

Improving Productivity through Physician Profiling

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Abstract

Provider profiling is a tool used within healthcare management to determine differences between individual provider productivity levels. This study will attempt to identify some of the variables that influence provider productivity. Specifically, within Blanchfield Army Community Hospital, historical data will be used to determine what group of providers demonstrates the highest level of productivity. Productivity was operationally defined as total simple relative value units (RVUs). These totals represent monthly workload level by provider in each clinical area. The study used multiple linear regression analyses to examine the relationships among variables. Study findings supported the hypothesis that contract medical doctors generate the highest overall productivity. The statistical model yielded $R^2 = .091$ with $F(14, 3404) = 24.38$, $p < .001$. Other variables that emerged with statistical significance were gender, age, location, and board certification. Employment status emerged as the premier variable accounting for nearly 50% of the unique variance explained by this model.

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Improving Productivity through Physician Profiling

Introduction to the study

Physicians are directly responsible for 80 percent of the costs generated in providing healthcare in the United States. These costs derive from such items as procedures, tests, inpatient hospital stays, prescription drugs, and return visits. Healthcare is an industry in which those directly responsible for generating the costs (the providers) as well as those receiving the services (the patients) are almost totally unaware of the costs involved. This is one of the many reasons why healthcare costs are rising at such an astronomical rate (Ranson, S., Pinsky, W., & Tropman, J., 2000).

Unlike private sector hospitals, personnel costs at military hospitals are paid by an external source. As one might expect in a healthcare setting, labor expenses represent the largest expenditure. Time spent improving efficiency in this line of expense often yields the most significant improvement in overall efficiency. The budget for Blanchfield Army Community Hospital for fiscal year 2005 is displayed in figure 1.

Blanchfield Army Community Hospital

FY 2005 Financial Status

13-Dec-05

TOTAL DHP FUNDING (In Thousands)

	Available
Medical Care	104,699
Tricare	22,606
Dental	4,175
Veterinary	389
RPMA	11,970
Environmental	54
Total	<u>\$143,893</u>



MEDICAL CARE COST DETAIL (In Thousands)

	Core Budget	GWOT	2005 Total	2004 Total
Pay	40,499	4,689	45,188	40,871
Travel	775	23	798	975
Supplies	6,606	1,681	8,287	8,698
Pharmacy (\$20,640K Target)	20,766	5,457	26,223	21,931
Equipment	3,311	282	3,593	1,738
Contracts	12,749	5,154	17,903	11,016
Other	2,620	87	2,707	3,145
	<u>\$87,326</u>	<u>\$17,373</u>	<u>\$104,699</u>	<u>\$88,374</u>

Figure 1: FY 05 BACH Budget

As healthcare organizations struggle with increasing costs and restrictive reimbursement policies, they are increasingly focusing on provider productivity. Monitoring physician expenses at each visit is an impractical solution; it would require more resources than it could possibly save. Physician profiling provides the appropriate visibility at a reasonable cost.

Physician profiling is an analytical tool used to assess health care delivery by focusing on patterns of care rather than on individual occurrences of care (Pechman,

2000). As early as 1970, organizations were profiling provider clinical practices. This early focus advanced the industry's ability to monitor costs and workload.

The healthcare industry is constantly changing and evolving from the way we provide healthcare to the way that care is reimbursed. Early fee-for-service medical reimbursement was quite simple. Individuals or insurance companies simply paid directly for the care received. As healthcare costs have increased at a rate much higher than inflation, different reimbursement methods have attempted to control medical expenses. Managed care evolved as one possible solution in the attempt to control increasing medical expenses. Gatekeepers are used to control access to high cost medical specialists. Additionally, managed care coordinates access by determining locations where individuals may seek healthcare. This allows organizations to control costs by either hiring providers in a salary type arrangement or by establishing volume based discounted rates with provider organizations. Managed care demonstrates some success with controlling costs, but costs continue to increase at a rapid rate. Capitation, as a reimbursement rate, is another possible solution to escalating costs. Capitation works by collecting a fixed per-person payment, made in advance by the insurance

company to the healthcare provider. When an individual enrolls in a Health Maintenance Organization (HMO), for example, the insurance company advances the healthcare provider a fixed amount of money for that individual's care, regardless of how many services that particular individual needs or utilizes. This style of prospective payment shifts the risk to the provider who is assuming responsibility for the healthcare of individuals at a per member per month rate. This method of reimbursement is a fundamental shift away from a volume based reimbursement to providing incentives to keep individuals healthy and out of the healthcare setting.

The shift in reimbursement methodology increases the importance of physician profiling as a tool for healthcare organizations in order to maintain financial viability and fiscal stability in today's healthcare market. Organizations are better equipped to choose the providers they hire or to whom they contract. As such, it is imperative an organization understands the productivity levels of its providers. Provider profiling is one way an organization can obtain data on the productivity of their providers. Research shows that by engaging in profiling physicians alone results in increased provider productivity.

The Military Health System (MHS) is facing many of the same problems. The MHS must maintain costs similar to those of private healthcare organizations. If the costs of providing healthcare are significantly higher than in private organizations then the MHS will come under public scrutiny. The MHS must demonstrate fiscal responsibility by providing cost effective healthcare. Facing these challenges coupled with the challenges of the Global War on Terrorism (GWOT), the MHS must maximize its ability to increase workload and minimize potential waste. The key to achieving this goal is to work in concert with providers to maximize their productivity.

The three main areas physician profiling can focus on are; clinical quality of care, patient expectations or satisfaction, and resource consumption. When conducting physician profiling it is important to monitor all three areas because a physician may perform above their peers in one area but have a much lower score in another area. One of the major assumptions of provider profiling is that, "a reduction in unexplained variation and a change in professional behavior towards some ideal state will occur over time" (Pechman, 2000, p. 52).

Monitoring physician productivity requires a standardized measurement which allows all physicians to be

compared to one another. Relative Value Units (RVUs) were developed to meet this requirement. RVUs assign relative values or weights to medical procedures primarily for the purpose of reimbursement, but they are also used for productivity measurement, cost analysis, and benchmarking. Glass and Anderson (2002a) define RVUs as non - monetary relative units of measure assigned to medical common procedural terminology (CPT) codes. CPT codes were developed to aid in the reimbursement of healthcare and cover the gamut of possible medical interventions by assigning a code to each intervention. RVUs establish the financial worth of specific interventions in relation to other interventions by analyzing health economics, health insurance plans, managed care and provider contracting, utilization and clinical practice management, claims processing, outcomes research, and a variety of different risk analyses for a specific intervention (Glass & Anderson, 2002b).

Benchmarking goes one step further by allowing comparison of individuals both internally and externally. Benchmarking is defined as a process of measuring another organization's product or service according to specified standards in order to compare it with and improve one's own product or service. Glass and Piland (2002) outline an

eleven step process of benchmarking to monitor the processes of the physician profiled. The eleven step process is comprised of the following steps: 1. Establish internal practice objectives and strategy, 2. Identify performance indices for individuals, specialties and the group, 3. Identify available benchmark sources, 4. Collect data, 5. Perform data comparison, 6. Communicate findings, 7. Develop action and assessment plans, 8. Implement plans and monitor progress, 9. Assess practice objectives; evaluate benchmark standards measurements, 10. Repeat, 11. Recalibrate (p. 120-121). This study will not address the process of benchmarking that is used by the South East Regional Medical Command (SERMC) to establish RVU production goals.

Beyond developing a sound process of performing provider profiling the organization must focus on data quality and involving physician champions to facilitate provider buy-in. Often providers question data by stating that the data is biased against certain types of practices. The use of RVUs eliminates any productivity bias that may exist in the practice's charges and/or office visit volume data, because it is directly linked to physician coding (Glass & Anderson, 2002b, p. 286). MHS coding presents a challenge in that providers do not have any direct

financial incentives to code. Even with the limitations, profiling can identify over or underutilization of services, problems with efficiency and quality of care, and provider performance issues. To overcome data limitations it is imperative that a coding audit is completed to assure that the data is correct and representative of the provider's actual workload. This is especially important in organizations, such as the MHS, where providers are reimbursed based on predetermined salary schedule or contract and not directly by workload produced. Profiling has broad applications for not only health care professionals, but for patients, payers, medical educators, and policy makers (Pechman, 2000, p. 51). As an organization we have much to learn from the habits of providers. Studying profiling may allow for cost containment as providers are responsible for generating the majority of our healthcare costs.

a. Conditions that prompted the study

Currently at Blanchfield Army Community Hospital (BACH) primary care physicians are profiled by daily reports displaying the number of providers by name working in each of the primary care clinics and the number of patients templated for each provider for that day (Appendix 2). An additional report, generated daily, displays actual

workload produced three business days prior (Appendix 3).

The process of provider profiling is new at BACH and currently focuses only on monitoring primary care productivity.

At BACH, the outcomes management department compiles data from the MHS mart (M2) and Composite Health Care System (CHCS II) and disseminates the results to the clinic chiefs and hospital executives. The information is briefed to the hospital Commander from the clinical perspective to determine if the hospital is meeting workload goals established by the SERMC. The SERMC funding model holds organizations responsible for generating appropriate workload relative to the resources invested. Workload projections are a dynamic process including seasonal trends and fluctuating patient populations based on deployment cycles.

Failure to meet the workload projections results in a financial penalty as a certain percentage of the hospital budget directly corresponds to these projections. SERMC, through a process of benchmarking, established target level RVU production goals for each product line in the business plan as displayed in figure 2. Clinic Medical Expense and Performance Reporting System (MEPRS) codes are used to identify each clinic within the hospital. MEPRS codes are

standardized within the MHS with all B codes representing outpatient clinics.

PRODUCT LINE	CLINIC MEPRS	RVU TARGET PER DAY PER PROVIDER
BEHAVIORAL HEALTH	BFAA, BFB2, BFBA, BFCA, BFDQ, BFE2, BFEB, BFFA	16
DERMATOLOGY	BAPA	20
EMERGENCY MEDICINE	BIAA	12
ENT	BBF5, BBFA	19.1
EYE	BBD5, BBDA, BBDQ, BHCC	17.2
GENERAL SURGERY	BBA5, BBAA	10.4
IM SUBSPECIALTIES	BABA, BACC, BAG5, BAGA, BAKA, BAKC, BALA, BALC	12.4
MUSCULOSKELETAL	BEA5, BEAA, BEDA, BEEA, BEF5, BEFA, BLAA, BLAE	16.1
OB/GYN	BCB5, BCBA, BCC0, BCC5, BCCA, BCCL	17.3
OTHER	BBLA, BHDA, BHDB, BHFA, BHGA, BHGB, BLBA, FBNA, FBNB	13.2
PRIMARY CARE	BAAI, BDAA, BDAB, BGAB, BGAC, BGAD, BHA2, BHAI, BHAM, BHAP, BHAS, BHBA, BJAA	14.5
SURGICAL SUBSPECIALTIES	BBG5, BBGA, BBI5, BBIA	8.9

Figure 2: RVU Production Goals

BACH recently converted all outpatient primary care clinics to CHCS II and will continue the effort in the specialty clinics until they reach 100% implementation. The conversion places the onus on the provider as this new system automatically codes encounters. Providers initially must create encounter templates to efficiently use the system. Until these templates are established the provider must review the coding and manually override incorrect

coding. This places the hospital in a prime position to perfect the use of physician profiling by developing more complex RVU measuring criteria and increasing the speed in which the information is presented at both the provider and command level. This level of analysis will demonstrate to providers the importance of proper coding.

With recent changes in MHS funding based on workload projections it is critical the BACH Command group understands which provider groups are most efficient and effective. When a particular clinic, individual provider or group of providers are identified as falling below the SERMC benchmark, coding audits can be focused in these areas. If coding is found to be an accurate reflection of workload, then interventions can be made to attempt to increase productivity. The intent is to increase the Commander's awareness of outpatient clinical performance so adjustments can be made early to maximize productivity.

b. Statement of the Problem or Question

Which group of providers is the most productive? Specifically within BACH outpatient clinical areas which group is most productive? Is productivity related to age, gender, education level, or employment status within the organization (military, civil servant, or contractor?).

c. Literature Review

The use of physician profiling is a new performance monitoring technique that is here to stay. Literature on the subject relieves slightly different definition of the process. Physician profiling defined in the article *physician performance assessment* (2003) is, "an administrative tool that can be used to improve effectiveness and monitor the effects of changes in health policies across organizations or groups of physicians" (Parkerton, Smith, Belin, & Feldbau, p. 1034). Goldfield, Gnani, and Majeed (2003) define physician or provider profiling as, "an attempt to measure the performance of doctors and providers of healthcare by supplying interested parties with information on the structure, process, and outcomes of healthcare" (p. 744). These definitions are slightly different but the focus remains on monitoring physician effectiveness.

The first definition of physician profiling was developed in 1914 by Ernest Goodman. Early attempts with physician profiling have been influenced by improvements in technology and by the consumer. Changes in technology now allow for the use of automation in data collection. Today's consumer is demanding to see outcomes and value for their healthcare dollar. The practice of profiling

physicians allows organizations the opportunity to monitor outcomes, quality of care, and efficiency at the level of the individual provider, medical group, or at the health plan level (Parkerton et al., 2003). Profiling providers is a tool that can assist an organization in demonstrating value to the consumer.

Organizations must assess the benefits of spending the resources necessary to conduct physician profiling. In an organization that is technologically advanced in automation, the process will require fewer resources and be easier to implement. The practice of profiling physicians can allow an organization to identify areas that need improvement, provide feedback to physicians to improve performance, quality, and efficiency, as well as provide management with a way to better select, motivate, and reward physicians (Parkerton et al., 2003).

Profiling includes numerous different measures and can be customized to meet an organization's mission. The two major branches of physician profiling are clinical and economic profiling. Clinical profiling focuses on the provider's style of practice by comparing treatments and services utilized and the outcomes of their care against those of other similar providers. Economic profiling focuses on measuring resources used and the resulting costs

of care. Both of these branches of physician profiling combine to allow the purchasers of healthcare to measure the quality and variability of the services for which they are paying (Goldfield, Gnani, & Majeed, 2003).

The clinical focus on physician profiling includes a measure of patient satisfaction, disease-management profiles for chronic conditions, and measures of preventive services provided by physicians with defined patient populations. These are a few examples of measures used in the clinical profiling of providers. Much of the data used in this process is based on the Health Plan Employer Data and Information Set (HEDIS). This data set is widely accepted in the healthcare industry. The measures include: 1. Components of effectiveness, 2. Access, 3. Patient satisfaction, 4. Stability, 5. Utilization, 6. Cost, 7. Organization descriptions (Parkerton et al., 2003).

When conducting physician profiling it is important to remember that the number of RVUs a provider can produce is related to many factors, some of which are outside the control of the physician. Clinic and building design, support staff ratios, and logistical support are a few of the issues outside the immediate control of a provider working in a military setting. Proper documentation and coding of medical visits and encounters in both inpatient

and outpatient settings are factors over which providers have direct control.

Relative Value Units differ from one location to the next based on regional conversion factors. The method of RVU calculation also varies based on the facility and the number of factors incorporated in the calculation. RVU figures are based on three components. The physician work component makes up 52% of the total RVU value. This number is based on physician time, technical skill, and physical effort. The regional conversion factor accounts for about 44% of the total, with the remaining four percent based on the cost of medical liability insurance by geographic area (Hamilton, 2004). The regional conversion factor is unique based on geographic location. RVUs are typically multiplied by regional conversion factors (CFs) to establish a dollar value (alternativelink, n.d.). For example, an RVU of 5.2 would be multiplied by a conversion factor of \$10.00 to establish a baseline value of \$52 for the corresponding service. For another service, the RVU might be 12.4 and, with the same conversion factor, the baseline value would be \$124.

Based on these three factors every organization should be able to determine the cost per RVU at either the clinic or organization level. This figure can then be used to

make business decisions concerning services to provide within an organization. To determine the cost per RVU the organization would start by determining the cost of operation for the organization with all expenses included. Then the organization would determine their annual RVU production level by looking at billing reports. Once this total production figure is generated, the cost of running the organization is divided by the annual production of RVUs to determine a cost per RVU (Hamilton, 2004). This figure can then be refigured at the clinic level or the provider level. Once this has been done the cost of production versus the amount of reimbursement can be compared. This figure is critical to the MHS as it might be financially sound to send certain types of care and services to the network and adjust or reallocate resources within the facility to optimize services that can be delivered at a lower cost.

The M2 system bases the RVU calculation solely on the physician work component (M.E. Arrington, personal communication, 5 September, 2005). The practice expense is counted in the Ambulatory Patient Group weight, while malpractice is not an element of the calculation (Working Information Systems to Determine Optimal Management, 2003, p. 7). Ambulatory patient group weight is a figure for

explaining the amount and type of resources used for each different type of visit. In a civilian hospital setting RVUs include all three elements: 1. Malpractice, 2. Physician work component 3. Regional conversion factor. Therefore, when comparing RVU production figures one should only compare figures with other organizations within the MHS.

Beyond making adjustments for differences in RVU production it is important to risk adjust based on differences in the health status of the provider's enrolled population. By risk adjusting, an organization is able to make a similar comparison of different clinical areas. In fact, studies have shown that adjusting for patient characteristics can play a major role in the identification of statistical outliers. The majority of individuals identified as outliers are no longer considered such, when the data is case mix adjusted (Rutledge & Osler, 1998).

At BACH, the Automated Staffing Assessment Model (ASAM) is the standard which determines the number of patients enrolled to each provider. The ASAM model is population-based, meaning the model considers the needs of the population when determining the number of individuals to be assigned to providers (D.L. Young, personal communication, 14 September 2005).

In general, the Medical Group Management Association (MGMA) has found better performing groups have the following characteristics: 1. Lower total cost per procedure, 2. Higher ratio of both support staff and mid-level providers per full time equivalent (FTE), 3. Higher number of both total and work RVUs, 4. Higher volume of procedures, 5. Higher total gross charges, 6. A higher ratio of patients. This is achieved by a combination of factors. The MGMA found that by assigning mid-level providers (Nurse Practitioner or Physician Assistance) to patients with minor injuries, it allowed the physician to be free to see more complex patients. The MGMA also shows that a higher ratio of support staff to providers allows for smoother work and patient flow and leads to improved claims billing and collection (Glass & Piland, 2002).

The issue of determining what constitutes an FTE is another challenging issue for both the MHS and the civilian sector. Currently, no national standard exists for an FTE in terms of the number of clinical work hours per week. Clinical hours should only include direct patient care and patient care follow-up time, such as charting and phone calls, but not any administrative time. Administrative time includes the time a provider is engaged in meetings or committee work and they are operating outside there

traditional role of providing direct patient care. This difference in accounting for FTEs creates a difficult situation when attempting to benchmark your organization (Glass & Piland, 2002).

The MHS faces the additional challenge of accounting for workload that is neither clinical nor administrative but is determined to be related to readiness. Although readiness would appear to be an easily defined set of activities there is no standard set defined by the MHS. This leaves room for interpretation that can lead to problems comparing different medical treatment facilities within the MHS. Within the Army, the Uniform Chart of Account Personnel System (UCAPERS) has been developed to capture manpower utilization data and personnel expenses from each work center. The other military services developed and utilize other personnel systems. UCAPERS is an automated system used solely in fixed medical treatment facilities within the Army. Field units do not utilize this system. It defines an FTE as 168 hours of work to an assigned work center per month (J.A. Ashby, personal conversation, 19 September, 2005).

UCAPERS, a system developed in the 1970's, has seen very few changes since its initial introduction and now has some shortfalls. The system is automated but requires

manual data entry of basic hours. In addition, the distribution of provider time between multiple work centers creates a number of opportunities for variability. In the end the MHS has a cumbersome system with complex work codes that few physicians take the time to learn. Much of the utility of this data has been reduced by its' questionable validity. To overcome these problems, a new Microsoft access based application of UCAPERS was developed at BACH. The application allows individual providers to account for their workload by utilizing a series of drop down menus. This system is in the early beta testing phase. The results look promising because the accuracy for reporting the number of hours a physician works is improving as the system is simplified and the importance of accurate workload reporting is reemphasized to the individual providers. Placing the responsibility for reporting workload on the individual provider, on a daily basis, is an important step towards increasing accuracy. The traditional UCAPERS system is done weekly, at best, with some providers waiting until the end of the month to record the distribution of their hours among various work centers (J.A. Ashby, personal conversation, 19 September, 2005).

Currently datum collection and input take approximately 45 days before they are entered into the

UCAPERS system and considered valid. This data is too old to provide useful information in organizations with a high rate of provider turnover. Blanchfield Army Community Hospital's turnover is due primarily to military deployments. The organization must constantly adapt to the loss of providers who are part of the Professional Filler System (PROFIS). As providers are deployed, BACH backfills them with Army Reserve and National Guard members or by hiring contract employees. The transition requires a provider to adapt to the military computer systems used in the delivery of healthcare within the MHS.

With all of these potential obstacles to overcome, it is important to remember that the productivity equation as outlined in Enhancing Physician Performance (2000) is reducible to a fairly simple equation: Productivity = Efficient design + Work flow + Patient flow + Patient Scheduling + Information Management - Distractions (p. 296). So often the focus of research is directed at patient satisfaction, but when monitoring physician satisfaction the most important predictor seems to be not the number of patients per se, but rather the efficiency with which they are seen (p. 257).

Research consistently demonstrates that the earlier physicians are exposed to physician profiling, the more

likely they are to have a positive response to the process. Research conducted on new residents undergoing physician profiling as a tool to monitor their performance shows that they find the experience extremely positive. Ninety five percent of the residents rated the feedback provided as useful or very useful. Some of the narrative comments from this study revealed that some of the participants felt this process was the most comprehensive feedback received during their residency. One disappointing result of this study was that only 57% of the residents felt the profiles would influence their practice style (Callahan, Fein, & Battleman, 2002).

Other studies have shown that the value of physician profiling depends on acceptance by physicians and the clarity of the messages imparted. Profiles have been shown to be more effective when the users: 1. Have been involved in their development, 2. Are flexible over time, 3. Are seen as fair. The information must additionally be presented to the providers in an easy to understand fashion (Piland & Lynam, 1999).

Changing a provider's behavior is possible. However, before an organization attempts change, it must look at its priorities and address strategies for improvement in areas with the largest potential for improvement. At BACH,

access to care is a problem; thirty percent of our daily outpatient census is seen on a walk in basis as opposed to individuals with scheduled appointments. This access problem is believed to be impacting patient satisfaction scores, as they reflect dissatisfaction with the difficulty in making an appointment and increased wait times.

Here at BACH, provider profiling is in its infancy. Looking only at the provider templates for the primary care areas, results in an incomplete picture of actual workload. Provider profiling was started in order to increase beneficiary's access to care. This study intends to assist in advancing the implementation of provider profiling here at BACH.

The MHS is also initiating improvements in the process by studying patient satisfaction and has partnered with the Veterans Administration (VA) in the implementation of clinical practice guidelines. Patient satisfaction data is now available to the Commander and other key leaders on a daily basis, with overall score updates occurring every two weeks. Clinical practice guidelines are monitored by outcomes management in the Population Health Department (M.E. Arrington, personal communication, 26 September 2005). The overall goal is to use all the available tools and impact how provider practices improve patient outcomes

in ways similar to figure 3 shown below from an article by Strunk & Reschovsky in 2002.

	Physicians Affected ¹		
	1997	1999	2001
Profiling			
All Physicians	33.3%	32.2%	34.3% [*]
PCPs	37.1	35.9	40.1 ^{*#}
Specialists	30.8	29.8	30.4
Patient Satisfaction Surveys			
All Physicians	58.0	57.8	61.6 ^{*#}
PCPs	58.4	57.9	62.9 ^{*#}
Specialists	57.8	57.8	60.8 ^{*#}
Treatment Guidelines			
All Physicians	45.9	48.7 [*]	56.2 ^{*#}
PCPs	45.7	52.1 [*]	60.7 ^{*#}
Specialists	46.0	46.6	53.2 ^{*#}
At Least One of the Above Three Tools			
All Physicians	76.1	76.7	80.4 ^{*#}
PCPs	76.6	78.2 [*]	82.8 ^{*#}
Specialists	75.7	75.7	78.9 ^{*#}

¹ Data are presented as the percentage of physicians responding that the care management technique had a "very large," "large" or "moderate" effect on their practice of medicine.

^{*} Change from previous period is statistically significant at $p < .05$.

[#] Change from 1997 to 2001 is statistically significant at $p < .05$.

Figure 3: Percent impact of different tools on physician behavior

These other studies also show how technical issues reflect on the reliability and validity of profiling and they remain at the forefront of concern (Parkerton et al., 2003). If providers are not involved in the process of developing the system for profiling then the organization must be ready and able to deal with rebuttals such as: 1. The data is not credible, 2. My patients are sicker, 3. How I practice medicine is my business. This is why educating

the provider is such an important step in the success of provider profiling. The non-punitive nature of the use of the data should be reemphasized and it must be stressed that there is not necessarily a target rate (Ross, Williams, & Pavlock, 1998). An inherent conflict exists because managers and CEOs are trained to be cognizant of the whole organization, whereas the provider is trained to focus on one patient at a time (Ransom, Pinsky, & Tropman, 2000).

One other way the information has been used to influence provider behavior is to release this data to the public. The fear of information being open for public scrutiny has been shown to alter physician behavior (Boscario & Adams, 2004). At the same time, research has shown very few individual patients know how to or even attempt to access information of this sort prior to making a healthcare decision. It has been shown that patients are often more interested in the process of care (what will happen to them) than in the outcomes of care (Goldfield et al., 2003). It is interesting to note that research indicates that individuals who reported a medical error in their household were more likely to access this information. This data has been released to the public in hopes of promoting informed consumer choice, improving

healthcare quality, and reducing costs through changes in consumer behavior and marketplace competition (Boscario & Adams, 2004).

The trend of releasing information to the public to assist with inform decisions about their healthcare is likely to continue as consumer directed health plans and health savings accounts are aligning the responsibility of selecting healthcare with the consumer. Marketplace competition will drive organizations to release information to the public, so individuals are more likely to utilize their services. In the changing Tricare environment of the MHS where patients are gaining more independence in selecting the site of their healthcare, releasing this information to the public will enable the MHS to remain competitive with the civilian healthcare marketplace.

The choice to release information to the public is no longer an option because of the Consumer Bill of Rights, passed under President Clinton. It requires that individuals have the right to receive, "comparable measures of quality and customer satisfaction" for both health plans and health professionals. The level of detail provided to the individual is not comprehensive and may eventually evolve into a movie like rating system where a number of stars are assigned to a provider. Consumers are already

familiar with this as they purchase automobiles and mutual funds with the assistance of similar systems (President's advisory commission on consumer protection and quality in the health care industry, 1998). This transition to providing meaningful consumer information is most evident in the Utilization Review Accreditation Commission's (URAC) effort to recognize highly functioning health plans. URAC recently partnered with J.D. Power and Associates to form a strategic alliance to use service excellence scores based on consumer reported experiences to evaluate health plans (URAC, 2003). As freedom of choice for MHS enrollees increases, financial viability will hinge on communicating and providing quality healthcare.

An extensive literature review was conducted in an attempt to locate similar research done at other MHS facilities. No literature was located addressing this topic in the MHS setting. Fellow students throughout the MHS were queried to attempt to locate additional information. The majority of fellow students reported this issue was not being monitored at their locations. A few students reported their Commands were looking at provider productivity on a number of visits templated per day in the primary care setting in a method very similar to what is being done here.

d. Purpose

The purpose of this GMP is to objectively evaluate differences in provider productivity. This information will be a key component in all the initiatives implemented to improve overall productivity. The scope of this GMP will be limited strictly to a historical data analysis of RVUs produced per physician in the outpatient clinical setting.

The goal is to determine which variables most directly impact provider productivity. This will allow the Command to work with the Outcomes Management Department to review coding practices with these providers to ensure coding accurately reflects workload. Once coding compliance is determined the Executive Leadership can work with individual clinics or providers to increase productivity. Once identified, providers who exceed the standards will be analyzed to determine key drivers or processes contributing to the higher level of performance. Once key drivers are identified changes can be implemented at the organizational level.

II. Methods and procedures

Data from all BACH outpatient clinics for the period of 1 October 2004 to 31 August 2005 were analyzed using both M-2 and CHCS to study provider productivity. The unit

of analysis involved in this research project is total simple RVUs produced per month. This total represents workload totals at the provider level in each different clinical area in which a provider may work. The provider work load factor is the only part of an RVU used in tabulating the number of simple RVUs generated in the M-2 system. This component of an RVU is nationally standardized and therefore provides a measurement tool that is both statistically valid (meaning that it measures what it purports to measure) and reliable (meaning that repeated measurements yield the same results) (Glass & Piland, p.120 2002).

RVUs per hour were not chosen as the unit of analysis for this study because the number of hours worked in UCAPERS is a self reported task often delegated to one or two individuals within each section to collect and input into the system. Audits performed comparing civilian employee's time card hours to UCAPERS hours show large disparities between these two numbers. Time card hours are considered valid as frequent audits are performed to maintain validity. This system does not capture military hours as these individuals are on salary. Based on these limitations, simple RVU totals will serve as the dependent variable in this study.

The MHS uses only the physician workload portion of the RVU figure in monitoring RVU production. This process is outlined in further detail in the literature review portion of this paper. Total provider encounters were also gathered on a monthly basis. Telephone consult encounters were excluded, as these visits generate marginal RVU values and would skew the RVU per encounter. All data produced here at BACH by outcomes management exclude telephone consult workload for this same reason (M.E. Arrington, personal communication 5 September, 2005). After the data were collected, it was analyzed twice, once with simple RVUs as the dependent variable, then with total encounters as the dependent variable. The data were further analyzed at the RVU/hr and RVU/encounter level. Total simple RVU as the dependent variable yielded the highest level of statistical significance, so this was the dependent variable utilized.

The total simple RVU per month will serve as the dependent variable of study. This will be studied in relationship to the independent variables of; quarter (time), year, treatment location, provider age, provider gender, civilian status, military status, contract status, MD, non MD, and board certification status. The dependent variable is a continuous variable with provider age serving

as the only continuous independent variable. All other independent variables were grouped accordingly and coded in a dichotomous fashion. A dichotomous variable is simply a variable that can only have two possible values. For example one of the variables in this study was gender, all entries in this data set where the provider is male are coded as 1, with all female providers coded as 0. By using dichotomous variable sets one can also ensure the validity of the data set as the sum of the means for a set of dichotomous variables is 1.0. For example, three dichotomous variables were grouped to represent the employment status of the providers. Each entry in the data set was either a civilian, military, or contract employee. The means for each of these groups was; Civil servant, 0.22, military, 0.55, contract, 0.23. These three means then total 1.0 indicating that the data was accurately entered.

To further investigate the potential relationship to RVU production between employment status and each subset of providers, that are either a MD or not an MD, a factorial analysis was conducted. This approach created six new variables. To create each new variable, two of the original variables were multiplied together. This resulted in a value of 1 for each newly created variable that was a

member of each of the variables combined, with all others falling out as zeros. This is best displayed pictorially with a 2X3 table. See figure 4.

	Military	Civilian	Contract	Total
MD	30%	8%	13%	51%
Non-MD	25%	14%	10%	49%
Total	55%	22%	23%	100%

Figure 4: Group membership by skill level

It was necessary to conduct a factorial analysis to answer the proposed research question of what subgroup of providers is the most productive. Without conducting a factorial analysis the research would only show if military, civil servant, or contract employees were more productive overall. The manner in which the data was coded for analysis is outlined in Appendix 4. Descriptive statistics for the data are displayed in table 1.

Table 1: *Descriptive Statistics for RVUs and Predictors at Ft. Campbell, KY Army Medical Treatment Facilities*

	RVUs*			
Variable	mean	S.D.	n	%
Dependent Variable:				
Simple RVU	86.86	92.69	3419	100
Independent Predictor Variables:				
A. Time				
Year:				
2004	78.02	76.83	908	27
2005	90.06	97.61	<u>2511</u>	<u>73</u>
Total			3419	100

Table 1 - continued

Variable	RVUs*		n	%
	mean	S.D.		
Quarter:				
First	78.05	76.79	909	27
Second	84.89	87.38	952	28
Third	90.98	98.52	930	27
Fourth	96.51	109.98	<u>628</u>	<u>18</u>
Total			3,419	100
B. Location				
LaPointe	96.83	107.24	600	17
BACH	88.23	90.83	2,588	76
Aviation	45.61	54.18	<u>231</u>	<u>7</u>
Total			3,419	100
C. Provider				
Age (in years) *	43.85	10.41	3,419	100
Gender				
Male	87.57	90.36	2,139	63
Female	85.67	96.49	<u>1,280</u>	<u>37</u>
Total			3,419	100
Board Certified				
Yes	68.75	81.09	1,107	32
No	95.53	96.58	<u>2,312</u>	<u>68</u>
Total			3,419	100
D. Employment Status				
Civilian				
MD	77.74	79.25	274	8
Non MD	119.73	114.21	478	14
Contract				
MD	111.48	115.74	444	13
Non MD	106.36	129.03	342	10
Military				
MD	63.26	62.82	1,026	30
Non MD	79.48	70.69	<u>855</u>	<u>25</u>
Total			3,419	100

Note: n = 3,419 encounter observations

* Mean and standard deviation for age are in year units

Ethical considerations are an essential component in the study design. Patient privacy was determined to be the most significant ethical consideration in this research effort. This study was designed to utilize grouped encounter data that was not traceable to a specific patient. To maintain the confidentiality of the providers involved in the research the names have been removed. No protected health information was accessed during the course of this study because the RVUs created by each provider were pulled using an ad-hoc report totaling monthly RVU production for each provider by clinical location, not by individual encounter.

III. Data Limitations

There were several small issues that if left uncorrected had the potential to impact the results of the study. All of these possible errors were identified and solutions applied to overcome or mitigate their impact. These solutions are outlined below.

Due to an error within M-2 all skill type 958 individuals were removed from the study. These individuals work in Social work service areas and their workload in M-2 appeared only for June of 2005. This error was reported to M-2 administrators and will take months to correct within

the system, so for this study they were removed for time considerations.

One provider who works outside of the hospital setting has reported hours in our system, but he does not chart in the traditional manner consistently. Since this issue is known and his resulting lower productivity numbers could affect his skill set he was removed from the sample group.

Data for this study was pulled from M-2, which is considered a reliable data set within the MHS, and is used as the data set of choice when comparing different MHS facilities to each other. When using dichotomous variables, the mean of each subset of variables will total one. If this does not occur, the researcher knows an error exists within the data set. The descriptive statistics in table 2 show that each subset of dichotomous variables total 1 indicating a valid data set.

IV. Results

The data were entered into the Standard Package for the Statistical Sciences (SPSS) version 11.0 for analysis. Means and standard deviations are reported in appendix 5. The data set studied revealed an F value of 24.38 with df (14, 3,404), at the .000 significance level. The $R^2 = .091$ or 9.1% of the variance in RVUs accounted for by the predictors within this model. This value may seem low, but

with a sample size this large and with the standard deviation for simple RVU totals larger than the mean simple RVU value, the R^2 value is anticipated to be low, but the model still has statistical relevance based on the resulting F distribution value.

Past research has not been done to determine what subset of providers is the most productive in the MHS. Based on personal experience it was anticipated that contract providers would be the most productive group. It was also anticipated that the non MD group of contract providers would have the highest level of productivity. The actual results are displayed in table 2. Results for the model from SPSS are found in appendix 5.

The model was then analyzed by removing one variable at a time to determine the variance unique to each variable and to calculate the corresponding F value for each variable. This calculation determines the unique variance explained by that variable while accounting for the impact of all of the other variables. These results are displayed in table 2.

Table 2:

Hypothesis Tests of effects on simple RVU generation uniquely attributable to Independent variables

Effect Tested	R^2 Full	R^2 Reduced	Unique Variance Explained	df1	df2	F	p
Full Model	.091128	.000	.091	14	3,404	24.38	***
Year	.091128	.091	.000	1	3,404	.19	ns
Quarter	.091128	.090	.001	3	3,404	1.47	**
Location	.091128	.078	.013	2	3,404	24.22	***
Age	.091128	.082	.009	1	3,404	33.01	**
Gender	.091128	.081	.010	1	3,404	39.09	**
Board Cert.	.091128	.087	.004	1	3,404	13.63	
Employment Status	.091128	.042	.049	5	3,404	37.16	***

Note: $n = 3,419$, ** $p < .01$, *** $p < .001$ statistically significant, ns = not significant

The independent predictor variable of employment status accounted for nearly 50% of the unique variance explained by this model. By depicting the differences in the mean RVU between the different employment status variables one can visually determine what group has the greatest mean RVU value. This is displayed in figure 5. The findings suggest that the most productive providers here at BACH are contract MDs.

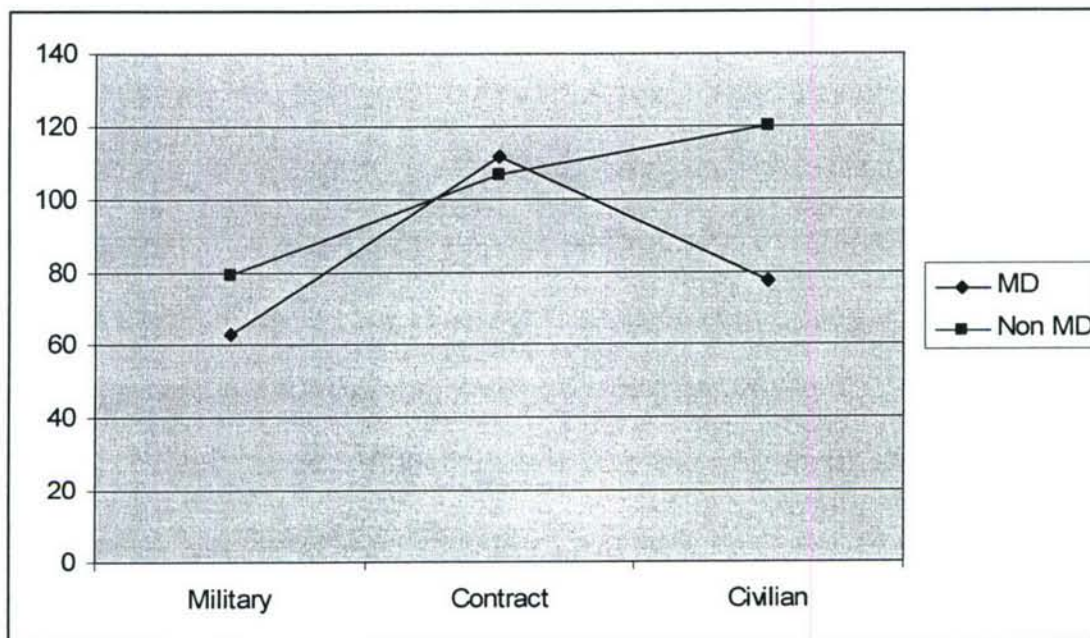


Figure 5: Graph with mean RVU production values for MD and non-MD providers within the three group categories of Military, Contractor, and DoD Civilian

V. Discussion

This historical analysis suggests that provider productivity is made up of many different variables. The shared variance in this study was relatively low, so there are other factors that influence productivity. The specific factors are appropriate for follow on research. Unfortunately, in this study, the majority of variables that reveal statistical significant F values can not be changed at will. At the same time, this data does have value, as it can be used when considering changes in provider type. Often contract providers are more costly than either civilian or military but these providers might be worth the additional cost as this study suggests that

they are more productive than the other groups of providers. Financial analysis needs to be conducted to determine if the additional cost associated with the employment of a contract provider outweigh the lower cost civil servant or military provider alternative.

While these findings paint a grim picture for the military provider at all skill levels, I feel that the majority of the problem lies in two different areas. First I think that the military provider who works on a salaried basis does a poor job of accounting for his or her workload, as the number reported is felt to have no impact at the individual level. The second problem I think lies in the military provider coding of the care they provide. The majority of contract providers have experience delivering healthcare in a civilian setting, feel the financial impact of proper coding, and understand its importance. On the other hand, the majority of providers in the military have never had civilian experience.

Of interest is the fact that a large percentage of the civilian providers have limited experience in a non military healthcare work environment, yet their productivity is still higher than military providers. This may be explained by the bi-weekly payroll reporting that civilian providers perform. It is possible that the hours

they report in the UCAPERS system are a better representation of the actual hours worked. If this assumption holds true then the key may lie not in improvements in military provider coding but in capturing the actual hours a military providers work in a more accurate manner. As the new computer system to capture provider hours is fielded, it would be interesting to repeat this study to evaluate the impact on results.

Future studies could also include analysis of provider productivity at the individual provider level and carry this level of detail down to productivity in each clinical area. I would suggest looking at trends over a much longer period, possibly ten years, to get a better understanding of potential seasonal impacts.

This research may be better suited for a civilian setting with a low level of employee turn over. If a ten year study were considered in the MHS, civil servant providers may be the only provider type with sufficient longevity to be meaningful. Studying the relationship of RVUs/hr is an additional avenue of study that might produce interesting findings. This was not assessed in the current study because the reliability of provider hours is questionable.

The importance of data quality and performing a coding audit prior to any interventions for change cannot be over emphasized. BACH has just recently transitioned to a new method of outpatient charting, CHCS II, that assists with coding. Unfortunately, CHCS II does not always code an encounter properly and when this occurs the provider must go into the record and override the assigned code. Based on the reimbursement methods of our individual providers as salary or hourly reimbursement, the assumption is that coding does not receive the degree of attention it receives in a civilian environment. If this assumption is correct our providers might be performing at a level much higher than the data indicates. This analysis can be used to focus coding audits, as the data suggest a significant decrease in productivity in the Aviation Health Clinic.

VI. Conclusion and recommendations

As the MHS transitions to funding based on business plans, with financial penalties for failing to meet workload projections, physician profiling will become more important. Individual hospitals will now be held accountable for costs at a level never before seen in the MHS. Physician profiling emerged as a tool to attempt to control costs as our medical system transitioned into managed care. This tool can provide valuable information

to Medical Commands as they struggle both with the process of making workload projections and then achieving these projections.

The MHS is a complicated environment composed of many different elements. At the local level, the process of monitoring physician performance against their peers and taking the necessary steps to improve performance, may very well be one of the easiest ways for the facility to gain more control over their workload projections.

Working with physicians and acquiring physician champions, to ease an organizations pain in the transition to physician profiling, is paramount. Without physician buy-in your best efforts as administrators are likely to fail. Studies indicate physician buy-in is dependent on risk adjusted profiles. Data quality can not be over-emphasized because decisions made based on physician profiling data can have devastating consequences. Any clinic demonstrating superior or below average results should first undergo a coding audit to insure the workload numbers generated are an accurate reflection of actual workload. When presenting these findings to providers it is recommended that the report does three things: 1. Provide a graphic representation of the data, 2. Document

how the data was collected, 3. Provide relevant background and literature references (Diamond, 2000).

If the providers practice under a closed panel primary care environment, then I would recommend the inclusion of preventive health service measures. The key to reducing healthcare expenses hinges on early detection, intervention, and treatment of chronic diseases. To do this you must measure the percentage of individuals enrolled to a provider who are in need of any preventive services. Once these measurements are in place you can reward physicians with the lowest rates of individuals in need of these services. By instilling this type of behavior in your providers, you are reducing healthcare expenses in the long run by detecting and treating chronic conditions early and at a much lower cost to your limited healthcare budget.

The inclusion of clinical practice guidelines in the process of physician profiling is yet another area that can be added for certain clinic level applications. The percentage of time a given provider follows the recommended evidence based decision pathway is an important measure to monitor. By following these guidelines, we are reducing variation among providers while providing care proven to be the most effective in a given situation.

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Appendix 1: Definitions of terms

Capitation: a set amount to cover a person's medical care for a specified period, normally paid on a per member per month basis.

Closed system: provides healthcare only to individuals eligible for services, except in cases of emergency.

Fee-for-service: payment of separate fees to physicians for each service performed, such as examination, administering a test, or hospital visit, the physician sets the fees.

Gatekeeper: A person responsible for the administration of the patient's treatment. A gatekeeper coordinates and authorizes all medical service, laboratory studies, specialty referrals, and hospitalizations.

Military Health System (MHS): The combination of healthcare agencies within the Department of Defense that provide healthcare to military beneficiaries. This includes the Air Force, Army, Navy, Marines, and the Department of Veterans Affairs.

Medical common procedural terminology (CPT) codes: codes that are part of the code set standard selected by HIPAA, used to describe health care services in electronic transactions.

Appendix 3: Previous Workload Clinical Totals

23-Sep-05							
DATE	CLINIC	# Temp Prov	Avail Non-Temp	Total Booked	%Booked/T emp	Total Open	Total Temp
9/23/05	BLUE CLINIC	7	0	42		48	90
9/23/05	GOLD IM	4	0	27		18	45
9/23/05	RED CLINIC	5	0	32		31	63
9/23/05	WHITE CLINIC	7	0	48		54	102
9/23/05	YOUNG EAGLE	9	0	70		35	105
	BACH (0060) TOTALS	32	0	219	54%	186	405
9/23/05	ASHAU VALLEY CLINIC	1	0	1		0	1
9/23/05	BASTOGNE CLINIC	0	0	0		0	0
9/23/05	CARENTAN CLINIC	0	0	0		0	0
9/23/05	MEDICAL EXAMINATION	2	0	20		9	29
	LHC (7307) TOTALS	3	0	21	70%	9	30
9/23/05							
9/23/05	AVIATION MEDICINE CLINIC	0	0	0		0	0
9/23/05	FLIGHT MEDICINE	0	0	0		0	0
	AVN (1506) TOTALS	0	0	0	#DIV/0!	0	0
	Total Primary Care	35	0	240		195	435

CHCS							
WAIT LIST STATS SEP 05*							
DATE	NEW WB	NEW SCHOOL	NEW PAP	TOTAL NEW	OLDEST	OVERALL TOTAL	
9/1/2005	0	0	0	0	8/23/2005	12	
9/2/2005	0	0	0	0	8/23/2005	9	
9/6/2005	1	0	1	2	8/23/2005	11	
9/7/2005	0	0	0	0	8/23/2005	11	
9/8/2005	0	0	10	10	8/23/2005	22	
9/9/2005	0	1	12	13	8/23/2005	34	
9/12/2005	7	0	6	13	8/23/2005	47	
9/13/2005	6	1	8	15	8/23/1005	62	
9/14/2005	6	0	10	16	8/23/2005	77	
9/15/2005	2	6	4	12	8/30/2005	72	
9/16/2005	4	1	9	14	9/6/2005	57	
9/19/2005	0	0	3	3	9/6/2005	49	
9/20/2005	0	0	2	2	9/6/2005	51	
9/21/2005	1	0	2	3	9/7/2005	20	
9/22/2005	1	0	7	8	9/12/2005	17	
9/23/2005	6	1	4	11	9/12/2005	28	
9/26/2005	0	0	0	0		0	
9/27/2005	0	0	0	0		0	
9/28/2005	0	0	0	0		0	
9/29/2005	0	0	0	0		0	
9/30/2005	0	0	0	0		0	

*New wait list numbers represent those added in the last 24 hours. Numbers reported on 8/16/05 will be for those added on 8/15/05.

Appendix 4: Code Set Key

Enrollment Site Name:

Aviation Health Clinic = 1

Blanchfield = 2

LaPointe Clinic = 3

Gender:

Male = 1

Female = 0

Quarter:

First: Oct 2004- Dec 2004

Second: January 2005- March 2005

Third: April 2005- June 2005

Fourth: July 2005- August 2005

Appendix 5: SPSS Results Full Model

Variables Entered/Removed^a

Model	Variables Entered	Variables Removed	Method
1	CON_NON, LAPOINTE, FOUR, AVIATION, CIV_MD, CIV_NON, YEAR05, CONT_MD, GENDER, BOARD, THREE, AGE, MIL_NON, ONE	.	Enter

a. Tolerance = .000 limits reached.

b. Dependent Variable: RVU

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.302 ^a	.091	.087	88.5481

a. Predictors: (Constant), CON_NON, LAPOINTE, FOUR, AVIATION, CIV_MD, CIV_NON, YEAR05, CONT_MD, GENDER, BOARD, THREE, AGE, MIL_NON, ONE

ANOVA^b

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	2676073	14	191148.046	24.379	.000 ^a
	Residual	26689991	3404	7840.773		
	Total	29366063	3418			

a. Predictors: (Constant), CON_NON, LAPOINTE, FOUR, AVIATION, CIV_MD, CIV_NON, YEAR05, CONT_MD, GENDER, BOARD, THREE, AGE, MIL_NON, ONE

b. Dependent Variable: RVU

Coefficients^a

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	59.567	89.419		.666	.505
	THREE	4.411	4.088	.021	1.079	.281
	FOUR	9.413	4.560	.039	2.064	.039
	ONE	32.072	88.810	.153	.361	.718
	YEAR05	38.406	88.811	.183	.432	.665
	AVIATION	-40.976	6.571	-.111	-6.236	.000
	LAPOINTE	6.191	4.571	.025	1.354	.176
	AGE	-1.100	.191	-.124	-5.746	.000
	GENDER	22.512	3.601	.118	6.252	.000
	BOARD	-15.613	4.228	-.079	-3.693	.000
	CONT_MD	60.532	5.735	.221	10.556	.000
	CIV_MD	33.806	6.777	.097	4.988	.000
	CIV_NON	66.084	6.324	.249	10.449	.000
	MIL_NON	13.204	5.249	.061	2.515	.012
	CON_NON	55.557	6.825	.178	8.141	.000

a. Dependent Variable: RVU

Excluded Variables^b

Model		Beta In	t	Sig.	Partial Correlation	Collinearity Statistics
						Tolerance
1	TWO	. ^a	.	.	.	.000
	BACH	. ^a	.	.	.	.000
	MIL_MD	. ^a	.	.	.	.000

a. Predictors in the Model: (Constant), CON_NON, LAPOINTE, FOUR, AVIATION, CIV_MD, CIV_NON, YEAR05, CONT_MD, GENDER, BOARD, THREE, AGE, MIL_NON, ONE

b. Dependent Variable: RVU

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14. ABSTRACT Provider profiling is a tool used within healthcare management to determine differences between individual provider productivity levels. This study will attempt to identify some of the variables that influence provider productivity. Specifically, within Blanchfield Army Community Hospital, historical data will be used to determine what group of providers demonstrates the highest level of productivity. Productivity was operationally defined as total simple relative value units (RVUs). These totals represent monthly workload level by provider in each clinical area. The study used multiple linear regression analyses to examine the relationships among variables. Study findings supported the hypothesis that contract medical doctors generate the highest overall productivity. The statistical model yielded $R^2 = .091$ with $F(14, 3404) = 24.38, p < .001$. Other variables that emerged with statistical significance were gender, age, location, and board certification. Employment status emerged as the premier variable accounting for nearly 50% of the unique variance explained by this model.					
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