumption that BAMC residents require the same level of clinical experience as WHMC residents, their 39 residents would require 312 spinal taps over a three year period, or an average of 104 per year. Over the past five fiscal years, BAMC has easily exceeded that guideline with an average of 271.4 lumbar punctures per year (Figure 21). Although the procedures provided for the beneficiaries age 65 and over accounted for 25% of all spinal taps at BAMC over the past five fiscal years (Figure 22), any loss in eligibility for the over-65 population will not be sufficient to force BAMC below the number of procedures required to maintain the current number of internal medicine residents. The underlying data for each of the Figures below are presented in Appendix A. A sample of the raw data for this study is presented in Appendix E and Appendix F.

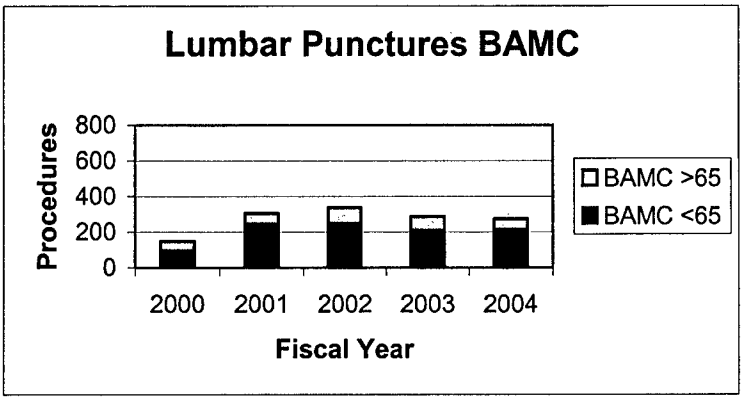

Figure 20. BAMC lumbar punctures for FY 00-04 by age group.

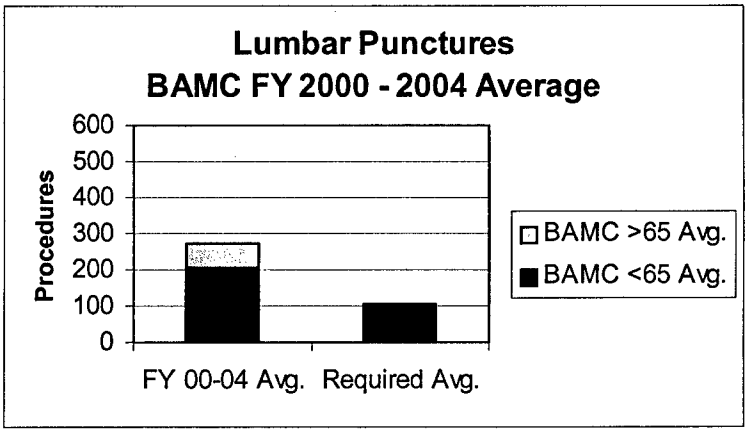

Figure 21. BAMC FY 00-04 average lumbar punctures by age group compared to required average based on internal matrix.

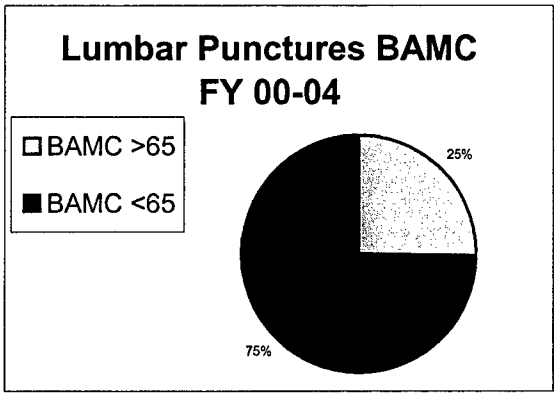

Figure 22. BAMC distribution of lumbar punctures by age group for FY 00-04.

Combined Results

WHMC and BAMC have sustained a lumbar puncture workload over the past five fiscal years that is both consistent (Figure 23) and is far beyond the level sufficient to support the current number of internal medicine residents in their respective programs. A combined 17% of all spinal taps were performed for patients age 65 and over during that same time period (Figure 24). For the lumbar puncture procedure, neither GME program could be detrimentally affected by the anticipated decrease in the portion of care provided for the population age 65 and over.

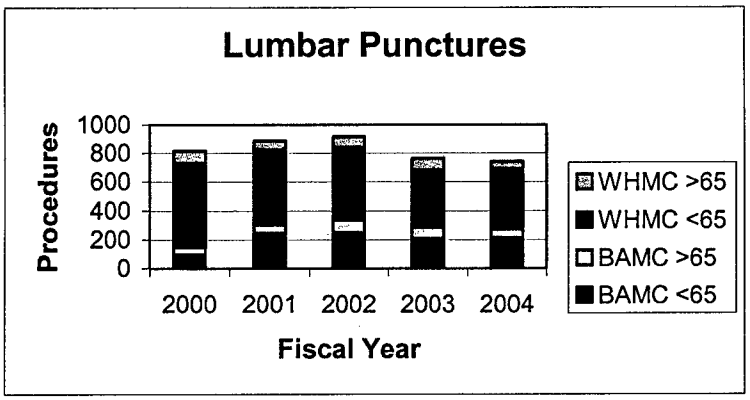

Figure 23. WHMC and BAMC lumbar punctures for FY 00-04 by age group

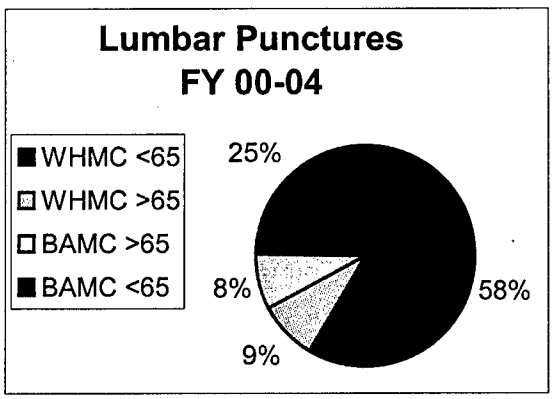

Figure 24. WHMC and BAMC distribution of lumbar punctures by age group for FY 00-04

Discussion

A PubMed search of recent literature revealed no journal articles indicating that the lumbar puncture procedure has fallen out of favor in medical practice. Because the procedure is generally diagnostic in nature and no other test has been proven to be a suitable substitution, the variation and trends reported for this procedure in the San Antonio military medical centers is more likely due to changes in patient access or provider supply than they are to changes in accepted treatment regimen or demand. The trend for the past five fiscal years reveals that both BAMC and WHMC average sufficient spinal tap procedures to support the current number of residents, with only 17% of current workload provided for patients age 65 and over (Figure 24).

Central Catheter Placement

A vascular access catheter, or central catheter, is a long, thin tube that is placed in a vein in the arm, in the neck, or in the chest just beneath the collarbone. The tube is then threaded into a major vein in the middle of the chest. In many conditions, having this type of tube inserted provides a simple and painless means of drawing blood, or delivering drugs, nutrients or both. This also spares the patient the discomfort and stress of repeated needle sticks. Central catheters can remain in place for weeks, months or even years (National Library of Medicine, 2005).

Methodology

Coding data were used to quantify the number of central catheter placements performed over the past 5 years in both the inpatient and outpatient setting. The CPT codes 36488 (placement of central venous catheter, age 2 and under) and 36489 (placement of central venous catheter, over age 2) were identified as corresponding to the central venous catheter placement procedure. The ICD-9 code 38.93 (venous catheritization, not otherwise specified) was also

identified as corresponding to the central venous catheter placement procedure. Raw disposition data for these three codes were collected from the M2 database along with corresponding demographic data. The data were then compiled for fiscal years 2000-2004 in Microsoft Excel for the portions of the population that were under age 65 and age 65 and over. The portion of the population age 65 and over was identified and accumulated by sorting the data with a pivot table in Microsoft Excel. Patients age 65 and over were identified by the CHCS age group indicator "H" (age 65 and over) for procedures coded by ICD-9 and by sorting by age for procedures coded by CPT.

The Program Requirements for Residency Education in Internal Medicine published by ACGME (2004) do not specify a mandatory number of central catheter placements for program accreditation, but instead leaves objective measurements of clinical competency to the local program directors. The WHMC internal medicine program director maintains an internal matrix for the number of specific procedures required for each intern to obtain clinical proficiency. This matrix was developed with the intent of meeting the intent of the ACGME RRC for internal medicine programs and for the direct purpose of properly preparing residents to excel in certification boards. The internal medicine residency matrix requires that each resident observe five central catheter placements before performing one. Further, it requires that each resident perform at least ten central catheter placements during the course of their residency. The annual requirement for the internal medicine program was established by multiplying the number of procedures required for each resident by the total number of active residents and dividing the result by the length in years of the program. This methodology results in an average number of procedures required per year to support the internal medicine GME program.

WHMC Results

The number of central catheter placements consistently increased and then decreased sharply at WHMC over the past 5 fiscal years. The data show a steady increase totaling 108% between FY 2000 and FY 2003 and an offsetting decrease of 95% in FY 2004 (Figure 25). Procedures among the population under age 65 have remained consistent with the overall trend, while the annual data for the population age 65 and over have fluctuated sharply. However, because the over-65 population has accounted for 25% of all abdominal paracentesis procedures between FY 2000 and FY 2004 (Figure 27), the loss of procedures among this population is of particular interest, especially with their anticipated loss of primary care eligibility at military treatment facilities.

At any given time, 48 internal medicine residents are underway in the WHMC program, requiring ten central line placements each or a total of 480 over the course of three years, an average of 160 per year. Over the past five fiscal years, WHMC has easily met that guideline, averaging 923.4 procedures per year (Figure 26). However, the sharp decrease in central catheter placements in FY 2004 (Figure 25) could be cause for concern if it proves to be a long-term trend. Currently, the contribution of the population age 65 and over to central catheter placement workload does not appear sufficient to inhibit the ability of the WHMC internal medicine GME program to support the current number of residents. The underlying data for each of the figures below are presented in Appendix A. A sample of the raw data for this study is presented in Appendix E and Appendix F.

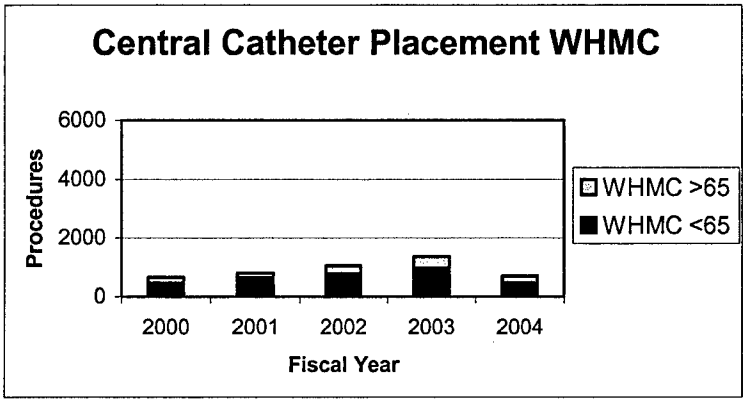

Figure 25. WHMC central catheter placements for FY 00-04 by age group.

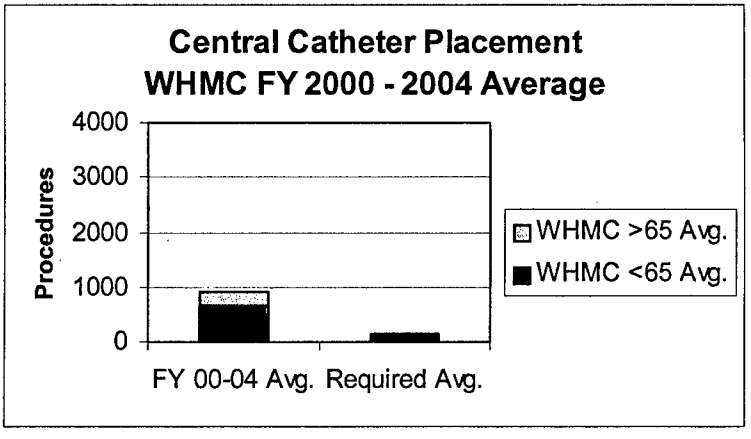

Figure 26. WHMC FY 00-04 central catheter placements by age group compared to required average based on internal matrix.

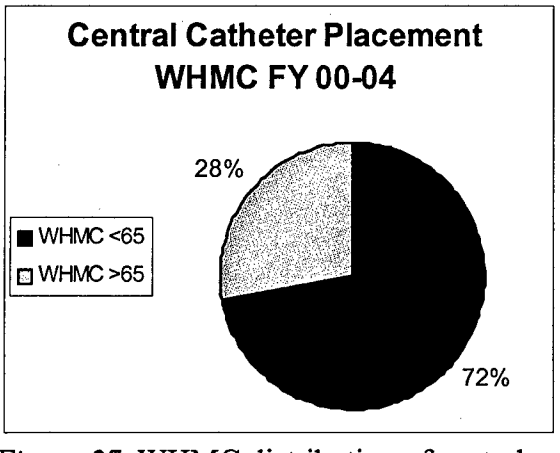

Figure 27. WHMC distribution of central catheter placements age group for FY 00-04.

BAMC Results

The number of central catheter placements has declined sharply at BAMC over the past 5 fiscal years with a total decrease of 90% from FY 2000 to FY 2004 (Figure 28). Procedures among both the population age 65 and over and the population under age 65 followed a similar pattern, peaking in FY 2001 and dropping sharply in FY 2003 and again in FY 2004. Because the population age 65 and over has accounted for 43% of all central line placements at BAMC between FY 2000 and FY 2004 (Figure 30), the loss of procedures among this population is of particular interest.

Given the assumption that BAMC residents require the same level of clinical experience as WHMC residents, their 39 residents would require 390 central catheter placements over a three-year period, or an average of 130 per year. Over the past five fiscal years, BAMC has easily exceeded that guideline with an average of 3310.4 per year (Figure 29). However, the total number of procedures for the final year of the study was only 509 (Figure 28), which is still well above the threshold for concern, but is also far below the five year average. Further, procedures provided for the beneficiaries age 65 and over accounted for 43% of all central line placements at BAMC over the past five fiscal years (Figure 30). Any loss in eligibility for this population will not be sufficient to force BAMC below the number of procedures required to support the current number of internal medicine residents, but it would further close the gap to a level of potential concern. The underlying data for each of the Figures below are presented in Appendix A. A sample of the data for this study is presented in Appendix E and Appendix F.

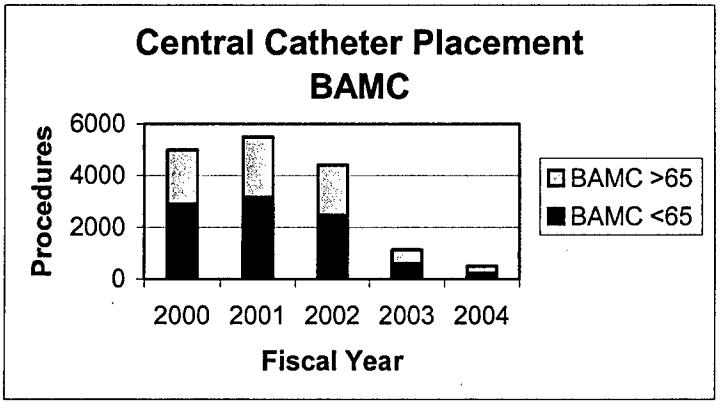

Figure 28. BAMC central catheter placements for FY 00-04 by age group

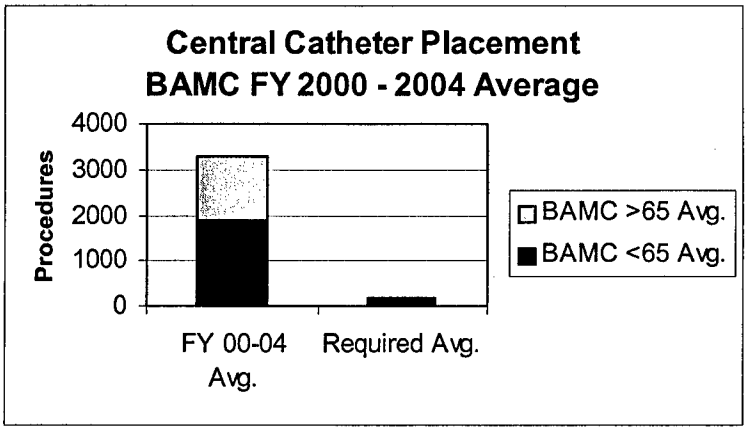

Figure 29. WHMC FY 00-04 average central catheter placements by age group compared to required average based on internal matrix

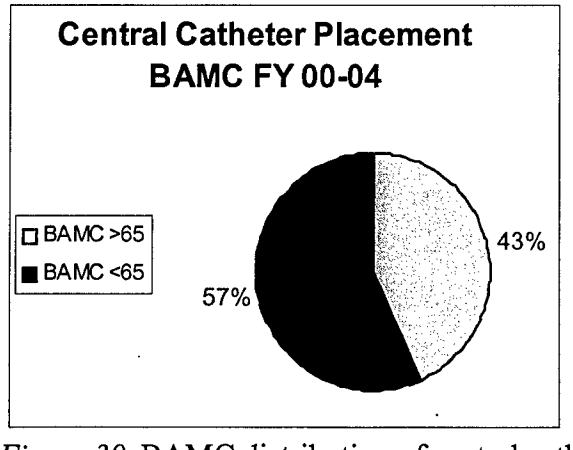

Figure 30. BAMC distribution of central catheter placements age group for FY 00-04

Combined Results

Although both the WHMC and the BAMC internal medicine GME programs are currently well above the required number of central catheter placements required to support their existing number of residents, the current negative trend (Figure 31) is cause for concern. If the number of procedures performed in 2004 remains constant in the coming years, both GME programs will continue to maintain adequate workload for this procedure, even if the 40% workload accounted for by the population age 65 and over (Figure 32) is decreased or lost. However, if the current trend continues, the combination with a decrease in procedures for the population age 65 and over could prove detrimental.

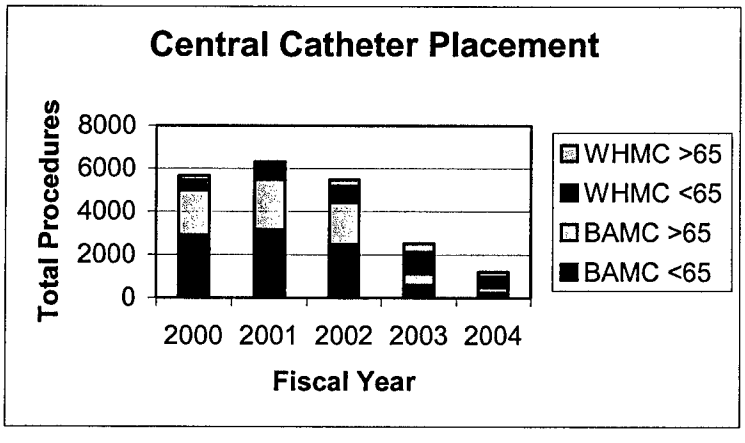

Figure 31. WHMC and BAMC central catheter placements for FY 00-04 by age group.

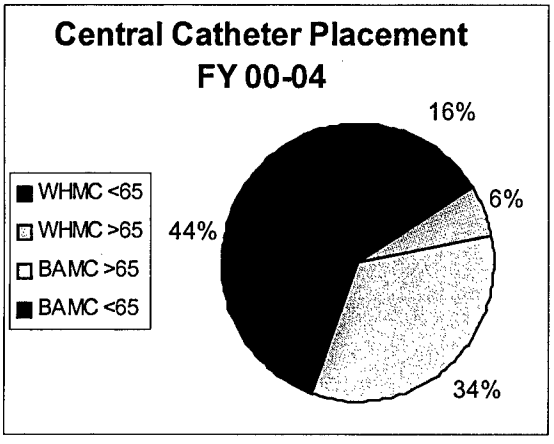

Figure 32. WHMC and BAMC distribution of central catheter placements age group for FY 00-04.

Discussion

A PubMed search of recent medical literature revealed no journal articles indicating that central catheter placement has fallen out of favor in medical practice. A 2005 study at the Mayo Clinic College of Medicine revealed that efforts are underway to enhance resident proficiency in central line placement, indicating that the procedure remains viable (Ramakrishna, Higano, McDonald, and Schultz, 2005). Another report on the efficacy and safety of central catheter devices reported that central lines were safe for children (Knue, Doellman, Rabin, Jacobs, 2005). Because no suitable substitution has been reported in the literature, the variation and trends reported for this procedure in the San Antonio military medical centers is more likely due to changes in patient access or provider supply than they are to changes in accepted treatment regimen or demand.

The trend for the past five fiscal years (Figure 31) reveals that both BAMC and WHMC average sufficient central catheter placements to support the current number of residents. While 40% of current workload is provided for patients age 65 and over (Figure 32), the under-65 patients provide sufficient workload to support the current number of residents. The vast

majority of the recent decreasing trend can be accounted for by the data from BAMC and their loss of procedures for the population under the age of 65. Any continuation of the current negative trend at BAMC could be cause for concern.

Program Recommendations

Of the four procedures suggested for review by the WHMC internal medicine GME program director, all four were performed with adequate frequency to support the internal medicine residency programs at both WHMC and BAMC. Two of the procedures under study (thoracentesis and paracentesis) maintained consistent and adequate workload throughout the five fiscal year range of the study, but could not maintain that workload without the care provided for the population age 65 and over. The average number of lumbar punctures was sufficient even without the portion of care provided for patients age 65 and over. The number of central catheter placements easily exceeded the quantity required to support the GME programs, but has declined drastically over the past three fiscal years.

Based on these sample procedures, the internal medicine GME program appears to be maintaining sufficient workload to support the existing number of residents. However, careful tracking of the utilization of internal medicine services by beneficiaries age 65 and over is recommended. The internal medicine residency programs appear to be heavily dependent on the population age 65 and over, and any changes in the utilization of that population could force the GME programs at both WHMC and BAMC to restructure clinical rotations to civilian facilities or to downsize their respective programs. Further, every effort should be made to ensure that referrals for the population age 65 and over are captured and executed at the military health centers.

Finally, further study is recommended, potentially utilizing data sources that better reflect the actual care provided and not just that which is coded. Further study could also be performed utilizing the methodology outlined in this report after the impact of the Global War on Terror has subsided and the medical centers are closer to normal clinical capacity.

Limitations

Limitations for the internal medicine section of this report include areas in program selection, procedure selection, data selection, data collection, data sources, and deployment status. The selection of the programs in this study was left to the subject matter expertise of the Dean of SAUSHEC and was not based on objective criteria. Similarly, the selection of procedures for study within those GME programs was determined by the program directors, as subject matter experts in their respective fields. Limiting the scope of this study to workload taking place only at WHMC and BAMC automatically precludes any experience residents obtain at other military and civilian sites such as UTSA or Fort Hood. Further, the nature of this study dictates that it cannot account for procedural overlap between and among residents. Multiple residents may observe or participate in singular events, and that overlap will not reflect in the procedure coding.

The selection of coding data for the data source was appropriate in that current policy is uncoded visits and procedures did not take place. However, coding completion rates vary between facilities and between individual clinical areas. This fact introduces variance into the study results. Further, changes in coding practice and policy within the five-year range of this study are not accounted for. Although every effort was made to collect data for every possible

code type for each procedure, overlaps and omissions between ICD-9 codes, CPT codes, and DRG codes could not be fully accounted for.

The Accreditation Council for Graduate Medical Education recently published new guidelines for the resident work environment. The most notable of these reforms is the limitation on resident work hours. Program directors reportedly anticipate improved resident safety and well being, but caseload, continuity of care, and education are expected to suffer (Lieberman, Olenwine, Finley, & Nicholas, 2005). This change in work hours limits the number of required cases that a resident may be exposed to. Further, it dictates that facilities must maintain GME workload that is well above the number required for existing residents in order to account for variations in schedule. This variation cannot be accurately measured within the scope of this study, so it serves as a limiting and confounding factor.

Finally, the confounding effects of the Global War on Terror are not fully measurable given the scope of this study. The five-year range of the study was chosen to cover a time period before the war, but the portion of each trend after fiscal year 2002 that is attributable to the Global War on Terror cannot be fully accounted for. Therefore, any attempts to assign causation for current trends were precluded in the scope of this study.

Anesthesiology

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Anesthesiology

Anesthesiology is the practice of medicine that is dedicated to the relief of pain and total care of the surgical patient before, during and after surgery. Anesthesiologists also provide medical care and consultations in many other settings and situations in addition to the operating room. In recent years, many anesthesiologists have dedicated their careers to the treatment of acute, chronic or cancer pain (American Society of Anesthesiologists, 2005).

The SAUSHEC anesthesiology GME program is a joint program between WHMC and BAMC. The anesthesiology program is fully ACGME accredited and is a three-year program with authorization for 12 residents per year (36 total). The residents are split evenly between WHMC and BAMC. For the purposes of this study, the data for the two programs will be calculated separately but presented together in order to reflect the flexibility of the program between facilities.

Program Methodology

In accordance with the overarching methodology for this project, the Assistant Program Director for the WHMC Anesthesiology GME program was interviewed and asked, as the subject matter expert, to provide a list of diagnoses or procedures for which he was concerned about maintaining adequate workload. The procedures that he listed were major vascular surgery, craniotomy, cesarean section, and cardiopulmonary intrathoracic procedures (J. Johnson, Personal Communication, January 20, 2005).

The procedure data were collected from the M2 data mart utilizing DRG codes. The data collection methodology for each specific diagnosis or procedure will be discussed in greater detail in their individual subsections of this report. The procedures were then quantified by year

and a threshold of required procedures was established based on internal matrices. Because the WHMC assistant program director cited the potential decrease in the eligible population age 65 and over as a hypothetical contributor to the perceived workload shortfall, the contribution of the population age 65 and over was identified and quantified for this GME program. Cesarean section data will be presented as raw data because the procedure is only performed at WHMC and there were no cases age 65 and over in the fiscal years under study. The results for each procedure will be discussed in detail below.

Major Vascular Procedures

For the purposes of this study, major vascular procedures are defined as any surgical procedure involving either the aorta or the carotid artery. These parameters were provided by the assistant program director for the WHMC anesthesiology program (J. Johnson, Personal Communication, January 20, 2005).

Methodology

Coding data were used to quantify the number of major vascular procedures performed over the past 5 fiscal years. For all procedures, the DRGs 110 (major cardiovascular procedure with CC) and 111 (major cardiovascular procedure without CC) were identified as corresponding to major vascular procedures for the purpose of this study. Raw disposition data (Appendix G) for these DRG codes were collected from the M2 database along with corresponding demographic data. The data were then compiled for fiscal years 2000-2004 in Microsoft Excel for the portions of the population that were under the age of 65 and age 65 and over. The portion of the population age 65 and over was identified by sorting the data with a pivot table in

Microsoft Excel. Patients age 65 and over were identified by the CHCS age group indicator "H" (age 65 and over) in the data query.

The Program Requirements for Graduate Medical Education in Anesthesiology published by ACGME (2004) specify a mandatory minimum of 20 major vascular procedures for each resident during the course of the three-year residency. The annual requirement for the joint anesthesiology GME program was established by multiplying the number of procedures required by each resident by the total number of active residents and dividing the result by the length in years of the program. This methodology results in an average number of procedures required per year to support the anesthesiology GME program.

Results

The number of major vascular procedures at WHMC and BAMC decreased significantly over the past 5 fiscal years. The data show a steady decline totaling 36% between FY 2000 and FY 2004 (Figure 33). Procedures among the population age 65 and over have remained consistent with the overall trend. However, because the population age 65 and over has accounted for 60% of all major vascular procedures between FY 2000 and FY 2004 (Figure 35), the loss of procedures among this population is of particular interest, especially with their anticipated loss of eligibility at military treatment facilities.

Currently, 36 residents are underway in the joint SAUSHEC anesthesiology GME program, requiring 20 major vascular procedures each or a total of 720 over the course of three years, an average of 240 per year. Over the past five fiscal years, the two facilities have averaged far below this requirement, averaging 94.6 procedures per year (Figure 34). The

underlying data for each of the figures below are presented in Appendix B. A sample of the raw data for this study is presented in Appendix G.

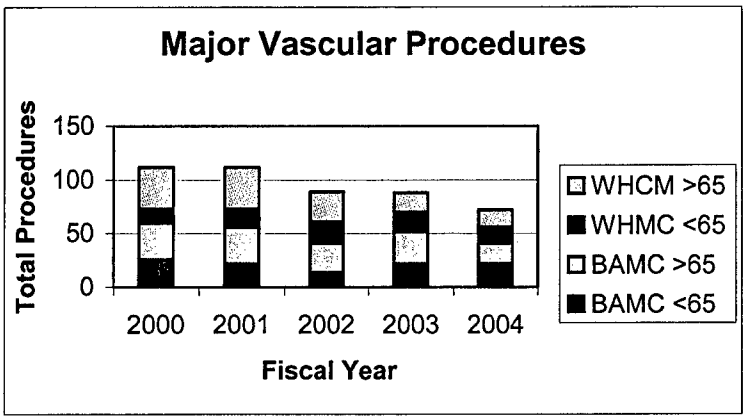

Figure 33. WHMC and BAMC major vascular procedures for FY 00-04 by age group.

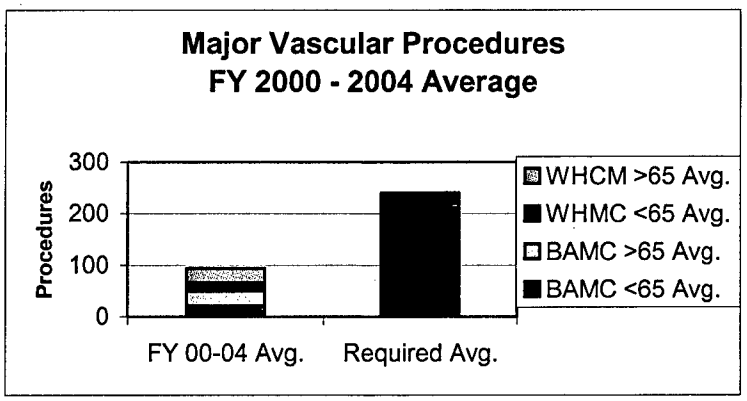

Figure 34. WHMC and BAMC FY 00-04 average major vascular procedures by age group compared to required average based on RRC requirement.

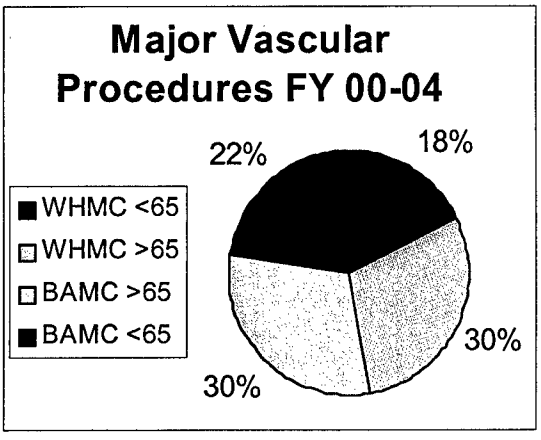

Figure 35. WHMC and BAMC distribution of major vascular procedures by age group for FY 00-04.

Discussion

Major vascular procedures encompass a broad array of surgical applications, some of which may be declining in recent years with improved drug therapies. However, new vascular procedures are developed to offset those changes, and in general, a PubMed search of recent literature revealed no journal articles indicating that major vascular procedures have fallen out of favor in medical practice. The variation and trends reported for this procedure in the San Antonio military medical centers is more likely due to changes in patient access or provider supply than they are to changes in accepted treatment regimen or demand. The trend for the past five fiscal years reveals that both BAMC and WHMC average far below the number of major vascular procedures required to support the current number of residents. Over the past five fiscal years, 60% of major vascular procedures were performed for patients age 65 and over (Figure 35), and any loss in the availability of the workload for that population would leave the anesthesiology program with an even greater shortfall.

Craniotomy

A craniotomy is the surgical opening of the skull, or brain surgery. Craniotomies are performed to treat lesions of the brain and its surrounding structures through an opening in the skull (cranium). Brain surgery may be needed to treat brain tumors, bleeding, blood clots, hematomas, aneurysms, malformations, infection, or trauma (National Library of Medicine, 2005).

Methodology

Coding data were used to quantify the number of craniotomies performed over the past 5 years. The DRGs 1 (craniotomy age 0-17 except for trauma), 2 (craniotomy over age 17), and 3 (craniotomy age 0-17) were identified as corresponding to the craniotomy procedure. Raw disposition data (Appendix G) for these three DRG codes were collected from the M2 database along with corresponding demographic data. The data were then compiled for fiscal years 2000-2004 in Microsoft Excel for the portions of the population that were age 65 and over and those under the age of 65. The portion of the population age 65 and over was identified by sorting the data with a pivot table in Microsoft Excel. Patients age 65 and over were identified by the CHCS age group indicator "H" (age 65 and over) in the data query.

The Program Requirements for Graduate Medical Education in Anesthesiology published by ACGME (2004) specify a mandatory minimum of 20 craniotomy procedures for each resident during the course of their three-year residency. The annual requirement for the joint anesthesiology GME program was established by multiplying the number of procedures required by each resident by the total number of active residents and dividing the result by the length in

years of the program. This methodology results in an average number of procedures required per year to support the internal medicine GME program.

Results

The total number of craniotomy procedures at WHMC and BAMC decreased significantly over the past 5 fiscal years. The data show a steady decline totaling 28% between FY 2000 and FY 2004 (Figure 36). Procedures among the population age 65 and over have decreased at a slightly more rapid rate than the overall trend. Because the population age 65 and over has accounted for 28% of all major vascular procedures between FY 2000 and FY 2004 (Figure 38), the loss of procedures among this population is of particular interest.

Currently, 36 residents are underway in the joint SAUSHEC anesthesiology GME program, requiring 20 craniotomy procedures each or a total of 720 over the course of three years, an average of 240 per year. Over the past five fiscal years, the two facilities have averaged far below this requirement, averaging 138 procedures per year (Figure 37). The underlying data for each of the figures below are presented in Appendix B. A sample of the raw data for this study is presented in Appendix G.

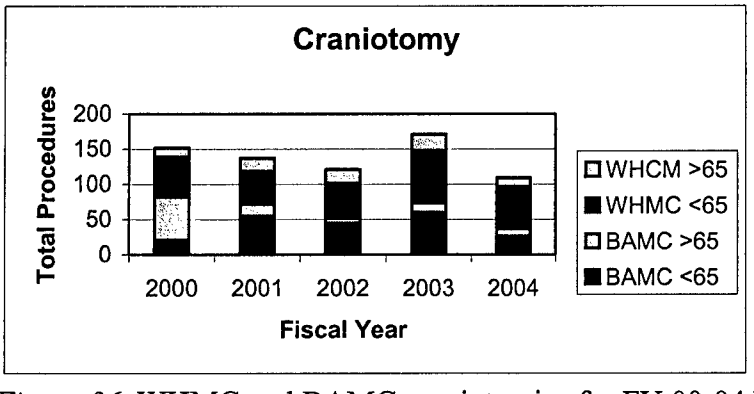

Figure 36. WHMC and BAMC craniotomies for FY 00-04 by age group.

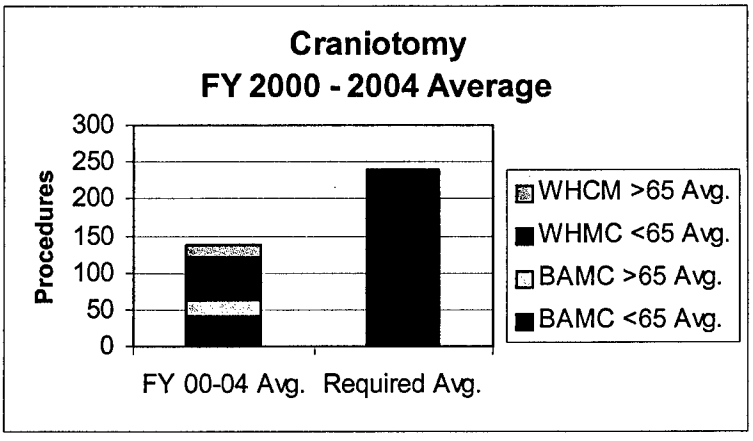

Figure 37. WHMC and BAMC FY 00-04 average craniotomies by age group compared to required average based on RRC requirement.

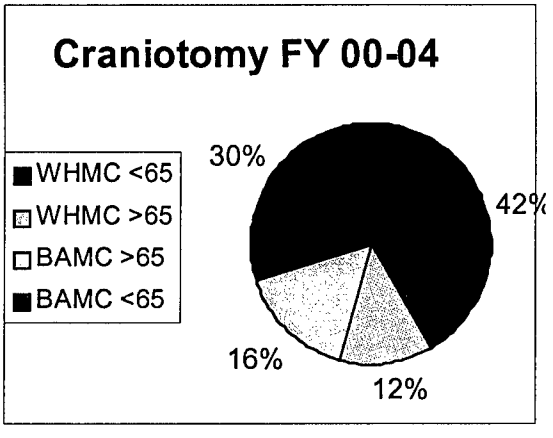

Figure 38. WHMC and BAMC distribution of craniotomies by age group for FY 00-04.

Discussion

Craniotomies are performed for a wide variety of indications, and a PubMed search of recent medical literature revealed no articles indicating that they have fallen out of favor in medical practice. The variation and trends reported for this procedure in the San Antonio military medical centers are more likely due to changes in patient access or provider supply than they are to changes in accepted treatment regimen or demand. The trend for the past five fiscal years reveals both BAMC and WHMC average far below the number of craniotomies required to support the current number of anesthesiology residents. This shortfall is compounded by the

decreasing trend (Figure 36). Further, 28% of all craniotomies were performed for patients age 65 and over (Figure 38) over the past 5 fiscal years, and any loss in availability of the workload for that population would leave the anesthesiology program with an even greater shortfall.

Cardiovascular Intrathoracic Procedures

For the purposes of this study, a cardiovascular intrathoracic procedure is defined as the surgical opening of the chest cavity (thorax) in order to perform coronary or cardiac procedures. Intrathoracic procedures are performed to treat a wide variety of circulatory irregularities.

Methodology

Coding data were used to quantify the number of cardiovascular intrathoracic procedures performed over the past 5 years. The DRGs 104 (cardiac valve and other major cardiac procedure with cardiac catheter), 105 (cardiac valve and other major cardiac procedure without cardiac catheter), 106 (coronary bypass with percutaneous transluminal coronary angioplasty), 107 (coronary bypass with cardiac catheter), and 109 (coronary bypass without percutaneous transluminal coronary angioplasty or cardiac catheter) were identified as corresponding to cardiovascular intrathoracic procedures. Raw disposition data (Appendix G) for these five DRG codes were collected from the M2 database along with corresponding demographic data. The data were then compiled for fiscal years 2000-2004 in Microsoft Excel for the portions of the population that were under the age of 65 and those age 65 and over. The portion of the population age 65 and over was identified by sorting the data with a pivot table in Microsoft Excel. Patients age 65 and over were identified by the CHCS age group indicator "H" (age 65 and over) in the data query.

The Program Requirements for Graduate Medical Education in Anesthesiology published by ACGME (2004) specify a mandatory minimum of 20 craniotomy procedures for each resident during the course of their three-year residency. The annual requirement for the joint anesthesiology GME program was established by multiplying the number of procedures required for each resident by the total number of active residents and dividing the result by the length in years of the program. This methodology results in an average number of procedures required per year to support the internal medicine GME program.

Results

The total number of cardiovascular intrathoracic procedures at WHMC and BAMC decreased significantly over the past 5 fiscal years. The data show a steady decline totaling 37% between FY 2000 and FY 2004 (Figure 39). Procedures among the population age 65 and over have decreased at a rate consistent with the overall trend. Because the population age 65 and over has accounted for 58% of all major vascular procedures between FY 2000 and FY 2004 (Figure 41), the anticipated loss of procedures among this population is of particular interest.

Currently, 36 residents are underway in the joint SAUSHEC anesthesiology GME program, requiring 20 cardiovascular intrathoracic procedures each or a total of 720 over the course of three years, an average of 240 per year. Over the past five fiscal years, the two facilities have averaged slightly below this requirement, averaging 223.8 procedures per year (Figure 40). The underlying data for each of the figures below are presented in Appendix B. A sample of the raw data for this study is presented in Appendix G.

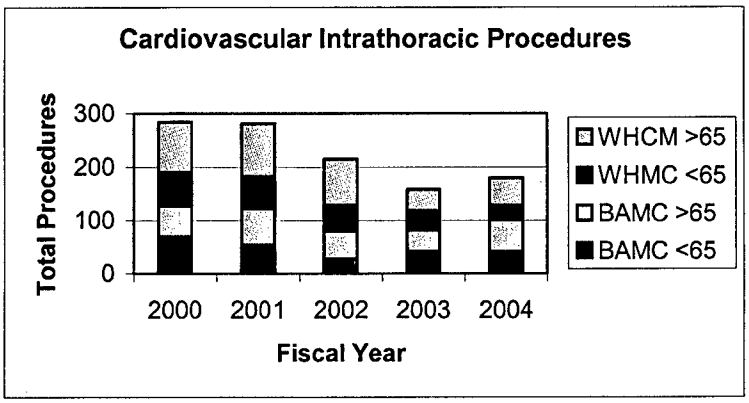

Figure 39. WHMC and BAMC cardiovascular intrathoracic procedures for FY 00-04 by age group.

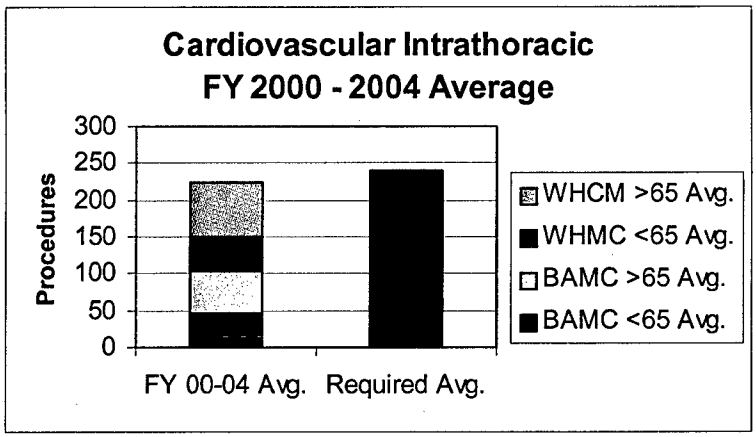

Figure 40. WHMC and BAMC FY 00-04 average cardiovascular intrathoracic procedures by age group compared to required average based on RRC requirement.

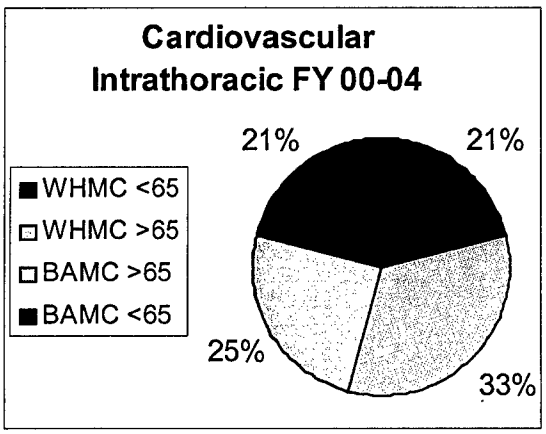

Figure 41. WHMC and BAMC distribution of cardiovascular intrathoracic procedures by age group for FY 00-04.

Discussion

Cardiovascular intrathoracic procedures encompass a broad array of surgical applications, some of which may be declining in recent years with improved drug therapies. However, new cardiovascular procedures are developed to offset those changes, and in general, a PubMed search of recent literature revealed no journal articles indicating that cardiovascular procedures have fallen out of favor in medical practice. The variation and trends reported for this procedure in the San Antonio military medical centers is more likely due to changes in patient access or provider supply than they are to changes in accepted treatment regimen or demand. The trend for the past five fiscal years reveals that BAMC and WHMC average slightly below the number of cardiovascular intrathoracic procedures required to support the current number of residents. This slight shortfall is compounded by a consistently decreasing trend (Figure 39). Finally, over the past five fiscal years, 58% of cardiovascular procedures were performed for patients over the age of 65 (Figure 41). Any loss in availability of the workload for that population would leave the anesthesiology program with an even greater shortfall.

C-section

A C-section, also called a cesarean section, is the delivery of a baby through a surgical abdominal incision. A C-section delivery is performed when a vaginal birth is not possible or is not safe for the mother or child. Surgery is usually done while the woman is awake but anesthetized from the chest to the legs by epidural or spinal anesthesia. An incision is made across the abdomen just above the pubic area. The uterus is opened, the amniotic fluid is drained, and the baby is delivered. C-sections are performed for a variety of reasons, including developmental abnormalities of the fetus, abnormal fetal position, extreme maternal illness,

prolonged or arrested labor, very large fetus, and umbilical cord prolapse (National Library of Medicine, 2005).

Methodology

Coding data were used to quantify the number of c-sections performed over the past 5 fiscal years. The DRGs 370 (cesarean section with clinical complications) and 371 (cesarean section without clinical complications) were identified as corresponding to c-sections. Raw disposition data (Appendix G) for these two DRG codes were collected from the M2 database along with corresponding demographic data. The data were then compiled for fiscal years 2000-2004 in Microsoft Excel. Because no c-sections were performed at BAMC and none were performed for patients age 65 and over, all data will be presented raw without facility or demographic delineation.

The Program Requirements for Graduate Medical Education in Anesthesiology published by ACGME (2004) specify a mandatory minimum of 20 c-sections for each resident during the course of their three-year residency. The annual requirement for the joint anesthesiology GME program was established by multiplying the number of procedures required by each resident by the total number of active residents and dividing the result by the length in years of the program. This methodology results in an average number of procedures required per year to support the internal medicine GME program.

Results

The total number of c-sections at WHMC has increased significantly over the past 5 fiscal years. The data show a steady increase totaling 30% between FY 2000 and FY 2004 (Figure 42). Currently, 36 residents are underway in the joint SAUSHEC anesthesiology GME

program, requiring 20 c-sections each or a total of 720 over the course of three years, an average of 240 per year. Over the past five fiscal years, the two facilities have averaged well above this requirement, averaging 345.6 procedures per year (Figure 43). The underlying data for each of the figures below are presented in Appendix B. A sample of the raw data for this study is presented in Appendix G.

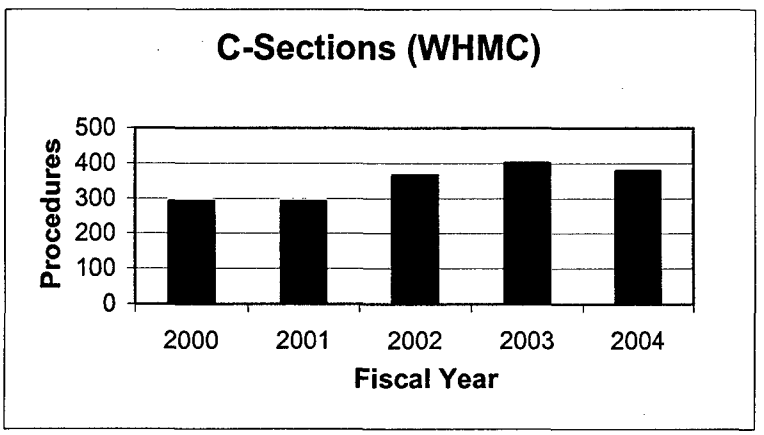

Figure 42. WHMC c-sections for FY 00-04.

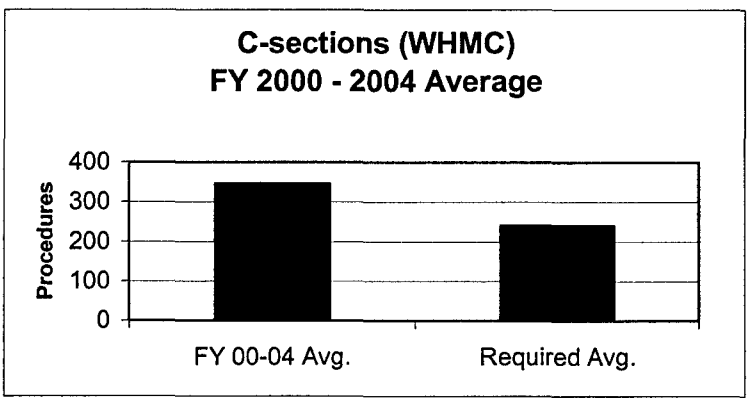

Figure 43. WHMC FY 00-04 average c-sections compared to required average based on RRC requirement.

Discussion

This comfortable measure over the ACGME requirement combined with an increasing trend leave little cause for concern for c-sections as they relate to the anesthesiology GME

program. Cesarean sections will be further reviewed in the obstetrics and gynecology section of this report.

Program Recommendations

Of the four procedures suggested for review by the WHMC anesthesiology GME assistant program director, three were performed with a frequency that was insufficient to support the requirements of the anesthesiology residency program. Two of the procedures under study (craniotomies and major vascular procedures) maintained workload far below the required average throughout the five fiscal year range of the study and were further complicated by their dependency on the care provided for the population age 65 and over. The average number of cardiovascular intrathoracic procedures was nearly sufficient to support the existing number of residents, but a large portion of those procedures were provided for patients age 65 and over. The number of c-sections performed was easily sufficient to support the anesthesiology GME program and have increased consistently over the five-year range of the study.

Based on these sample procedures, the anesthesiology GME program appears to be maintaining insufficient workload to support the existing number of residents. These findings are consistent with the concerns of the assistant program director, who reported that many procedures are performed in local civilian healthcare facilities in order to meet program requirements. Careful tracking of the utilization of anesthesiology services at WHMC and BAMC is recommended in order to determine that the appropriate mix of care is being provided to provide optimum patient care and to support the anesthesiology residents. Costlier procedures and those with larger shortfalls should be the emphasis for the care provided in the two military medical centers. Further, the anesthesiology residency program appears to be heavily dependent

on the population age 65 and over, and any changes in the utilization of that population could force the GME program to restructure clinical rotations to civilian facilities or to downsize. Every effort should be made to ensure that referrals for the population age 65 and over are captured and executed at the military health centers whenever possible.

Finally, further study is recommended, potentially utilizing data sources that better reflect the actual care provided and not just that which is coded. Further study could also be performed utilizing the methodology outlined in this report when the impact of the Global War on Terror has subsided and the medical centers are closer to their normal clinical capacity.

Limitations

Limitations for the anesthesiology section of this report include areas in program selection, procedure selection, data selection, data collection, data sources, and deployment status. The selection of the programs in this study was left to the subject matter expertise of the Dean of SAUSHEC and was not based on objective criteria. Similarly, the selection of procedures for study within those GME programs was determined by the program directors, as subject matter experts in their respective fields. Limiting the scope of this study to workload taking place only at WHMC and BAMC automatically precludes any experience residents obtain at other military and civilian sites such as UTSA or Fort Hood. Further, the nature of this study dictates that it cannot account for procedural overlap between and among residents. Multiple residents may observe or participate in singular events, and that overlap will not reflect in the procedure coding.

The selection of coding data for the data source was appropriate in that current policy is uncoded visits and procedures did not take place. However, coding completion rates vary

between facilities and between individual clinical areas. This fact introduces variance into the study results. Further, changes in coding practice and policy within the five-year range of this study are not accounted for. Although every effort was made to collect data for every possible code type for each procedure, overlaps and omissions between ICD-9 codes, CPT codes, and DRG codes could not be fully accounted for.

The Accreditation Council for Graduate Medical Education recently published new guidelines for the resident work environment. The most notable of these reforms is the limitation on resident work hours. Program directors reportedly anticipate improved resident safety and well being, but caseload, continuity of care, and education are expected to suffer (Lieberman, Olenwine, Finley, & Nicholas, 2005). This change in work hours limits the number of required cases that a resident may be exposed to. Further, it dictates that facilities must maintain GME workload that is well above the number required for existing residents in order to account for variations in schedule. This variation cannot be accurately measured within the scope of this study, so it serves as a limiting and confounding factor.

Finally, the confounding effects of the Global War on Terror are not fully measurable given the scope of this study. The five-year range of the study was chosen to cover a time period before the war, but the portion of each trend after fiscal year 2002 attributable to the Global War on Terror cannot be fully accounted for. Therefore, any attempts to assign causation for current trends were precluded in the scope of this study.

Obstetrics and Gynecology

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Obstetrics and Gynecology

Obstetrician-gynecologists specialize in the general medical care of women, as well as care related to pregnancy and the reproductive tract. The obstetrician-gynecologist provides services in the areas of preconceptional health, pregnancy, labor and childbirth, postpartum care, genetics, genetic counseling and prenatal diagnosis. Training in gynecology also covers women's general health, including care of reproductive organs, breasts, sexual function, and screening for cancer at multiple sites. Gynecology also includes the management of hormonal disorders, treatment of infections, and training in surgery to correct or treat pelvic organ and urinary tract problems to include cancer of the reproductive organs (American Board of Obstetrics and Gynecology, 2005).

The SAUSHEC obstetrics and gynecology GME program is based primarily at WHMC although some OB-Gyn procedures, particularly surgical procedures, are performed at BAMC. For the purposes of this study, the BAMC workload data will be included in the results wherever applicable. The WHMC anesthesiology GME program is fully ACGME accredited and is a four-year program with authorization for 6 residents per year (24 total).

Methodology

In accordance with the overarching methodology for this project, the Program Director for the WHMC obstetrics and gynecology GME program was interviewed and asked, as the subject matter expert, to provide a list of diagnoses or procedures for which he was concerned about maintaining adequate workload. The procedures and diagnoses that he listed were c-sections, abdominal hysterectomies, and low birth weight deliveries (R. Robinson, Personal Communication, January 31, 2005).

The data for these procedures and diagnoses were collected from the M2 data mart utilizing ICD-9, CPT, and DRG codes. Codes were identified for each of these procedures in order to best identify both inpatient and outpatient procedures. The data collection methodology for each specific diagnosis or procedure will be discussed in greater detail in their individual subsections of this report. The procedures were then quantified by year and a threshold of required procedures was established based on internal matrices.

Because the program director could not cite a specific hypothesis for any anecdotal decrease in procedures, all data for the obstetrics and gynecology will be presented as raw data with descriptive statistics. All Obstetrics and Gynecology procedures under study except hysterectomies were performed at WHMC, and there were no cases age 65 and over in the fiscal years under study. Therefore, the results will only be presented with facility or demographic delineation where appropriate. The results for each procedure will be discussed in detail below.

C-section

As previously discussed, a C-section, also called a cesarean section, is the delivery of a baby through a surgical abdominal incision. A C-section delivery is performed when a vaginal birth is not possible or is not safe for the mother or child. Surgery is usually done while the woman is awake but anesthetized from the chest to the legs by epidural or spinal anesthesia. An incision is made across the abdomen just above the pubic area. The uterus is opened, the amniotic fluid is drained, and the baby is delivered. C-sections are performed for a variety of reasons, including developmental abnormalities of the fetus, Abnormal fetal position, extreme maternal illness, prolonged or arrested labor, very large fetus, and umbilical cord prolapse (National Library of Medicine, 2005).

Methodology

Coding data were used to quantify the number of c-sections performed over the past 5 years. The DRGs 370 (cesarean section with CC) and 371 (cesarean section without CC) were identified as corresponding to c-sections. Raw disposition data (Appendix G) for these two DRG codes were collected from the M2 database along with corresponding demographic data. The data were then compiled for fiscal years 2000-2004 in Microsoft Excel. Because no c-sections were performed at BAMC and none were performed for patients age 65 and over, all data will be presented raw without facility or demographic delineation.

The Program Requirements for Residency Education in Obstetrics and Gynecology published by ACGME (2004) do not specify a mandatory minimum number of c-sections for program accreditation, but instead leaves objective measurements of clinical competency to the local program directors. The WHMC internal medicine program director maintains an internal matrix for the specific number procedures required for each intern to obtain clinical proficiency. This matrix was developed with the intent of meeting the intent of the ACGME RRC standards for obstetrics and gynecology programs and for the direct purpose of properly preparing residents to excel in certification boards. The specific methodology used by the program director for establishing standards is to use the 15th percentile as a minimum. In order to remain above the 15th percentile, the obstetrics and gynecology residency matrix requires each resident to perform a total of 120 c-sections during the course of their four-year residency. The annual requirement for the program was established by multiplying the number of procedures required by each resident by the total number of active residents and dividing the result by the length in

years of the program. This methodology results in an average number of procedures required per year to support the obstetrics and gynecology GME program.

Results

The total number of c-sections at WHMC has increased significantly over the past 5 fiscal years. The data show a steady increase totaling 30% between FY 2000 and FY 2004 (Figure 44). Currently, 24 residents are underway in the WHMC obstetrics and gynecology GME program, requiring 120 c-sections each or a total of 2880 over the course of four years, an average of 720 per year. Over the past five fiscal years, WHMC has averaged well below this requirement, averaging 345.6 procedures per year (Figure 45). The underlying data for each of the Figures below are presented in Appendix C. A sample of the raw data for this study is presented in Appendix G.

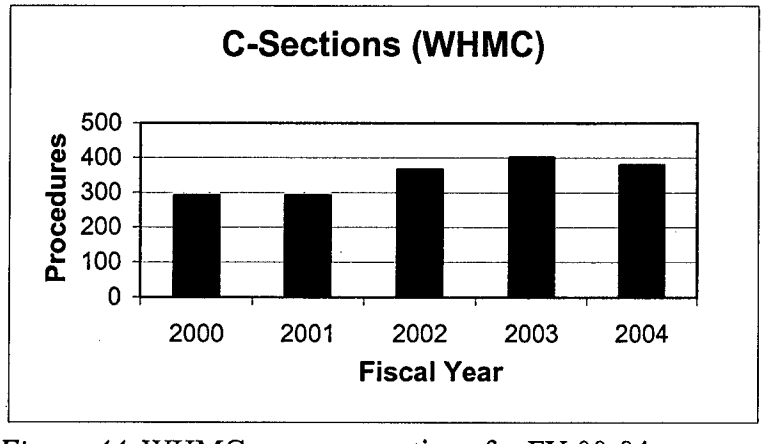

Figure 44. WHMC cesarean sections for FY 00-04.

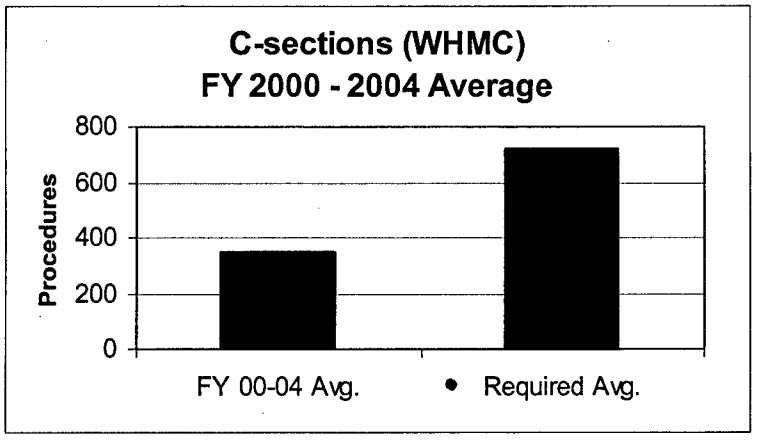

Figure 45. WHMC 00-04 average c-sections by age group compared to required average based on 15th percentile threshold.

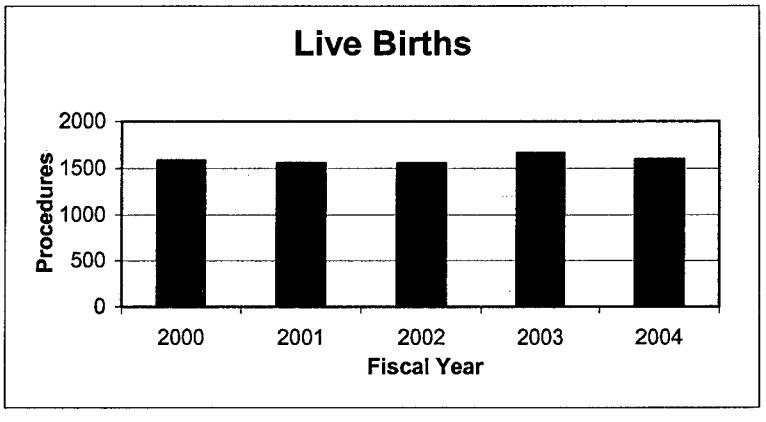

Figure 46. WHMC live births for FY 00-04.

Discussion

The national cesarean rate reached 27.6% in 2003, the highest ever reported (Martin, Kochanek, Strobino, Guyer, & MacDorman, 2005). By comparison, WHMC has an average c-section rate of 21.71% over the past five fiscal years, with an overall increasing trend (Figure 44). The WHMC c-section rate has been closer to 24% over the past 3 fiscal years. This rate is in keeping with the national average, and differences are likely accounted for by the relative health of the military population versus the U.S. population at large.

The total number of live births at WHMC is shown for comparison purposes (Figure 46). The number of c-sections has increased 30% over the past five fiscal years, while the number of total live births has remained relatively constant. Although the increasing trend in overall procedures is encouraging for the WHMC obstetrics and gynecology residency program, it is doubtful that the number of c-sections required to support the existing number of residents will be attained in the near future.

Low Birth Weight Deliveries

The World Health Organization (2005) defines a low birthweight delivery as "any fetus who is delivered to a reproductive female at the end of a pregnancy at a weight of less than 2500 grams." This definition is consistant with WHMC coding and with the methodology and scope of this study.

Methodology

Coding data were used to quantify the number of c-sections performed over the past 5 fiscal years. The DRGs 602 (neonate, birth weight <750g, discharged alive), 603 (neonate, birth weight <750g, died), 604 (neonate, birth weight 750-999g, discharged alive), 605 (neonate, birth weight 750-999g, died), 606 (neonate, birth weight 1000-1499g, w significant OR procedures, discharged alive), 607 (neonate, birth weight 1000-1499g, without significant OR procedures, discharged alive), 608 (neonate, birth weight 1000-1499g, died), 609 (neonate, birth weight 1500-1999g, w significant OR procedures, with multiple major problems), 610 (neonate, birth weight 1500-1999g, with significant OR procedures, without multiple major problems), 611 (neonate, birth weight 1500-1999g, without significant OR procedures, with multiple major problems), 612 (neonate, birth weight 1500-1999g, without significant OR procedures, with

major problems), 613 (neonate, birth weight 1500-1999g, without significant OR procedures, with minor problems), 614 (neonate, birth weight 1500-1999g, without significant OR procedures, with other problems), 615 (neonate, birth weight 2000-2499g, w significant OR procedures, with multiple major problems), 616 (neonate, birth weight 2000-2499g, with significant OR procedures, without multiple major problems), 617 (neonate, birth weight 2000-2499g, without significant OR procedures, with multiple major problems), 618 (neonate, birth weight 2000-2499g, without significant OR procedures, with major problems), 619 (neonate, birth weight 2000-2499g, without significant OR procedures, with minor problems), and 621 (neonate, birth weight 2000-2499g, without significant OR procedures, with other problems) were identified as corresponding to low birth weight deliveries. Raw disposition data for these 19 DRG codes were collected from the M2 database along with corresponding demographic data. The data were then compiled for fiscal years 2000-2004 in Microsoft Excel. Because no deliveries were performed at BAMC and none were performed for patients age 65 and over, all data will be presented raw without facility or demographic delineation.

The Program Requirements for Residency Education in Obstetrics and Gynecology published by ACGME (2004) do not specify a mandatory minimum number of low birth weight cases for program accreditation, but instead leaves objective measurements of clinical competency to the local program directors. The WHMC obstetrics and gynecology GME program director maintains an internal matrix for the specific number procedures required for each intern to obtain clinical proficiency. This matrix was developed with the intent of meeting the intent of the ACGME RRC standards for obstetrics and gynecology programs and for the direct purpose of properly preparing residents to excel in certification boards. The specific

methodology used by the program director for establishing standards was to use the 15th percentile as a minimum. In order to remain above the 15th percentile, the obstetrics and gynecology residency matrix requires each resident to follow a total of 40 low birth weight cases during the course of their four-year residency. The annual requirement for the program was established by multiplying the number of procedures required by each resident by the total number of active residents and dividing the result by the length in years of the program. This methodology results in an average number of procedures required per year to support the obstetrics and gynecology GME program.

Results

The total number of low birth weight deliveries at WHMC has remained consistent over the past 5 fiscal years. The data show a total decrease totaling 23% between FY 2000 and FY 2004 (Figure 47), but the difference is accounted for by normal fluctuation between years and is not indicative of a trend. Currently, 24 residents are underway in the joint SAUSHEC obstetrics and gynecology GME program, requiring 40 low birth weight cases each or a total of 960 over the course of four years, an average of 240 per year. Over the past five fiscal years, WHMC has averaged well below this requirement, averaging 135.4 cases per year (Figure 48). The underlying data for each of the figures below are presented in Appendix C. A sample of the raw data for this study is presented in Appendix G.

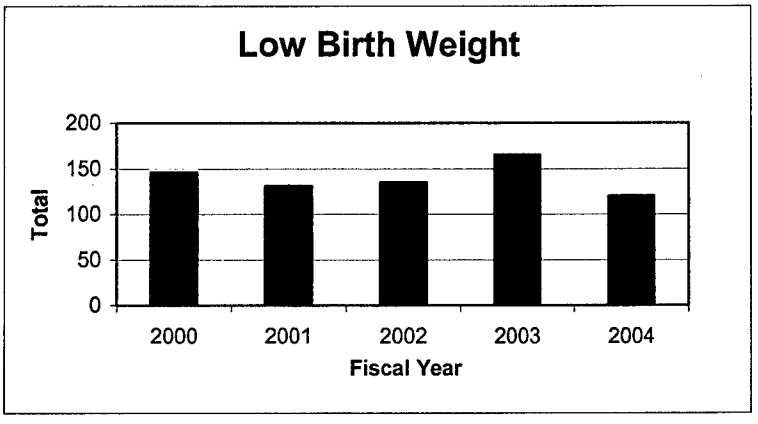

Figure 47. WHMC low birth weight deliveries for FY 00-04.

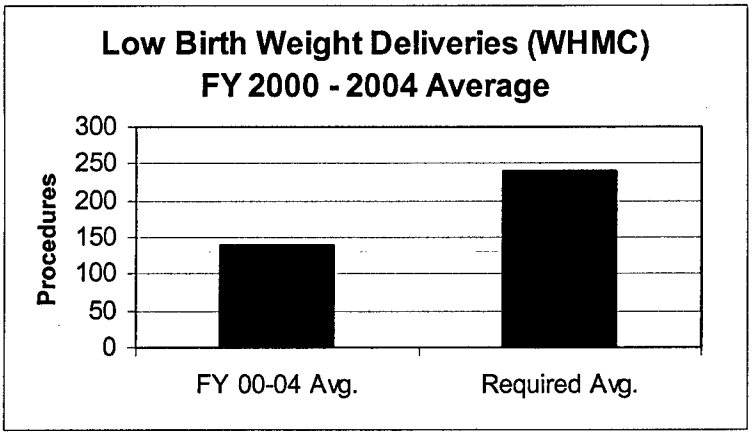

Figure 48. WHMC and BAMC FY 00-04 average craniotomies by age group compared to required average based on 15th percentile threshold.

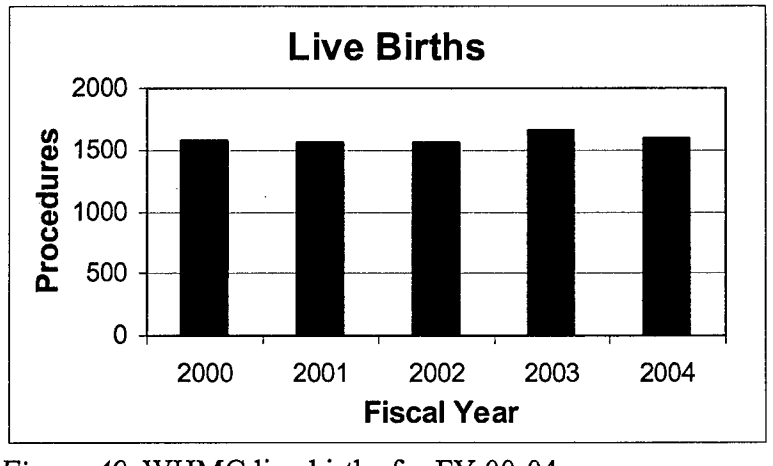

Figure 49. WHMC live births for FY 00-04.

Discussion

The national low birth-weight rate reached 7.82% in 2002, the highest rate reported in 30 years (National Center for Health Statistics, 2004). By comparison, WHMC has an average low birth-weight rate of 8.76% over the past five fiscal years, with an overall decreasing trend (Figure 47). In 2004, the WHMC low birth-weight rate was 7.53%. These rates are consistent with the national average.

The total number of live births at WHMC is shown for comparison purposes (Figure 49). The number of low birth-weight deliveries has decreased by 23% over the past five fiscal years, while the number of total live births has remained relatively constant. Although the decreasing trend in overall procedures is encouraging for the WHMC obstetrics and gynecology residency program in terms of successful prenatal care, it is doubtful that the number of low birth-weight deliveries required to support the existing number of residents (Figure 48) will be attained in the near future.

Total Abdominal Hysterectomy

A hysterectomy is a surgical removal of the uterus, resulting in the inability to become pregnant (sterility). It may be done through the abdomen or the vagina. During a hysterectomy, the uterus may be completely or partially removed. The fallopian tubes and ovaries may also be removed. A partial (or supracervical) hysterectomy is removal of just the upper portion of the uterus, leaving the cervix intact. A total hysterectomy is removal of the entire uterus and the cervix. A radical hysterectomy is the removal of the uterus, the tissue on both sides of the cervix (parametrium), and the upper part of the vagina. A hysterectomy may be performed through an abdominal incision (abdominal hysterectomy), a vaginal incision (vaginal hysterectomy), or

through laparoscopic incisions. Hysterectomies may be recommended for tumors in the uterus, cancer of the cervix, cancer of the ovary, endometriosis, extreme vaginal bleeding, and complications during childbirth (National Library of Medicine, 2005). This study will review data for total abdominal hysterectomies only.

Methodology

Coding data were used to quantify the number of total abdominal hysterectomies performed over the past 5 years at WHMC and BAMC. The CPT code 58150 (total abdominal hysterectomy) and ICD-9 code 68.4 (total abdominal hysterectomy) were identified as corresponding to the total abdominal hysterectomy procedure. Raw disposition data (Appendix F) for these two codes were collected from the M2 database along with corresponding demographic data. The data were then compiled for fiscal years 2000-2004 in Microsoft Excel. Because no total abdominal hysterectomies were coded for patients age 65 and over, all data will be presented without demographic delineation.

The Program Requirements for Residency Education in Obstetrics and Gynecology published by ACGME (2004) do not specify a mandatory minimum number of abdominal hysterectomies for program accreditation, but instead leaves objective measurements of clinical competency to the local program directors. The WHMC obstetrics and gynecology GME program director maintains an internal matrix for the specific number procedures required for each intern to obtain clinical proficiency. This matrix was developed with the intent of meeting the intent of the ACGME RRC standards for obstetrics and gynecology programs and for the direct purpose of properly preparing residents to excel in certification boards. The specific methodology used by the program director for establishing standards is to use the 15th percentile

as a minimum. In order to remain above the 15th percentile, the obstetrics and gynecology residency matrix requires each resident to perform a total of 60 total abdominal hysterectomies during the course of their four-year residency. The annual requirement for the program was established by multiplying the number of procedures required by each resident by the total number of active residents and dividing the result by the length in years of the program. This methodology results in an average number of procedures required per year to support the obstetrics and gynecology GME program.

Results

The total number of abdominal hysterectomies at WHMC and BAMC has decreased significantly over the past 5 fiscal years. The data show a steady decrease totaling 28% between FY 2000 and FY 2004 (Figure 50). Currently, 24 residents are underway in the WHMC obstetrics and gynecology GME program, requiring 60 c-sections each or a total of 1440 over the course of four years, an average of 360 per year. Over the past five fiscal years, WHMC and BAMC have combined to average well below this requirement, averaging 178.4 procedures per year (Figure 51). The underlying data for each of the figures below are presented in Appendix C. A sample of the raw data for this study is presented in Appendix E and Appendix F.

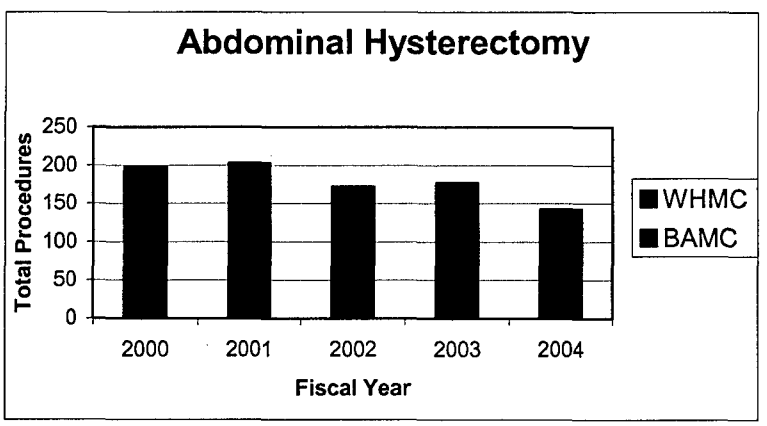

Figure 50. WHMC and BAMC total abdominal hysterectomies for FY 00-04.

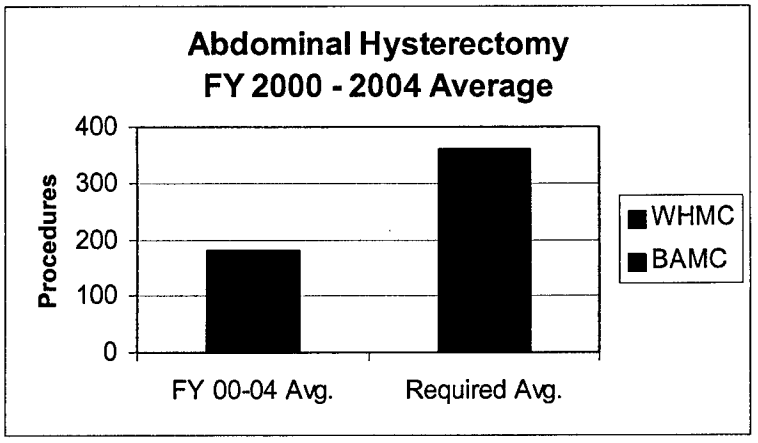

Figure 51. WHMC and BAMC FY 00-04 average total abdominal hysterectomies by age group compared to required average based on 15th percentile threshold.

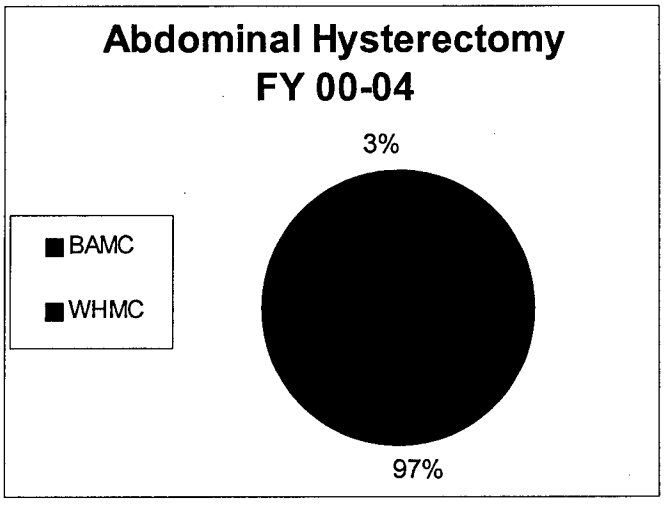

Figure 52. WHMC and BAMC distribution of total abdominal hysterectomies for FY 00-04.

Discussion

A PubMed search of recent medical literature revealed that total abdominal hysterectomies may be falling out of favor in medical practice. Vaginal hysterectomies reportedly show a higher cure rate, shorter operative time, reduced blood loss, reduced morbidity, and minimal mortality when compared to abdominal hysterectomies (Susini, Amunni, Marchionni, Taddei, & Scarselli, 2005). Johnson, Barlow, Lethaby, Tavender, Curr, and Garry (2005) assert that "significantly improved outcomes suggest that vaginal hysterectomy should be

performed in preference to abdominal hysterectomy where possible." Therefore, the variation and trends reported for this procedure in the San Antonio military medical centers is more likely due to changes in accepted treatment regimen and patient access than they are to changes in provider supply or patient demand. The trend for the past five fiscal years reveals that the BAMC and WHMC obstetrics and gynecology GME program average significantly below the number of total abdominal hysterectomies currently required to support the existing residents (Figure 51). This shortfall is compounded by a consistently decreasing trend (Figure 50).

Program Recommendations

Of the three procedures suggested for review by the WHMC obstetrics and gynecology GME program director, each was performed with a frequency that was insufficient to support the requirements of the obstetrics and gynecology residency program. The average number of c-sections and low-birth weight deliveries coded by DRG was barely over half of the quantity required to support the existing number of residents. Abdominal hysterectomies averaged under half of the quantity required, and they were performed almost exclusively at BAMC rather than WHMC, the main site of the obstetrics and gynecology GME program.

Based on these sample procedures, the obstetrics and gynecology GME program appears to be maintaining insufficient workload to support the existing number of residents. These findings are consistent with the concerns of the program director. Careful tracking of the utilization of obstetrics and gynecology services at WHMC and BAMC is recommended in order to determine that the appropriate mix of care is being provided to provide optimum patient care and to support the obstetrics and gynecology residents. Assuming that the majority of cases are

DRG coded, SAUSHEC may not have the case-mix to support the existing number of obstetrics and gynecology residents.

Finally, further study is recommended, potentially utilizing data sources that better reflect the actual care provided and not just that which is coded. Further study could also be performed utilizing the methodology outlined in this report when the impact of the Global War on Terror has subsided and the medical centers are closer to their normal clinical capacity.

Limitations

Limitations for the obstetrics and gynecology section of this report include areas in program selection, procedure selection, data selection, data collection, data sources, and deployment status. The selection of the programs in this study was left to the subject matter expertise of the Dean of SAUSHEC and was not based on objective criteria. Similarly, the selection of procedures for study within those GME programs was determined by the program directors, as subject matter experts in their respective fields. Limiting the scope of this study to workload taking place only at WHMC and BAMC automatically precludes any experience residents obtain at other military and civilian sites such as UTSA or Fort Hood. Further, the nature of this study dictates that it cannot account for procedural overlap between and among residents. Multiple residents may observe or participate in singular events, and that overlap will not reflect in the procedure coding.

The selection of coding data for the data source was appropriate in that current policy is uncoded visits and procedures did not take place. However, coding completion rates vary between facilities and between individual clinical areas. This fact introduces variance into the study results. Further, changes in coding practice and policy within the five-year range of this

study are not accounted for. Although every effort was made to collect data for every possible code type for each procedure, overlaps and omissions between ICD-9 codes, CPT codes, and DRG codes could not be fully accounted for.

The Accreditation Council for Graduate Medical Education recently published new guidelines for the resident work environment. The most notable of these reforms is the limitation on resident work hours. Program directors reportedly anticipate improved resident safety and well being, but caseload, continuity of care, and education are expected to suffer (Lieberman, Olenwine, Finley, & Nicholas, 2005). This change in work hours limits the number of required cases that a resident may be exposed to. Further, it dictates that facilities must maintain GME workload that is well above the number required for existing residents in order to account for variations in schedule. This variation cannot be accurately measured within the scope of this study, so it serves as a limiting and confounding factor.

Finally, the confounding effects of the Global War on Terror are not fully measurable given the scope of this study. The five-year range of the study was chosen to cover a time period before the war, but the portion of each trend after fiscal year 2002 that is attributable to the Global War on Terror cannot be fully accounted for. Therefore, any attempts to assign causation for current trends were precluded in the scope of this study.

Pediatrics

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Pediatrics

Pediatrics is the branch of medicine dealing with the development, care, and diseases of children (American Academy of Pediatrics, 2005). The SAUSHEC pediatrics GME program is a joint program between WHMC and BAMC. The pediatrics program is fully ACGME accredited and is a three-year program with authorization for 14 residents per year (42 total).

Methodology

In accordance with the overarching methodology for this project, the Program Director for the WHMC pediatric GME program was interviewed and asked, as the subject matter expert, to provide a list of diagnoses or procedures for which she was concerned about maintaining adequate workload. She asserted that no specific procedures required study, but that the pediatric RRC does require a minimum number of pediatric inpatients per resident per day. She voiced concern that admissions could be declining. (J. Lynch, Personal Communication, January 6, 2005).

Because of the nature of the program directors request, coding was deemed an inappropriate source for data. Instead, raw inpatient admissions and disposition data for fiscal years 2000-2004 were extracted from the WHMC Executive Information Center (E.I.C.). Inpatient pediatric data for BAMC was excluded because all inpatient pediatric clinical rotations take place at WHMC. Residents rotate through inpatient areas in groups of three; one first-year, one second-year, and one third-year resident.

The Program Requirements for Residency Education in Pediatrics published by ACGME (2005) specify that first year pediatric residents should be responsible for six to ten inpatients and that second and third year residents should be involved in the care for more, not to exceed

30. For the purposes of this study, it was assumed that each resident, regardless of year, should maintain direct care for a bare minimum of six inpatients per day, though more would be preferable. The average number of residents on inpatient pediatric rotations at any given time is 2.6, given that only six-sevenths of the three-resident team is on duty on any given day. Multiplying the average number of residents on inpatient rotations (2.6) by the number of patients required per resident per day (six) results in a minimum daily pediatric census of 15 to support the pediatric GME program.

Results

The total number of beddays per year for pediatric inpatients declined steadily from fiscal year 2000 to fiscal year 2004 (Figure 53). The decline totaled 30% during those five fiscal years. Similarly, inpatient pediatric admissions declined 18% over the five fiscal years under study (Figure 54). The average daily census for WHMC and BAMC decreased 30% from 16.8 to 11.7 patients per day (Figure 55).

Currently, 42 pediatric residents are underway in the joint WHMC and BAMC GME program. Of those, three are on inpatient rotations at any given time. Assuming six/sevenths of those three residents are on duty every day, and assuming that each resident requires a bare minimum of six patients per day based on the RRC guidelines, a daily average of 15 pediatric inpatients per day are required to support the residency program. In the early years of this study, WHMC met that requirement, but in the latter years, WHMC has averaged well below this requirement, the decrease culminating in an average of 11.7 pediatric inpatients per day in FY 2004 (Figure 55). The underlying data for the figures below are presented in Appendix D.

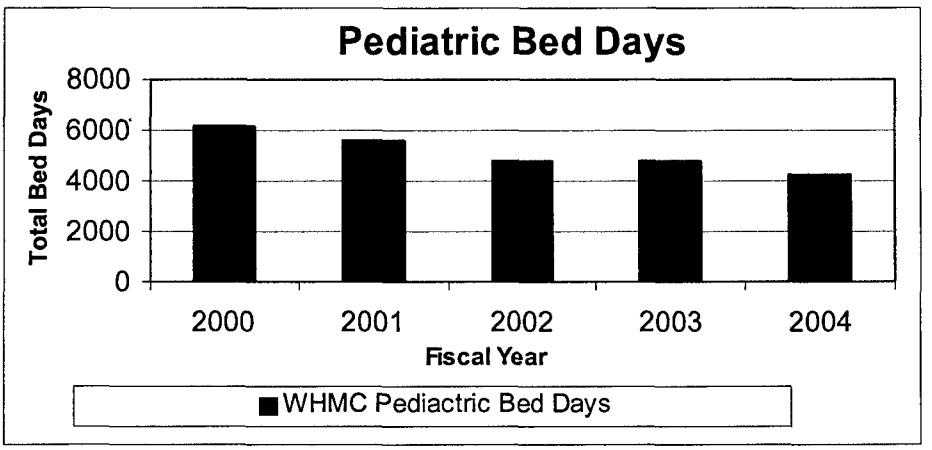

Figure 53. WHMC total inpatient bed days on pediatric ward FY 00-04

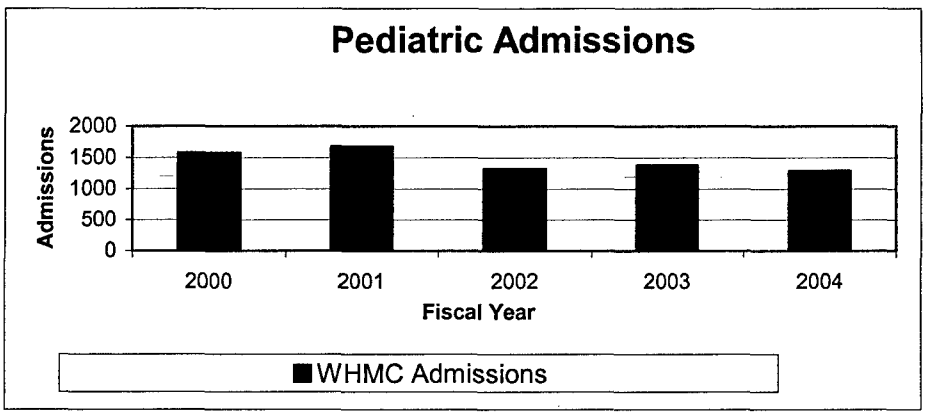

Figure 54. WHMC total inpatient admissions on pediatric ward FY 00-04

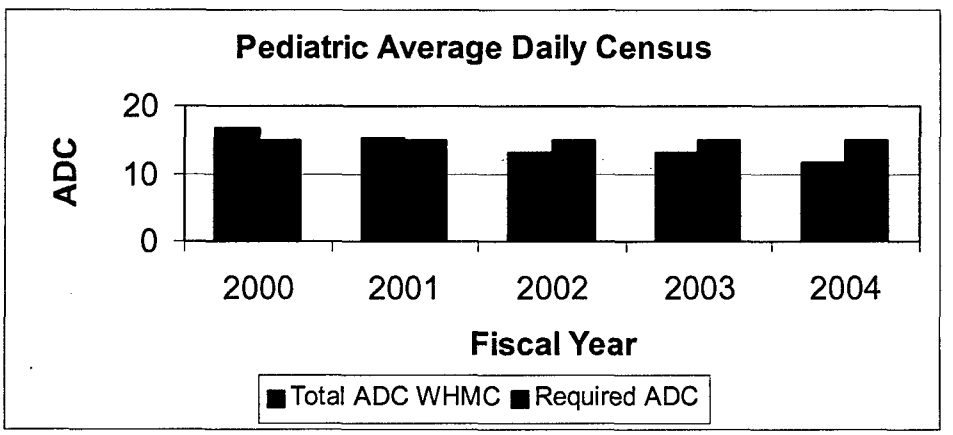

Figure 55. WHMC average daily census of inpatients on the pediatric ward for FY 00-04 compared to number required by pediatric GME RRC (15)

Discussion

A PubMed search of current literature indicates efforts to decrease pediatric admissions and inpatient lengths of stay are underway on both clinical (Flores, Abreau, Chaisson, & Sun, 2003) and administrative fronts. Further, studies indicate pediatric trauma has decreased significantly in the past decade (Mooney & Forbes, 2004), which directly impacts WHMC, as it is currently a level-one trauma center. These factors have each contributed to the overall decrease in inpatient pediatric care at WHMC and BAMC.

The variation and trends reported for pediatric inpatient care in the San Antonio military medical centers is more likely due to changes in accepted treatment regimen and patient access than they are to changes in provider supply or patient demand. The trend for the past five fiscal years reveals that the joint BAMC and WHMC pediatrics GME program has averaged below the daily census required to support the existing number of residents (Figure 55). This shortfall is compounded by a consistently decreasing trend that will likely continue in the coming years.

Program Recommendations

Although inpatient care is decreasing nationwide, a review of inpatient pediatric capacity and access at WHMC is recommended. If WHMC is not maximizing capacity and is maintaining access standards, they likely have insufficient demand for inpatient services to support their large residency program. The validity of the mission requirement for the existing number of residents should be also reviewed. Clinical rotations in civilian facilities may be necessary to maintain the current number of residents. Further study could also be performed utilizing the methodology outlined in this report when the impact of the Global War on Terror has subsided and the medical centers are closer to normal clinical capacity.

Limitations

Limitations for the pediatrics section of this report include areas in program selection, data selection, data collection, data sources, and deployment status. The selection of the programs in this study was left to the subject matter expertise of the Dean of SAUSHEC and was not based on objective criteria. Similarly, the selection of procedures for study within those GME programs was determined by the program directors, as subject matter experts in their respective fields.

The Accreditation Council for Graduate Medical Education recently published new guidelines for the resident work environment. The most notable of these reforms is the limitation on resident work hours. Program directors reportedly anticipate improved resident safety and well being, but caseload, continuity of care, and education are expected to suffer (Lieberman, Olenwine, Finley, & Nicholas, 2005). This change in work hours limits the number of required cases that a resident may be exposed to. Further, it dictates that facilities must maintain GME workload that is well above the number required for existing residents in order to account for variations in schedule. This variation cannot be accurately measured within the scope of this study, so it serves as a limiting and confounding factor.

The confounding effects of the Global War on Terror are not fully measurable given the scope of this study. The five-year range of the study was chosen to cover a time period before the war, but the portion of each trend after fiscal year 2002 that is attributable to the Global War on Terror cannot be fully accounted for. Because of this confounding factor, any attempts to assign causation for current trends were precluded in the scope of this study.

Conclusion

With few exceptions, most indicators selected for study have trended negatively over the past five fiscal years. Further, the indicators reviewed for the anesthesiology, pediatrics and obstetrics and gynecology programs were all below the level required to sustain the current number of residents in each respective program. Finally, the dependence of the internal medicine and anesthesiology programs on population age 65 and over presents a unique challenge in terms of eligibility policy.

Although the internal medicine procedures were adequate for the current number of residents, the dependence of the program on the population age 65 and over could be cause for concern if the MTFs continue to lose workload from that group. The two San Antonio MTFs must continue to monitor utilization by the elderly population if they intend to maintain the current size of their respective GME programs. Any major change in their eligibility for care due to TRICARE or local policies could drastically affect the workload necessary to support the internal medicine and anesthesiology GME programs.

The current level of inpatient pediatric care does not appear to be sufficient to maintain the current size of the pediatric GME program. Further, pediatric inpatient care has trended consistently downward over the past five fiscal years. Although this study did not include inpatient pediatric care provided at other civilian facilities, the pediatric GME program should assess the need for the current scope of their program and the workload needed to support that scope.

Further, additional study should be pursued to determine the cause of decreasing workload in those procedures where the decline cannot be accounted for by changes in clinical

practice. The Global War on Terror currently serves as a terminally confounding factor for this study at this time, but as clinical capacity normalizes, the trends identified in this study should be assessed for causation.

Military treatment facilities are not alone in their struggles to maintain caseload and funding in support of GME programs. Civilian GME programs also face major challenges in maintaining patient care standards and for financing GME. Medicare, widely considered the primary payer for GME programs, has drastically reduced funding for GME programs in recent years and many civilian GME programs are struggling or closing as a result (Koenig, Allen, Ho, Siegel, Blumenthal & Weissman, 2003). As the military health system receives no direct funding from Medicare, most GME activities are internally financed resulting in an even lower rate of return on GME investment. Rather than balancing funding and workload to determine the appropriate sizes of their GME programs, the military must balance mission requirements and unpredictable workload to appropriate funding for the best size and mix of GME programs. Measurably insufficient workload places the San Antonio military GME programs in the position of having to monitor very closely the appropriate number of residents their medical centers can sustain while simultaneously balancing that against an unpredictable readiness requirement. Further study is required in order to determine the best balance between the quantity of residents required and the best possible practical application of skill for each resident. The number of physicians in each specialty required by military health system should be the primary determinant for the size of residency programs, and strategies should be enacted to adjust market share accordingly.

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Appendix A

Internal Medicine Data

Internal Medicine

Lumbar Punctures

	2000	2001	2002	2003	2004	FY 00-04 Avg.
BAMC <65	96	246	250	209	214	203
BAMC >65	54	60	89	78	61	68.4
BAMC Total	150	306	339	287	275	271.4
WHMC <65	580	521	504	397	417	483.8
WHMC >65	86	60	73	81	51	70.2
WHMC Total	666	581	577	478	468	554
Total	816	887	916	765	743	825.4

Thoracentesis

	2000	2001	2002	2003	2004	FY 00-04 Avg.
BAMC <65	70	57	91	62	85	73
BAMC >65	86	108	116	99	111	104
BAMC Total	156	165	207	161	196	177
WHMC <65	66	49	41	37	29	44.4
WHMC >65	63	69	50	55	51	57.6
WHMC Total	129	118	91	92	80	102
Total	285	283	298	253	276	279

Abdominal Paracentesis

	2000	2001	2002	2003	2004	FY 00-04 Avg.
BAMC <65	48	51	29	46	40	42.8
BAMC >65	58	39	30	30	36	38.6
BAMC Total	106	90	59	76	76	81.4
WHMC <65	69	58	44	47	64	56.4
WHMC >65	29	37	39	25	40	34
WHMC Total	98	95	83	72	104	90.4
Total	204	185	142	148	180	171.8

Central Catheter Placement

	2000	2001	2002	2003	2004	FY 00-04 Avg.
BAMC <65	2904	3163	2473	597	243	1876
BAMC >65	2086	2335	1942	543	266	1434.4
BAMC Total	4990	5498	4415	1140	509	3310.4
WHMC <65	466	650	771	975	470	666.4
WHMC >65	195	158	297	400	235	257
WHMC Total	661	808	1068	1375	705	923.4
Total	5651	6306	5483	2515	1214	4233.8

Appendix B

Anesthesiology Data

Anesthesiology

Cardiovascular Intrathoracic Procedures						
	2000	2001	2002	2003	2004	FY 00-04 Avg.
BAMC <65	70	54	28	42	41	47
BAMC >65	58	69	52	40	60	55.8
WHMC <65	63	60	49	37	28	47.4
WHCM >65	93	98	86	40	51	73.6
Total	284	281	215	159	180	223.8

Major Vascular Procedures						
Fiscal Year	2000	2001	2002	2003	2004	FY 00-04 Avg.
BAMC <65	26	22	14	22	22	21.2
BAMC >65	34	34	27	30	19	28.8
WHMC <65	13	17	20	18	15	16.6
WHCM >65	39	39	28	18	16	28
Total	112	112	89	88	72	94.6

C-Sections						
	2000	2001	2002	2003	2004	FY 00-04 Avg.
BAMC <65	0	0	0	0	0	0
BAMC >65	0	0	0	0	0	0
WHMC <65	291	291	366	401	379	345.6
WHCM >65	0	0	0	0	0	0
Total	291	291	366	401	379	345.6

Craniotomy						
	2000	2001	2002	2003	2004	FY 00-04 Avg.
BAMC <65	21	55	45	60	26	41.4
BAMC >65	61	17	7	14	11	22
WHMC <65	57	47	50	74	60	57.6
WHCM >65	13	18	19	23	12	17
Total	152	137	121	171	109	138

Appendix C

Obstetrics and Gynecology Data

Obstetrics and Gynecology

C-sections						
	2000	2001	2002	2003	2004	FY 00-04 Avg.
BAMC <65	0	0	0	0	0	0
BAMC >65	0	0	0	0	0	0
WHMC <65	291	291	366	401	379	345.6
WHCM >65	0	0	0	0	0	0
Total	291	291	366	401	379	345.6
Rate per live birth	18.38%	18.70%	23.55%	24.16%	23.78%	21.71%

Live Births						
	2000	2001	2002	2003	2004	FY 00-04 Avg.
BAMC <65	0	0	0	0	0	0
BAMC >65	0	0	0	0	0	0
WHMC <65	1583	1556	1554	1660	1594	1589.4
WHCM >65	0	0	0	0	0	0
Total	1583	1556	1554	1660	1594	1589.4

Low Birth Weight Deliveries						
	2000	2001	2002	2003	2004	FY 00-04 Avg.
BAMC <65	0	0	0	0	0	0
BAMC >65	0	0	0	0	0	0
WHMC <65	146	131	135	165	120	139.4
WHCM >65	0	0	0	0	0	0
Total	146	131	135	165	120	139.4
Rate per live birth	9.22%	8.42%	8.69%	9.94%	7.53%	8.76%

Total Abdominal Hysterectomies						
	2000	2001	2002	2003	2004	FY 00-04 Avg.
BAMC	196	202	163	171	134	173.2
WHMC	2	1	9	6	8	5.2
Total	198	203	172	177	142	178.4

Appendix D

Pediatrics Data

Pediatrics

Average Daily Census						
	2000	2001	2002	2003	2004	FY 00-04 Avg.
Total ADC WHMC	16.78	15.27	13.25	13.08	11.72	14.02
Required ADC	15	15	15	15	15	15

Admissions						
	2000	2001	2002	2003	2004	
Total WHMC Admissions	1574	1669	1319	1378	1287	1445.4

Appendix E

Sample ICD-9 Raw Data

Dispos	Age Grp	FMP	FY	Proc1	Proc2	Proc3	Proc4	Proc5	Proc6	Proc7	Proc8	DMIS
1	A	01	2000	0331	8749	8801	8831	9929	9921			0117
1	A	01	2000	0331	9002	9921	9132	9052	8876	9929		0117
1	A	01	2000	0331	9092							0117
1	A	01	2000	0331	9921	9052	9132	9002				0117
1	A	01	2000	3893								0117
1	A	01	2000	3893	3899	9983						0117
1	A	01	2000	3893	9905	9904	9921	9052	8801	9974		0117
1	A	01	2000	3893	9921	9132	9929					0117
1	A	01	2000	8622	8894	9921	3893					0117
1	A	01	2001	0331	9921	9394	8744	9052	9132			0117
1	A	01	2001	0331	9921	9396						0117
1	A	01	2001	3892	3891	3893	9547					0117
1	A	01	2001	3893	9929							0117
1	A	01	2001	640	9983	8967	3893	9929				0117
1	A	01	2001	9604	9607	3892	3893	9983	9390	9396		0117
1	A	01	2001	9604	9960	9671	0331	3892				0117
1	A	01	2002	0331	9921	8967						0117
1	A	01	2002	0331	9921	9132						0117
1	A	01	2002	3893	9921	640						0117
1	A	01	2002	5471	5472	9672	8967	9396	3893	9904	3891	0117
1	A	01	2002	640	9929	3893	8967	8762	9547	8809		0117
1	A	01	2002	8967	0331	3893	9921					0117
1	A	01	2002	8967	3893	966	640	9921				0117
1	A	01	2002	9921	3893	9923						0117
1	A	01	2002	9921	8967	3893	640					0117
1	A	01	2002	9925	0331	8744	3893	8877				0117
1	A	01	2002	9929	0331							0117
1	A	01	2003	3893	640							0117
1	A	01	2003	3965	9671	8967	3893	3891	3404	8945	9905	0117

Appendix F

Sample CPT Raw Data

Encounters	Age	FY	FMP	Proc 1	Proc 2	Proc 3	Proc 4	DMIS
1	0	2000	01	A4344	90784	62270	36000	0117
1	0	2000	04	99000	90782	62270	36415	0117
1	3	2000	02	90781	62270			0117
3	3	2000	07	96450	62270	36000		0117
1	4	2000	02	99141	99000	62270	36000	0117
1	4	2000	02	99141	99000	94760	62270	0117
1	6	2000	01	62270	36000			0117
1	7	2000	01	96450	90781	62270	36000	0117
1	7	2000	03	90784	62270			0117
1	16	2000	01	62270				0117
1	18	2000	20	73560	20600			0109
1	18	2000	98	76942	36489			0109
4	19	2000	20	62270				0117
1	19	2000	20	94760	90784	90780	62270	0117
1	20	2000	01	99000	90780	62270	36415	0117
1	21	2000	20	62270				0117
1	21	2000	20	90780	84702	81002	62270	0117
1	21	2000	20	90784	90781	90780	62270	0117
2	21	2000	20	99000	36534	36489		0109
1	22	2000	30	36489				0117
2	23	2000	20	20600				0117
2	23	2000	30	62270				0117
1	24	2000	20	29075	20600			0109
2	24	2000	20	99000	96410	36534	36489	0109

Appendix G

Sample DRG Raw Data

Dispos	Age Group	FY	FMP	DRG	DRG Desc	DMIS
1	D	2003	98	1	CRANIOTOMY AGE >17 W CC	117
1	D	2004	98	1	CRANIOTOMY AGE >17 W CC	117
2	H	2002	98	1	CRANIOTOMY AGE >17 EXCEPT FOR TRAUMA	117
4	H	2003	30	1	CRANIOTOMY AGE >17 W CC	109
2	H	2004	30	1	CRANIOTOMY AGE >17 W CC	109
1	D	2003	20	1	CRANIOTOMY AGE >17 W CC	109
1	D	2004	20	1	CRANIOTOMY AGE >17 W CC	109
1	E	2001	20	1	CRANIOTOMY AGE >17 EXCEPT FOR TRAUMA	109
1	E	2001	30	1	CRANIOTOMY AGE >17 EXCEPT FOR TRAUMA	109
1	D	2000	20	1	CRANIOTOMY AGE >17 EXCEPT FOR TRAUMA	117
1	D	2001	1	1	CRANIOTOMY AGE >17 EXCEPT FOR TRAUMA	117
3	D	2000	20	1	CRANIOTOMY AGE >17 EXCEPT FOR TRAUMA	109
1	D	2003	98	1	CRANIOTOMY AGE >17 W CC	109
1	D	2001	3	1	CRANIOTOMY AGE >17 EXCEPT FOR TRAUMA	117
2	D	2002	20	1	CRANIOTOMY AGE >17 EXCEPT FOR TRAUMA	109
3	F	2001	20	1	CRANIOTOMY AGE >17 EXCEPT FOR TRAUMA	117
1	F	2001	30	1	CRANIOTOMY AGE >17 EXCEPT FOR TRAUMA	117
1	F	2002	33	1	CRANIOTOMY AGE >17 EXCEPT FOR TRAUMA	109
1	E	2003	20	1	CRANIOTOMY AGE >17 W CC	117
1	E	2004	20	1	CRANIOTOMY AGE >17 W CC	117
1	F	2001	2	1	CRANIOTOMY AGE >17 EXCEPT FOR TRAUMA	109
1	F	2002	98	1	CRANIOTOMY AGE >17 EXCEPT FOR TRAUMA	117
15	G	2000	20	1	CRANIOTOMY AGE >17 EXCEPT FOR TRAUMA	109
6	G	2000	30	1	CRANIOTOMY AGE >17 EXCEPT FOR TRAUMA	109