

Running head: THE EFFECTS OF ECONOMIC FEEDBACK ON PROVIDERS

The Effect of Economic Feedback on Providers' Prescription habits:
Are Outcomes Improved? Are Institutional Savings Realized?

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ABSTRACT

Winn Army Community Hospital (WACH), a member of the Southeast Regional Medical Command, has experienced annual pharmacy budget increases of approximately 24 percent over the past 3 years. This is a result of several factors: (1) lack of physician ownership of the pharmacy budget, (2) lack of meaningful economic feedback and pharmacoeconomic efforts, and (3) lack of pharmacy/provider collaboration. Without these attributes present at WACH, pharmacy expenses routinely exceed programmed budget estimates. Since this situation is fairly representative of all medical treatment facilities (MTFs), efforts in improving the current situation at WACH might be beneficial and provide insight into the overall problem of pharmacy cost overruns plaguing the United States Army Medical Command (MEDCOM).

Thus, the situation at WACH was assessed. It was determined that to instill prudent prescription practices at WACH, a comparison of WACH, and DoD facilities overall, would be made to the private sector healthcare delivery systems--most notably closed panel Health Maintenance Organizations (HMOs). Essentially, the military model would have to change its existing paradigm to reflect as much of the private sector practices as possible. The result was a decentralization of the pharmacy budget down to the service level. Monthly reports by service as well as by provider would constitute the economic feedback. The reports would take the form of straight-line budget status as well as control charts depicting providers with outlying prescription costs. Since this was a new program, initially only average prescription cost per provider and total monthly cost per service would be studied. Comparisons would be made to the same month but previous year, in order to remove any seasonality confounding variables. The decentralized budget would be comprised of Fiscal Year 1999 historical costs plussed up by a factor of 24 percent (which has been the average growth through inflation and volume of WACH's prescription expenditures over the last 3 years).

In addition to the economic feedback, the other component to provider awareness was clinical education on a variety of pharmacoeconomic analysis methods. Although not quantified, there were a variety of clinical education efforts that originated either from specialty providers (for the benefit of the medical body), the pharmacy, or from the researcher. Overall, efforts centered on relative clinical efficacy differences as well as cost differences.

The results of the study indicate that there is a potential benefit towards decentralizing of the budget, instituting provider

ownership, and providing relevant feedback to be used to modify existing behavior. As each month of data was accumulated, results approached significance in both total overall cost as well as total average cost. Although the research is a result of only 4 months, the fact that the general trend was toward greater cost containment suggests further research and monitoring is warranted.

INTRODUCTION

Background

Winn Army Community Hospital (WACH) is a medium-sized Medical Treatment Facility (MTF) within the Southeast Regional Medical Command (SERMC). The facility provides healthcare in direct support of the 3rd Infantry Division (Mechanized) at Fort Stewart, Georgia as well as all other eligible retirees and active duty dependents. Winn Army Community Hospital and its higher headquarters, SERMC, operate within the Department of Defense (DoD) healthcare system called TRICARE.

TRICARE is the DoD managed healthcare program whose charter is to provide comprehensive healthcare for all active duty personnel, family members, and retirees that fall within the DoD umbrella of coverage. The TRICARE health system is structured to allow maximum choice and flexibility through the three separate coverage options it offers---TRICARE Prime, TRICARE Extra, and TRICARE Standard, which are defined below.

TRICARE Prime is an HMO-like benefit plan where all care received within an MTF is free of charge and beneficiaries have first priority over other non-Prime beneficiaries. All active duty military are automatically enrolled as a direct DoD benefit. Dependents of active duty are required to enroll, but there is no

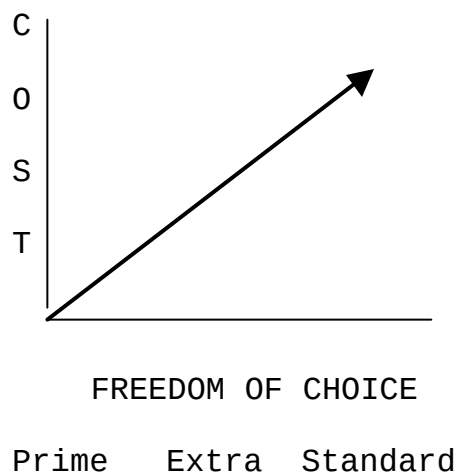
enrollment fee. Retirees and their dependents may enroll with the payment of an annual fee which ranges from \$230 to \$460 depending upon the number of eligible beneficiaries. Each TRICARE Prime beneficiary is assigned to a Primary Care Manager (PCM) who serves as the primary coordinator for all care the beneficiary receives. Healthcare derived out of the network of MTFs is considered at the Point of Service (POS) and usually incurs co-payments and deductibles. Beneficiaries who receive healthcare out of the network for approved emergencies are not charged additional fees.

TRICARE Extra- This option of the TRICARE coverage allows more choice for more cost to all beneficiaries other than active duty personnel. Although there is no enrollment fee required, healthcare derived out of the MTF requires co-payments and deductibles. However, healthcare received within the network of approved TRICARE providers is at a lower cost than that received outside the network. As a result, TRICARE Extra beneficiaries are offered care in the MTF on a space-available basis at no charge. This option allows more freedom of choice, but not as much as TRICARE Standard. This option is equivalent to enrolling in a Preferred Provider Organizations (PPO) in the private sector.

TRICARE Standard- This TRICARE option is for those (other than active duty) eligible beneficiaries who desire the maximum choice and are willing to pay more for that freedom. TRICARE Standard

does not require enrollment and care may be sought outside of the TRICARE network of providers. Consequently, TRICARE Standard beneficiaries are only eligible for care in an MTF on a space-available basis free of charge. However, maximum allowable rates are preset and were previously known as the Civilian Health and Medical Program of the Uniformed Services (CHAMPUS) rates. Costs incurred above this level are the responsibility of the beneficiary. This option is most like the Point of Service (POS) option in many private sector healthcare plans.

The TRICARE healthcare system allows the user to seek their own balance between freedom and cost as illustrated below:



The workload at WACH is consistent with that of similar facilities in support of a young active duty divisional population. The average daily census for the facility is usually between 25-30. The active duty soldier population is approximately 20,000. The actual breakdown of the catchment area eligible beneficiaries shown below depicts a modest increase in the total number of healthcare beneficiaries over the past 2 years.

Beneficiary Status	FY 98	FY 99
Active Duty	19,690	19,948
Active Duty Dependents	30,167	30,440
Non Active Duty Dependents	19,316	20,332
TOTALS	69,173	70,720

The annual operating budget of \$41.68 million is monitored in the same manner as other DoD medical facilities. The facility is staffed at 887, of which there are 54 military and 19 civilian healthcare providers, respectively.

There are many complex challenges faced every day at WACH. Although they are no different than any other MTF, they include managing a dichotomous work force of civilians, contractors, and

military. The WACH leadership is held accountable for a finite budget that is legislated through a complicated political system that allows little room for maneuvering or discretionary operations. The leadership, for example, must balance the DoD healthcare mission while maintaining the readiness of its soldiers and experiencing a high turnover of its personnel.

Although these many challenges are met successfully at WACH, one of the recurring problem areas is the facility's budget. Winn Army Community Hospital is not budgeted for increases commensurate with the inflationary rate. Each year, either the loss in buying power due to inflation, unfinanced requirements, or an increase in catchment area population places WACH's leadership in a quandary where it must strategically select and balance its resources between upgrading patient care capabilities and maintaining the facility infrastructure. Since there is little room to maneuver and less local autonomy than in similar civilian organizations, WACH must look internally to manage its resources in a way that allows the maximum flexibility to deal and cope with events outside its span of control.

Consequently, WACH's leadership must use its managerial skills and get the biggest "bang" for any "venture capital" invested in system-wide process improvements. The intent is for the "venture capital" to ultimately produce long-term savings to be used for

improvements in other areas of the delivery system. Since the WACH's pharmaceutical expenses consume one-sixth of the budget, one obvious way is to look at how to improve the Pharmacy's operation.

The pharmacy budget, other than civilian and military compensation, which are fixed costs to the facility, is the single largest cost center and was budgeted at \$6.5 million in Fiscal Year (FY) 1999. This area repeatedly experiences cost overruns; however, it affords the best single opportunity for resource savings, which can be used in other areas to improve patient care. Since the pharmacy annually exceeds its programmed budget, its affairs affect the entire hospital and often make a difficult situation untenable, requiring resources originally targeted for other areas to be used to cover the pharmacy's overruns. Moreover, while many of WACH's costs are fixed, the pharmacy is not. Effective management of the pharmacy is the best opportunity to improve healthcare delivery since incremental improvement on a small scale could save the facility more than large improvement in every other area of the hospital.

Typical of all other DoD medical facilities, the pharmacy is the largest "cost center" of the facility. There are two components to the pharmacy budget increases - inflation and volume. Budgets, historically, have grown 11-14 percent for

inflation annually and are projected to grow similarly this year at WACH and throughout DoD, according to the regional pharmacy chiefs that were polled. The second component to this growth, volume, is the increase of the pharmacy budget due to increases in total number of prescriptions. Currently, the growth due to volume is projected to be approximately 10 percent.

When considering both inflation and cost, the delta between programmed pharmacy budget and actual rates of inflation and growth is projected to be 19-24 percent in FY 00. This is a problem that cannot be ignored. Cost overruns are the norm in the pharmacy, and each year there is a chance for the actual expense to eclipse the programmed budget in excess of 25 percent. At the close of FY 99, the WACH leadership was confronted with a pharmacy cost overrun of nearly \$700,000. Although this is a large problem, it also represents the biggest potential for appreciable improvement due to the shear numbers discussed above.

Historically, the WACH pharmacy expenditures illustrate the excessive growth due to inflation and volume increases:

Year	FY 96	FY 97	FY 98	FY 99
Expenditure(In Millions)	3.89	4.34	5.72	7.4
Increase		12%	32%	29%

The average of the three year's worth of growth is 24 percent.

Currently, the WACH pharmacy is managed in the same centralized manner as all DoD budgets with a majority of the burden and ownership born by the pharmacy staff. As mandated by the Joint Commission for the Accreditation for Healthcare Organizations (JCAHO), there are both the Pharmacy and Therapeutics (P&T) committee and the Formulary Committee that assist in sometimes timely and judicious formulary decisions. Unfortunately, the WACH pharmacy is truly a self-contained island where providers write prescriptions without awareness of the cost, awareness of prescription alternatives, and without incentive to change the existing paradigm. This, coupled with the fact that the pharmacy must fill prescriptions written by network and/or supplementary care providers, increases the likelihood that the pharmacy will shatter its budget by a probability of 1.0. It is this study's intent to look at creating a better system that will:

1. Assist the Pharmacy Chief in managing the budget with no cost overages.
2. Improve, or at least not degrade, healthcare outcomes in the process of changing the current pharmacy process and procedures.
3. Improve staff/provider satisfaction to achieve "buy-in" to a new cultural climate.

4. Use some savings achieved to improve the Pharmacy's capabilities.
5. Achieve a system that is on a par with successful civilian counterparts.

The Current Systems of Provider Accountability and Utilization Management

Profiling of most relevant utilization measures occurs in the DoD Medical System. Each facility within DoD has in place a Utilization Committee which is charged with monitoring procedures, tests, clinic visits, surgeries, X-Rays, and Length of Stay (LOS) statistics to name just a few. Indeed, this is a function and an outgrowth of JCAHO, and thus it is mandated. The Utilization Management (UM) staffs conduct monthly meetings usually for only department chiefs. In these meetings, the UM staffs display the quantitative metric measurements that are selected and provided by the departments themselves. As a result, there is both a lack of objectivity and relevance to many of these reports. They are viewed by many as a valueless endeavor. This system of provider profiling/monitoring is slowly improving as the first stages of the new outcomes monitoring system, Oryx, are

already in place at WACH. Oryx is another JCAHO requirement that has potential to add UM value. Best of all is the fact that all data is collected by third party auditors. However, its potential for benefit has not been truly realized.

In the private sector, UM has more of an importance due to economic realities. Specifically, the Medicare/Medicaid prospective reimbursement schedule affords little deviation from national guidelines for disease management. The result of these efforts, depending on the focus of the facility, is a "standardizing" or "normalizing" of all measures with respect to the normal distribution of providers. Outliers are addressed to determine if profiling or pathway deviations are justified. Many private consultant groups make a considerable profit assisting facilities in this way. Iameter, for example, is one such company. Iameter is a for-profit consultant group, based in California, that provides many civilian hospitals with the expert monitoring capabilities needed to effectively manage a UM effort which includes, among other areas, the pharmacy. Iameter has devised a case-mix adjustment tool that can compare populations of patients and their severity of illness to determine if outliers on the UM reports are treating sicker patients. The cost of such an enterprise to a facility can be as much as \$30,000 a year. The resultant savings in all discretionary ancillary services,

especially in this era of increasing managed care proliferation, can justify such an expense in the first month.

In the DoD, we do not go to such lengths. Currently, the SERMC staff is developing a similar tool to aid the effectiveness of empanelment. This tool will allow meaningful comparisons and monitoring of each MTF's providers as a function of their empaneled population. This system, called Provider Perspectives, is a joint venture with Vector Research institute (VRI) and has been met with successful results in two beta test sites. It is expected to be implemented at WACH in early December 1999. Whether this will become a DoD standard adopted by all the Services remains something to be determined. However, the results at the beta test sites at Medical Activity (MEDDAC), Fort Benning and Eisenhower Army Medical Center (EAMC) at Fort Gordon are promising. Consequently, this appears to be a method of improving the DoD's current system of empanelment because of its use of case-mix adjustments which improve provider buy-in. This aspect coupled with its sound methodology serves to decrease the provider criticisms of the "bean-counter" monitoring and unfair comparisons due to population severity differences that are widely prevalent.

Although there is a current UM system in place in the DoD and at WACH for many different clinical areas, there is one critical area that is nominally represented at best and in many cases

ignored. This is the area of pharmaceuticals—the prescriptions written and the expenditures incurred by providers. All facilities have the Pharmacy and Therapeutics committee and the Formulary Committee which select the drugs that potentially could be added to or deleted from each facility's formulary. There are varied pharmacoeconomic factors presented for each drug. Many times, the drug selection is a function of the outcry by the local beneficiaries, the persuasiveness of the pharmaceutical representatives who present their "data" on the drug, and the political and persuasive acumen of the interested providers. The providers do not have cost and outcomes data available. Indeed, the providers are wholly unaware of drug costs or drug alternatives. Providers make decisions and recommendations without access to the types of information that is available to private sector HMO providers, who invest money for cost-effective and outcomes-oriented drug choices. Because many of the decisions are made on prospective events and because the DoD facilities are not staffed sufficiently with pharmaceutical educators, the outcome of such decisions are often not taken into consideration.

In contrast, many large civilian HMOs make use of abundant data that is collected regarding treatment effects of different drugs, outcomes associated with these, prospective analysis of new drugs and their corresponding potential benefit to a patient. The

pharmacist can record treatment and provider rationale. The results are reported on high cost providers or new and unproven drugs that are considered for formulary adoption. This type of drug informatic system is available to make judicious and informed choices that balance treatment and cost. (Mutnick, 1997) In fact, the movement in the private sector is toward further refinement of the formulary decision-making process. The use of statistical analysis software is the standard. With this software, formulary analysis will not lie exclusively on one drug, but rather on periodic review of a family of similar drugs. For example, a new drug will be evaluated under current practices of pharmacoeconomic analysis, but the other existing and similar drugs will be evaluated in areas of treatment efficacy and cost. The data capabilities that exist in most HMOs allow comparisons to be made on the total cost of the drug for treatment, instead of just the per unit dosage cost. This comparison along with the treatment efficacy allow formulary decision-makers to essentially conduct expected value analysis (Schechter, 1993). It is interesting to note that in many industrialized nations, even those with predominantly fee-for-service markets, objective pharmacoeconomic analysis in this manner has been standard practice for many years (Johnson, 1994.)

Providers at the MTF level make decisions on drug utilization

without respect to cost or outcomes. In many interviews during the course of this research, providers stated that prescription habits are learned behavior usually acquired during residency and perpetuated indefinitely thereafter. One study showed that between 1981-1988, there were 348 new drugs introduced by drug companies. Of these, 83 percent provided little or no therapeutic effect (Smith, G. 1996). Thus, habits incurred with regard to the use of these drugs would not result in better outcomes but would result in higher aggregate cost. Providers rely on pharmaceutical representatives for a majority of their education. Therefore, pharmacy must provide education that is both unbiased and accurate. In a system where education of providers is not stressed, more of this ad hoc and biased education will occur and result in needless costs of enormous magnitude.

In many civilian facilities, accurate education and experience is incorporated clinical protocols produced by the pharmacy in many civilian facilities where cost and treatment are issues and budget excesses are not tolerated (Foss, 1999). With respect to DoD providers, there is no knowledge of the cost of pharmaceuticals and little in the way of formal efforts directed toward provider education. Essentially this is due to the lack of ownership of the pharmacy budget among providers and no philosophy of better medicine through judicious study and choice in the DoD.

One cause of this is the critical difference DoD pharmacies have from civilian hospital pharmacies--the requirement to fill all prescriptions for all DoD beneficiaries whether they are TRICARE Prime or not. This effort alone amounts to some \$2.4 million of unmanageable costs at WACH. In the era of HMO saturation, the DoD has paralleled civilian HMOs through its implementation of TRICARE. TRICARE Prime beneficiaries have very similar benefits to beneficiaries of civilian HMOs. In these cases, civilian HMOs fill only those prescriptions that come from their HMO providers and no others.

In the DoD, Supplemental Care providers (providers outside the MTF who agree to see TRICARE Extra and TRICARE Standard beneficiaries) see DoD beneficiaries and give prescriptions without consideration to DoD pharmacy budgets. This group of providers are not under the control of WACH's leadership. This is a significant difference from civilian counterparts and can result in 40 percent of overall pharmacy expenditures. It is interesting to note that while our DoD beneficiaries incur co-payments and deductibles to go outside of our "HMO" to reduce moral hazard, they are not incurred with respect to pharmaceuticals. Indeed, many DoD beneficiaries refer to this phenomenon as "the last 'true' DoD benefit."

A second very important reason lies within our span of control

under the current setting--our own providers' prescription habits. Currently, there is no system whereby providers receive any type of economic feedback. Decisions on prescriptions are made based on prior habit, current pharmaceutical representative education, which may be suspect due to selfish financial motives, and patient outcry. Specifically, one provider revealed during my research that patients "feel" better if they receive a prescription even if one is not clinically warranted. Furthermore, a provider's time with a patient can be significantly reduced if some sort of pharmaceutical is issued. This is also prevalent in the private sector. However, providers are confronted with ongoing education which is aimed at successful exchanges of information with patients. Providers are urged to explain that in many cases that a prescription is not warranted, and in the case of antibiotic usage could potentially result in a deleterious effect (Marcy, 1999). However, many providers still feel that the arguing between patient and provider is inversely related to prescription issue and succumb to patient pressure. Health maintenance organizations that incorporate the use of cost awareness and track treatment efficacy such as Lovelace and Kaiser Permanente have saved thousands on disease treatments. Data and cost awareness in chronic diseases can save thousands and can reduce the cost per patient per visit by tens of dollars (McNitt, 1998).

The result of these poor prescribing habits is that the \$6.5 million projected budget for the pharmacy in FY 99 was actually \$7.2 million or approximately 16 percent of the total \$41.68 million for the entire facility and its outlying clinics. Staggeringly, this is more than double the 7.5 percent spent by private sector HMOs in the same situation and the 8 percent for the entire healthcare industry (Smith, G. 1996). In another report, all managed care organizations are projected to experience drug increases of 10-12 percent (Mehl, 1999). Clearly an indication that there is a significant and needless outlay of precious DoD resources that could otherwise be spent increasing access to the system or improving the healthcare infrastructure.

STATEMENT OF THE PROBLEM AND THE QUESTIONS

Pharmacy costs exceed the programmed budget every year in the DoD healthcare system. The situation at WACH is no exception. The problem, and ultimately its solution, lies within the system design. The current system is not dynamic; rather it is static based on historical precedent established and rooted in management practices reminiscent of the 1950s. As DoD healthcare is undergoing revolutionary change and its entire philosophy of the healthcare business ethic changes, the practice of running a

pharmacy currently does not.

The current system does not incorporate three very important aspects into its approach. The first two deal specifically with the provider monitoring and accountability. First, there is no ownership and/or accountability assigned to the entities that actually control the pharmacy--the providers. Moreover, the providers are not afforded entry into the system. Secondly, the current system is myopic. It looks within the auspices of the pharmacy for the solution. Thus, the problem is: How can the pharmacy system change its methodology in an adaptive way to solve the problem of cost exceeding the budget?

The third lies with the pharmacy's non-interactive approach to drug management. Currently at WACH, there is no systematic delineation of pharmacy priorities. Pharmacists are caught in several different struggles. First, they are short staffed and forced to channel their efforts into the short-term gratification requirements of the hospital--namely to fill prescriptions as fast as possible to reduce the patient perceptions of sub-optimal care. Secondly, they are caught in a struggle to conserve resources while at the same time bearing criticism from providers who perceive their actions as counter to their efforts of treating the patients. Often, providers accuse the pharmacy as just being interested in cost over treatment rather than balancing treatment

effects with pharmacoeconomic facts. Rupp argues that pharmacists are caught in a quagmire of either attempting to save money on prescriptions or save money on overall treatment of the second order effects associated with treatment choices (Rupp, 1999). In WACH's case, this is a valid concern. There is no system of collaboration between providers and the pharmacy, and each is antagonistic. This inevitably results in the patient caught in the middle, volleyed back and forth between provider and pharmacist. Rupp argues for mutual collaboration--a directional philosophy based on pharmacy involvement in patient care. Studies illustrate that when providers educate and consult with the pharmacy, and pharmacists are proactive in educating providers on various treatment effects and their cost, patients experience better outcomes at reduced cost (Boyko, 1997).

In order to establish the framework of an economically viable pharmacy, a methodology and thought process must be determined. Specifically, who has successfully bridged the delta between the fiscal irresponsibility that retrospective payment and a lack of analysis that characterized 1970s from the cost conscious and outcome based systems we find today? Who has created and implemented a successful pharmacy system that holds providers accountable for budgetary excesses, while incorporating clinical education, cost awareness, and outcomes management? Are we at

WACH in a position to incorporate successful business strategies in dealing with the pharmacy dilemma? Consequently, effort will be focused at this juncture on identifying the critical factors that will shape the proposal or the "remedy":

1. Determining the similarities with respect to our civilian counterparts--Are there sufficient likenesses to justify instituting a parallel system?
2. Determining the elements to a successful program.
3. Of these elements determine which may be adapted to WACH.
4. Determining which have to be discarded as a result of the limitations of the DoD healthcare.
5. The development of a timeline for actual implementation of an economic feedback program.
6. The determination of potential criticisms for such research from providers (those affected) that could undermine or reduce the efficacy of such an effort.
7. The creation of proper outcomes measurements to determine if this project could be successful in reducing costs and keeping outcomes at their current level or elevated and whether the results at WACH could successfully be implemented DoD wide.

The issues identified above will form the basis for the

necessary research required to achieve these aims. The literature review required to address these principle issues provides answers to the questions above and will culminate in the “remedy” taken or proposed solution. To date, such an effort has not been made in any DoD facility.

LITERATURE REVIEW

There is an abundance of information and literature on the subject of pharmacy budgetary control, successful programs, provider ownership and accountability with respect to their prescription practices, provider monitoring, and outcomes studies. Thus, a review of the literature provides a perfect blueprint on how to construct a viable alternative to the current paradigm. However, these initiatives lie completely within the private sector. For the purposes of this research, comparisons and contrasts between the DoD healthcare framework and the salient private sector counterpart, the HMO will be delineated. There are two areas to be addressed. First, is the DoD sufficiently similar to organizations that are currently engaging in successful outcomes-oriented cost control? Second, are any differences potentials for system failure at WACH? Following this examination, the study will address each critical element of the

successful processes and illustrate how each should be incorporated into a comprehensive plan for implementation.

Similarities between DoD and civilian counterparts

Currently, the DoD TRICARE plan bears significant similarity to the civilian systems in HMO derived medical care. First and most central to this research is the growing influence of the pharmacy. Both civilian HMOs and all DoD MTFs have in place a centralized formulary. A 1995 survey showed that 97 percent of all HMOs had a centralized formulary (Smith, G. 1996).

Within an HMO, there exists empanelment of an enrolled population. In many DoD medical activities, there is movement toward empanelment, and indeed, WACH providers have been directed to do so. Throughout the DoD, the movement is being undertaken as beneficiaries are directed toward primary care providers for their primary care management. Monetary penalties are present for those beneficiaries that seek medical care outside the list of HMO providers. Health maintenance organizations are a literal database and storehouse of medical treatment data that is used to enhance decision-making capability with regard to fiscally sound medical management. Our DoD facilities also have data collection activities, but not on the same scale. Moreover, DoD systems are

generally proprietary and are less adaptable as informational requirements change (Meyer, 1998).

Additionally, the DoD and the civilian HMOs also employ the use of hospital formularies, which are standardized drug lists available for prescription-writing by the staff providers. There are three types of formularies commonly used among private sector HMOs. The closed formulary is the most restrictive form whereby only those drugs cited on the formulary are reimbursed or covered by the HMO. Currently, the list of healthcare organizations adopting the closed formulary has increased from 23.9 percent in 1995 to 39.1 percent in 1998 (Mehl, 1999). The open formulary, which 57 percent of HMOs employ, has generally more options for the beneficiary. If the formulary does not contain a desired drug, cost sharing between the HMO and the beneficiary occurs through co-payments and deductibles. The third is a hybrid of the two where coverage goes beyond the formulary through the use of co-payments and deductibles, but some classes of drugs are completely eliminated (Smith, G. 1996). The DoD system overall is most similar to the closed formulary, but it allows each facility staff the freedom to tailor its respective formulary by adding additional pharmaceuticals. Department of Defense beneficiaries are only eligible for those pharmaceuticals that are listed on their servicing MTF formulary, but MTF formularies may vary.

Finally, the ability to collect and manage data in both settings is similar. Both the DoD and similar HMOs are essentially repositories for data collection. Both systems have in place solid automation plans and infrastructure to support data collection on a large perspective. This data is essential to sound business decisions. Minimal improvement in certain areas such as a pharmacy centralized budget (DoD) or a pharmacy benefits package (HMO) can still save millions of healthcare dollars that can be redirected to other areas. Data collection and trend analysis makes prudent decisions possible. According to one article, data and the use of information technology enhances the quality of care, facilitates accountability, and it provides for cost containment in the process (Felkey, 1997).

The Differences

Civilian HMOs have greater influence and control over the utilization practices of their providers. Health maintenance organizations create incentives to further direct and shape provider behavior in a manner best suited for the economic survival of the HMO as well as the patient satisfaction levels with respect to care received. Essentially, they have determined the point whereby care/beneficiary satisfaction is balanced

against cost. Conversely, disincentives also exist for providers not meeting the expectations of private sector HMOs. Fully 46 percent of all providers with prescription authority are in "risk pools." Providers who assume financial risk and/or share in economic incentives advocate pharmacy education that includes "cost-effectiveness and appropriate therapeutic practice..." (Mehl, 1999). Formulary decisions are made based on detailed data on their cost and treatment efficacy. Providers are "graded" and economically credentialed with respect to their prescription habits, productivity, and medical outcomes. When providers become stakeholders in the pharmacy equation, they become energized and seek out drug information.

Most important and contrary to the DoD philosophy, our counterparts have made the decision to adequately resource these programs. Moreover, there is concerted effort to look at the "system" as a whole within the vertically integrated delivery systems. Specifically, there is also a monitoring of the "second order effects." Private sector HMOs balance the treatment efficacy of a drug and its cost with the potential for increased pressures at other ends of the system. The key difference is that private sector HMOs look at pharmoeconomic analysis with respect to total prescription cost, patient outcomes, and total system cost. This is done through education and study with economic

feedback as the key (Lubarsky, 1997).

Lovelace Healthcare systems is an example of just such a successful effort. They made a decision to increase the number of patients diagnosed with depression from their enrollee population. They then made the decision to treat with Prozac, a drug more expensive than other options. As a result, they increased their pharmaceutical expenses in one area, but reduced the number of admissions for in-patient psychiatry stays. The end result was \$300/Prozac regimen per month vs. an increase in \$1000/day inpatient visits for depression (Advisory Board, 1995). In another study, it was found that starting with a more expensive set of drugs for gastro-esophageal illnesses resulted in better clinical outcomes that were initially associated with higher pharmaceutical cost but reduced the second order effects--in this case referrals, outpatient visits, endoscopies, and X-rays (Eggleston, 1998).

More importantly, the private sector has found that prescription habits of providers are a function of education. In such cases, a provider taking the "shotgun" approach to medicine may prescribe more medications or more expensive medications than the situation warrants. Non-dermatologists, for example, have been found to prescribe much more costly drugs with no better or worse outcomes than dermatologists (Smith, 1998). Using a

pharmacoeconomic analysis produced similar results internationally in treating tinea infections (Shear, 1998).

In the private sector, pharmacy leadership also develop pharmaceutical pathways. Such pathways illustrate the variance in the initial baseline for treatments. In one case, a haloperidol was the widely accepted drug of choice in the treatment of refractory schizophrenia. However, a newer drug called clozapine had better outcomes and was \$2,733 cheaper per patient per year than haloperidol. Cost savings in the facility that conducted the pharmoeconomic analysis reached nearly \$500,000 per year (Rosenheck, 1998). In one case, the better drug was more expensive. In the other the better drug was less expensive. In both cases outcomes were the deciding factor based on the specific pharmacy expense as well as the second order effects from the measures of acuity. Data collection is essential in these efforts and represents a way to capture the best ways to practice cost-effective medicine. Successes in this area are determined through treatment and cost analysis and are often incorporated into clinical pathways (Mutnick, 1997).

In all cases the institution of education into the equation is paramount. In large facilities, both for-profit and non-profit, studies found that a drug educator found a significant number of inappropriate prescriptions issued. In a study conducted within

the Philadelphia Veterans Hospital, the researcher found that after a physician educator provided numerous lectures, the prescription rate of prothrombin dropped 31 percent. This was a drug identified as an abused drug with no proof of better outcomes. The providers, confronted with this data, changed their prescribing behavior (Shulkin, 1994).

The use of the hospital formulary among our private sector counterparts is also somewhat divergent to the DoD system. Smith states that:

A formulary should assist the physician in choosing cost-effective therapeutic agents for their patients. A formulary can be viewed as a list of drugs that are the only agents paid for by a particular health plan or a list of preferred products to use when prescribing a drug for a plan member. Formularies continue to evolve and are becoming educational tools as well as a list of approved drugs. The formulary document is not intended to decide when drug therapy should be initiated; rather the formulary helps the provider make an informed treatment choice for the patient after the physician chooses a route of treatment (Smith, 1996).

The formulary is established as a tool for education. Indeed, it is a form of pharmaceutical education in most of the 97 percent of all private sector HMOs who use it, resulting in curbing the “creep” effect of rising drug costs in a capitated world. The savings is undoubtedly “returned” in part to providers as incentive for further savings. The remainder is used to provide quality healthcare at an affordable cost. It is also important to note that the formulary, being one component of the clinical education, is meant to provide the resources for most efficacious treatment. Yet a formulary that results from prudent pharmacological decisions can also break some ineffective provider prescription habits. Although Smith could be construed by critics as “idealistic,” his publication represents the beliefs of many who put this philosophy into action.

In conducting some of the research for this effort, “polling” among the providers served the purpose of reconciling policy with practice. Certainly, the DoD healthcare system does not employ the formulary as a management tool to serve as an algorithm or a template for most pharmacy decisions. Instead, it is viewed by as an additional constraint placed on their ability to deliver healthcare.

Currently, the PharmacoEconomic Center (PEC) is the sole effort in place within the DoD to provide MTF pharmacy chiefs with

a decision-making tool. Located in San Antonio and staffed at approximately 12 pharmacologists, the PEC provides monthly updates in its publication. These updates range from drug and cost comparison to new PEC bulk-buying initiatives with major drug companies. Small MTFs, such as WACH, use this publication as their pharmacology effort. Some may argue that the PEC updates provide MTFs with the ability to make credible formulary decisions. Unfortunately, however well intentioned, these efforts are neither germane nor timely for the daily drug decisions made by providers. Consequently, the formulary decision process at WACH is met with provider apathy and absenteeism. Much of the provider animosity and misunderstanding is deflected towards patients and the pharmacy at the local level.

What little current research outside of the PEC, undertaken by the DoD, is sponsored from private sector pharmaceutical company grants. Such a study, recently conducted at the Bremerton Naval Hospital and sponsored by Pfizer, revealed conversion in the formulary for one particular drug resulted in 29 percent cost savings without degradation in health status. Yet the publication clearly stated that the views expressed were not necessarily those of the DoD (Leaf, 1999).

The methods used to monitor providers within the private sector are extremely varied. Some facilities use the per member

per month costs broken down into pharmaceutical expenditure categories. Some organizations use averages (or a derivation thereof) of the ICD-9 and DRG pharmaceutical costs which are tracked by disease or by provider (Advisory Board, 1995). Some use protocols and clinical pathways that monitor the pharmaceutical expenses within the system of healthcare for a specific disease state (Kirsch, 1998). Still others use the above tools but "benchmark" against other leading facilities by using national databases such as JCAHO's Oryx system (Knoer, 1999). The results are considered a component of the education that pharmaceutical educators provide to their clinicians.

The critical elements of successful systems which can be adapted to WACH

The critical elements identified in the literature for the economic feedback to work are provider cost awareness, providers, incentives, and ongoing provider education with respect to different drug choices. The education provided on alternative drug choices can vary and often does based on the resources and the level of commitment of the facility. Each of these has sub-topics that depend and vary based on the facility/healthcare system as well as the disease-state or motivation. The critical

message is that the program should have these elements. Each element described below represents key considerations that have been addressed in successful pharmacy cost-containment programs. Thus, they are the seminal elements, which should be considered and included in any new pharmacy system implemented in the DoD. The resultant savings and benefit to the patient are a function of an inclusion of these elements and the magnitude of effort expended.

Shulkin elaborates that the key factors in drug use modifications are elements of acuity, outcomes, and cost. They would vary depending on the disease-state being studied, but many of them overlap regardless of the situation. In his case they were:

Length of Stay	Physician Fees
Laboratory tests	Dosage changes
X-rays	Adverse events
Direct drug costs	Ancillary services

There is a great overlap between what this researcher intends to implement and this approach. Additionally in both studies, there is great emphasis on the second order effects--those effects of the drug treatment that could adversely effect other areas of the

hospital such as: additional lab tests, length of stay within the hospital as a result of ineffective treatment, and x-rays. In this study, Shulkin even quantified the dosage changes to be \$5-\$6 based on the time-motion studies (Shulkin, 1994).

Shulkin argues for pharmacy collaboration with the provider and cost awareness for a program to be successful. By telling the providers what drugs cost, there can be some behavior modification. One study unrelated to pharmacy showed that physicians, when provided with information on the cost of lab tests, tend to order fewer lab tests (Cummings, 1982).

It is important to note that the facility had to invest in this strategy in order to get results. Without education the effect of cost awareness is lessened. It is one thing to convey to providers that "costs" are too high given their patient population, but without recommended strategies for change, there will not be as profound a result. On this same note, the Cleveland Clinic Foundation, a 1170-bed tertiary facility, recognized that drug costs were increasing at a rate of 20 percent per year. They decided to invest in a full-scale pharmoeconomic cell which was responsible for all education, formulary economic analysis, and economic feedback to providers. This cell either conducted or contracted studies on the efficacy of treatment of their top five used drugs which accounted for nearly \$16 million

of a \$30 million budget. While still concerned with outcomes and second order effects, they were able to achieve sizable savings in addition to better treatment. They broke down their base considerations into:

<u>Patient Outcomes</u>	<u>Total Treatment Costs</u>
Life-Death	Direct Costs
No disease-disease	Facility/Hotel
No discomfort-discomfort	Health Professionals
Patient satisfaction	Drug Product
	Dispensing/administration
	Monitoring
	Diagnostics
	Indirect costs
	Lost work/productivity

(Bakst, 1995).

In yet another publication, Gary Smith proposes a more simplified although encompassing model of:

Disease state management
Drug utilization review

Financial reporting**Formulary Management**

Another technique that incorporates both economic and educational elements as one feedback instrument is the adaptation of the Pareto principle from the Total Quality Management (TQM) discipline to the facility. This approach simply identifies statistical outliers within the system. Under the Pareto methodology, the relevant indicators are displayed graphically. In the case of pharmaceutical expenditures, the private sector uses a variety of indicators either alone or in combination with one another. The intent is for statistical outliers to be identified for further consideration or investigation.

The private sector uses the Pareto principle as a tool and balances it with the required care. An example of this, ironically in the DoD, is a drug called Synagis. Currently at WACH, we are about to initiate a series of 6 shots that are one month apart. Each shot equates to \$606 or a total of over \$5400 per patient. The drug protects prematurely born infants from acquiring respiratory syncytial virus (RSV). These infants are at risk due to underdeveloped lungs and if infected, could be hospitalized for 2-3 weeks in a pediatric ICU (PICU) at a cost of \$50,000 per episode. The expected value of the more expensive

medication administered correctly is much less than one PICU stay. Civilian facilities would look at the increased cost per provider (usually one provider is relegated as the proponent) and determine that although the expense metric is out of tolerance, it is medically justified. As the WACH system is implemented, the emphasis on the second order effects that are linked to prescriptions will not be ignored. An examination of other UM metrics will accompany pharmacy cost expenditures. Such an examination will ensure that the second order effects such as repeat clinic visits, hospital admissions, and ER visits will result from "pharmaceutical rationing."

Which elements must be modified due to system limitations

Despite the fact that there are many meaningful similarities between the staff model HMO and the DoD healthcare system, there are some significant differences. Such differences have the potential to limit the efficacy of interventions sectioned from the civilian counterparts into the DoD system. Principally, of the two areas--Pharmacy Education and Economic Incentive, the differences between the private sector and the DoD are manifested.

Differences in the Ability to Provide Pharmacy Education

In the civilian HMO, administrators monitor cost in all areas as it relates to outcomes. However, it is recognized that cost awareness information to providers is meaningless without ongoing clinical education. Education provided by a pharmacist with an advanced degree in pharmacoeconomics gives the provider comprehensive pharmacoeconomic data. This data that couples outcomes with overall cost allows the provider to make behavioral changes with accurate information.

In most cases, a pharmacist is retained on staff with the sole purpose of continual and ongoing education. This position is held by someone with an advanced degree in pharmacy education and trained on the current guidelines of analysis which include:

Cost minimization: Conducted when outcomes or consequences of two or more drugs are determined to be equal.

Cost-benefit analysis: Conducted when all costs and benefits are measured in monetary terms.

Cost-effective analysis: Conducted when all costs and benefits are measured in non-monetary terms

Cost-utility analysis: Conducted when effectiveness is important but also incorporates patient satisfaction and preference for a

particular drug.

Quantity-of-life-analysis: Conducted when the quality of life is important and drug choices are made with regard to both treatment efficacy and palliative care. Other studies show that the incorporation of a clinical educator into the pharmacy staff have positive effects that elevate the level of care at reduced costs. William McGhan's research shows that both immediate cost savings through appropriate prescription choice is a natural output but other second order effects are also possible. Some second order effects are not limited to: (McGhan, 1993).

1. Decreased morbidity in patient populations.
2. Reductions in treatment costs through more efficient modes of therapy.
3. Reductions in outpatient visits.
4. Reductions in inpatient Length-of-Stay (LOS).
5. Better use of manpower.
6. Reductions in iatrogenic disease due to improper drug choice.

Depending on the goals of the facility, the clinical educator, who has a Pharmacy Doctorate, possesses the economic tools as well as the pharmacy skills that are critical for pharmacoeconomic analysis. Furnished with these skills, the clinical educator has

the ability to provide clinicians with meaningful and comparative clinical and economic data on different drugs. By being able to compare and contrast these drugs, the provider is better educated and is able to write a prescription that is in a manner best suited for both the facility and its patients. The clinical educator then serves as the communicator of this analysis through the adoption and the promotion of drug protocols. The clinical educator also compiles trend data on prescription habits. When an outlier surfaces, the clinical educator collaboratively works with the provider to determine what treatment effect is desired. With this knowledge, the clinical educator has the ability to recommend and guide drug choices that meet the medical requirements, but also are the most cost-effective (Jolicoeur, 1992).

A good example of this is Pfizer's recent introduction of Celebrex, onto the drug market. Currently, there are more than 16,000 nonsteroidal anti-inflammatory drug (NSAID)-related deaths each year (Singh, 1998). Capitalizing on this, Pfizer has heavily marketed this new and much more expensive COX-2 inhibitor that has equal clinical effects to its competition. However, it claims to reduce the gastrointestinal (GI) bleeds associated with the standards like Ibuprofen. According to leading military pharmacists, Celebrex should only be given to those patients with a history of GI disease. In other cases, COX-1 inhibitors are

clinically adequate, and are much more cost effective. This example is experiencing a great deal of DoD visibility. However in cases where it is not as obvious, the clinical educator would be instrumental in comparing the different drugs, determining when the more costly one is needed, and educating the providers on the subject.

Such a position is distinctively separate from normal pharmacy responsibilities. Often, the pharmacist's compensation is tied in to varying degrees on total cost savings. Providers do not have the time to continually be aware of the changes in the different drug classes and their treatment efficacy. The provider also has no real view of overall cost or the ability to make meaningful cost comparisons. Where there is a dedicated advanced degree pharmacist on staff, he/she analyzes drug utilization trends and remains current on all literature to include alternative drug choices. The pharmacist continually engages all providers in an on-going dialogue and serves as the resident expert for all drug questions. In addition to making rounds on a regular basis and providing episodic education, the pharmacy educator also arranges for guest speakers or conducts specific training through educational presentations.

In the DoD setting, pharmacy educators conduct the same types of activities, but the emphasis on providing resources for these

efforts is constrained in comparison. For example, previously there was a pharmacy educator at WACH. When this person left 3 years ago, the position was never filled. Ongoing efforts to replace this loss include ad hoc presentations to providers, some dialogue and episodic education, and electronic messages under the computer pharmacy menu selection stating the current alternatives for certain classes of drugs.

Currently, WACH is short two pharmacists. Efforts at establishing satellite pharmacy and re-engineering existing practices are directed toward improving patient satisfaction and increased access by reducing prescription wait times. Why is this the case? Conflicting priorities are often times a function of the incentive structure or lack of one.

Differences in Economic Incentive Structure

From an economic standpoint, the two systems are radically different. So deep is this difference that it is embedded in the corporate culture. The economic incentive in the private sector affects both the pharmacy and the provider populations. It is a component of the culture. The success of a system designed to improve pharmacy operations, such as this, is inextricably linked to the private sector incentive structure. There are no conflicts

that cannot be decided by the common denominator—compensation. In the DoD system, there is no economic incentive tied to the provider or the pharmacy. The DoD corporate culture has allowed inefficient practices to perpetuate. Consequently, there are conflicts that go unresolved between providers and pharmacists. Providers, with no accountability for their prescription costs, have no incentive to do anything but practice cost-effective medicine. Additionally, pharmacists, who also have no incentivized buy-in and no provider cooperation, ultimately succumb to a dysfunctional system.

A perfect example of the effects of this lack of incentive is the glipizide drugs used to treat non-insulin dependent (Type II) Diabetes Mellitus. The PEC published an informative article on the treatment and cost differences between Glucotrol XL and glipizide. The cost differences are staggering, with Glucotrol XL costing 4.5 to 5 times more than glipizide. Proponents for Glucotrol XL argue that its sustained release facilitates more patient compliance, since patients take fewer pills per day than if they took glipizide (PEC Update, 1998). However, WACH pharmacists state that most providers prescribe the same number of pills per day of Glucotrol XL as glipizide requires. Thus, the treatment effects, which the PEC argues are minimal, do not appear to be the most essential consideration. However, due to the lack

of incentive, the WACH pharmacy does not effectively use this information to change prescription habits nor do providers adhere to it.

Of course there is generalized pressure from the WACH leadership which focuses them on treating the symptom--the excessive budget, but in relative isolation. Actions taken to mitigate cost overruns are not undertaken in a systems approach through the use of data and education. This is in stark contrast to the private sector. Culturally, the two systems are radically different.

Thus, to design and implement a program that incorporates the critical elements of a successful civilian system, there need to be some modifications to the system at WACH to mitigate the weaknesses which result from the constrained resources which cause the DoD system to produce lackluster results. Specifically, the decentralized system at WACH does incorporate incentivized buy in from the providers. Under this system, the WACH leadership promised to "share in any wealth" that results from the providers judiciously managing their decentralized budget. This ability, granted from the WACH leadership, allowed the researcher to institute a program whereby any retained savings is returned proportionately to the amount saved at the clinic level.

Consequently, the incentive structure and the education are

modified to fit the system's limitations while maximizing the ability of the plan. Department/service savings will be returned, in part, to the department chiefs. The department chiefs will have full autonomy over the savings to purchase furniture, schedule additional Temporary Duty (TDY) related to Continuing Medical Education (CME), etc. It is this study's intent to effect any pharmacoeconomic change through reward and incentive rather than through any coercion. Research has shown that optimal cost-effective care with no degradation in patient care is best achieved through education of providers. With the education, the pharmacists tend to accept pharmacy suggestions rather than rejecting pharmacy mandates (Briscoe, 1996).

Another aspect not intended, but stated by many providers, is the "realistic training." Many providers desire a parity of knowledge with their civilian counterparts. In the same philosophy that promotes medically benchmarking with civilian counterparts, many providers at WACH have stated an interest in obtaining financial proficiency with their peers. In this study, the educational piece will maintain the current semi-effective model with some additions. First, the pharmacy and the researcher will generate newsletters on a periodic basis that provide information on the dosage cost, high utilization patterns, the benefits of generic substitutes, and medical treatment efficacy,

but also present the options as a function of cost. Additionally, the researcher is in the process of coordinating guest speakers with the intent of responding to service level fields of interest and drug comparison.

The potential for criticism

Criticism does exist for this type of radical change in operational philosophy. The information discussed in this section relates specifically to WACH. Consequently, the study relied on personal interviews between the researcher and elements of the pharmacy, clinical, and administrative disciplines. Generally, criticism of the proposal's feasibility fell into one of two areas: corporate culture/lack of incentive and fiscal and methodological considerations.

From the pharmacy discipline, some felt that this type of feedback and provider monitoring had been done prior with insufficient success to warrant further consideration. One of the pharmacists remarked that supplying the cost comparative data on WACH's automated prescription selection was sufficient. Furthermore, from this pharmacist's perspective, the lack of incentive afforded to providers to change was a sufficient obstacle and rendered any pharmacological efforts academic. Moreover, WACH's current pharmacy educator questioned his relative

worth to the project in spite of his positional responsibilities and stated that other immediate needs would take precedence over those of an educator. These immediate needs were a function of his superior's desires to bring low-level projects to closure. The pharmacists interviewed also cited the poor relationship between themselves and providers as possible confounding variables to the study. More than once, pharmacists who accompanied the researcher on briefings regarding the plan were met with sardonic ridicule. The resultant effect curbed further visits by the pharmacists. Although the pharmacists felt uncomfortable, there was significant clarification and ad hoc education as the providers questioned the pharmacists on educational issues. This development was unfortunate as it needlessly broadened the schism between the two factions.

A regional pharmacy consultant questioned the entire effort of education as fruitless due to the lack of an adequately trained pharmacy educator. He stated that education provided as a function of the researcher and pharmacy staff's efforts, even coupled with a request to obtain SERMC support, was like "...spitting in the wind." Furthermore, the same individual questioned the abilities of the current staff, specifically its lack of a pharmacy educator, to be able to provide the education common in the civilian sector.

From the clinical perspective, criticism was very positive and constructive regarding the intent of the study. Providers were more concerned with improving the researcher's feedback to mimic their counterparts in the civilian sector. The providers were somewhat concerned with service to service comparisons and with ensuring provider anonymity. However, when made aware that the plan was a tool to improve practice by becoming aware of the business ethic needed to curb the currently bleak situation, they embraced it with alacrity. Their concerns only focussed on meaningful comparisons in the case-mix adjustment section of the project.

Administratively, the criticism centered on convincing providers of the worth of this undertaking. Efforts and criticism were geared toward improving the level of education, providing a proper and meaningful incentive strategy for providers to "buy-in", ensuring financial accuracy in all reporting mechanisms, and obtaining any required external support to ensure there was sufficient education. All but the financial accuracy aspects were seen as potential weaknesses that could be overcome with adequate effort. The credibility aspect was identified as the most important potential criticism. Specifically, the concerns were that (1) providers would believe that this proposal was a tool to improve practice habits and save money and (2) any comparisons

drawn would be done so in a non-punitive manner with a sound research design. The latter element would be made possible by normalizing any patient populations through statistical corrections for patient severity.

Outcomes studies with respect to justifying this proposal

Earlier in the text, the study spoke of differences between the civilian and military sectors of care. The focus then was on how the resource constraints limit the amount and type of valuable feedback to the providers. Iameter, the private consultant group that conducted case-mix adjustments with the aid of their acuity index, was an example of the type of service required to perform meaningful comparisons and provider monitoring. This, the final section of the literature review, concentrates on the types of measures required and the statistical measurements and tests of validity that various studies use. This information, although different from diabetes as a disease-state study, is essentially the same thought process the researcher used along with local provider input to determine the methodology for the second area of study and feedback. Although many of the studies that were reviewed did not make use of statistical case-mix adjustment, they were valuable benchmarks used ultimately for this study's approach to a quantitative study of a disease-state.

Because the field of drug study is so complicated, there will be no single study that will stand up to all scientific scrutiny. Many complete and accurate scientific analyses of drugs, their efficacy, and cost will use any number of research designs such as conventional randomized trials to pharmacoepidemiological studies. In these efforts, little in the way of patient severity is taken into consideration (Avorn, 1994). Researchers are more concerned with determining efficacy. Some compare both the efficacy levels and the cost as factors in determining formulary decisions or in creating drug protocols. Efforts toward examining the cost-effective usage of drugs are generally outcomes oriented. In other words, they concentrate on the outcomes as a function of any number of outcome measures. Some studies look at Quality of life measurements (QOL) as a key indicator of drug efficacy. With this approach, long-term effects that include "soft" areas such as social adaptation and cognitive effects of the drugs are taken into consideration (Bech, 1995). Other approaches take a prospective stance and employ modeling techniques to predict overall drug effects as a function of cost. In this approach, sample data is drawn and computer simulations offer insight into overall benefits (Peterson, 1998). Others look at drug variations and select various outcome measures such as physician visits or Emergency Room (ER) admissions, in the case of many asthma studies

(National Heart, Lung, and Blood Institute, 1995).

The studies above are more interested in either selecting the most efficacious drug when given a choice or searching for a middle ground between cost and toxicity. Furthermore, these studies are generally conducted within the spectrum of a clinical trial. Consequently, total numbers of cases are sought with the drug, itself, serving as the focal point. Generally, comparisons between provider's treatment habits are not significant. For the purposes of this research, the focal point is the providers. They are the mechanism for the independent variables of cost awareness and education to achieve their effect. Thus, provider acceptance is critical.

This study will employ case-mix adjustment for one disease in a similar manner to that which Iameter provides to its clients. Iameter and other consultant groups like it study one or more disease-states. Along with the literature and professional opinion, they develop acuity measures. These acuity measures are assigned a weight. Patients that are diagnosed for the disease-state of interest are assigned an additional weight--often the sum total of all appropriate measures of acuity. Another way to attack the differences in severity is to subjectively rank complications or sub-diagnoses higher or lower. Iameter, then uses the coefficient of severity along with outcome measures

salient to the disease-state in a regression equation. The disease-state study in this paper will use Analysis of Variance (ANOVA) rather than linear regression. The weights of severity, sex, age, and clinic visits will be determined for a specific disease-state. Any differences among providers' patient populations will be determined by a between-groups ANOVA.

The "Remedy"

It should be stressed at this point that the proposed solution to the pharmacy problem is to introduce a system of economic feedback to providers that has never been done before in a DoD facility. Such a system would be a pilot venture whereby the pharmacy "cost center" would be de-centralized to the departments based on Military Expense Performance Reporting System (MEPRS) utilization and expense data for the previous fiscal year. The system proposed would provide service chiefs with feedback on their departments and each provider as well as to the individual providers themselves. This information will be presented in such a way as to identify outliers. The key statistical metric in the overall system would be average prescription cost per provider. The assumption is that since empanelment is not fully or functionally in place, the intra-service comparisons would be just

and applicable solely for identifying outliers.

However, a further follow on-study will look at one specific disease state and case-mix adjust using ANOVA and identifying key indicators of acuity such as ER admissions, clinic visits, etc. These would be determined based on the literature of the particular disease. Diabetes is the disease that will be studied due to its relative ease of acuity measures, its large scope with respect to patients, lack of seasonality factors that might further confound the study such as asthma, and the variability of drug treatments. These acuity measures will also be used to determine if the proposed system expanded the “second order” effects that will be described in detail later on in the text. Essentially, the proposal will emphasize in its implementation the need to look beyond the basic system of pharmacy feedback to the extent that it is needed. We don’t want to encourage providers to merely look at husbanding and rationing prescriptions if the result is degradation on medical care with ballooning second order effects.

METHODOLOGY

Cost Comparison

In order to compare cost savings as a function of the intervention (cost feedback and periodic education) a baseline

cost per provider and service is required. This data is derived from MEPRS FY 99 pharmacy cost totals. Because of the time constraints involved in instituting the program on 1 October, only the first 10 months of FY 99 were used. Data was broken out by month. Each service was assigned an aggregate amount per month as well as a breakout by provider. Each prescription cost is recorded at the point of care. The prescription costs of patients treated in the ER, for example, are charged to the ER budget regardless if an ER provider is treating them or not. Because the consistency of MEPRS recording is not an issue, philosophical nuances are moot. The FY 99 MEPRS data is also used to create and program the notional budget for this study. An inflation factor totaling 14 percent are applied to the historical FY 99 actual cost totals to determine the programmed budget. This was due to the need to develop a budget. The intent was to create a goal for the providers. However, the monthly comparisons would be based off of 24 percent (the growth and inflation over the last 3 years). It was not critical that the decentralized budget include the growth projections. In fact, it was just to serve as a benchmark and not the definitive baseline for comparison for the providers. The growth and inflation factors are based on both the MEDCOM and SERMC projections as well as WACH historical data. These projections are the best determination based on regional

survey, historical perspective, and subjective interpretation by each regional senior pharmacist. Furthermore, they were confirmed via telephonic discussion with COL William Heath, US Army Pharmacy consultant.

The January comparisons deviated in one aspect. The January 1999 baseline cost was increased by 10 percent rather than the 24 percent of the other months. This is due to a shortcoming of the historical data and CHCS. Essentially, CHCS offers a snapshot in time. The data collected on any given day are different from the same data period collected one year later. This is due to the cost increases that are reflective in CHCS and the fact that every query adjusts for the most current pricing data. The months October through December were collected very close to the actual dates. January CHCS data was missing, and thus had to be collected in the present. Therefore, the assumption was made that the inflationary increases were present, and only the volume would have to be added in as a meaningful comparison. Because the projected budget is a function of both growth and inflation, in this case only growth (10 percent) needed to be added in.

Within each service, monthly feedback will be provided to the chief and to each provider. Chiefs will receive an overall composite and a breakout by provider. Providers will receive the breakout of providers without names. Separate providers will know

only their own identity, but will see where their prescription habits lie in relation to members of the department. In addition to this comparison, the chief and each service member will see, as a department, where their monthly expenditures are with the FY budget as a backdrop.

The overall budget for this plan (Appendix A) is a function of the total costs for FY 99 with the growth and inflation factors included. However, to eliminate seasonality considerations, each month will be compared to the same month the year prior to the intervention. For example, October 1999 is compared to October 1998 (with inflation and volume factored in) instead of against the straight-line breakout. This is to allow fair month to month comparisons which help eliminate confounders such as seasonality effects.

Service chiefs were briefed on the plan on 22 September 1999. Following the overall brief to the general body of providers, a follow-up briefing was given to each service. First and foremost, the follow-up briefings were scheduled to brief the actual decentralized budget at the service level (Appendix B). Appendix B represents one of many formal communications to the chiefs who would obtain a better understanding of the proposal's baseline and rules of engagement. Additionally, the briefings were designed to:

1. Provide the briefing to those absent at the initial briefing.
2. Solicit input from the providers on potential disease-state studies.
3. Explain that the plan was continuous and that a relationship between myself and the providers was necessary to provide education on the project.
4. Answer questions that the providers had regarding civilian managed care practices.
5. Assure the providers that this was a tool to help reduce costs and non-punitive.
6. Solicit input that would assist in preparing planned educational presentations. These presentations are being scheduled and are designed to be tailored to each service-specific field of medicine.

At the conclusion of the 4 months, each WACH service and division will be statistically compared to determine if the interventions of cost awareness and pharmaceutical education produced a material and significant decrease in prescription expenditures. There is one key issue with this comparison that should be addressed. Because there is provider turnover from FY 99, only providers who are currently at WACH will be reported in

each month's cost feedback. However, overall comparisons for departments and services will not filter out providers who have attrited from the provider population. The assumption is that there are no significant changes in patient and provider populations in the past 12 months that would affect meaningful cost comparisons. This assumption is based on the relatively level rate of growth in overall pharmaceutical cost and in enrollment size.

Hypothesis (1): Based on the literature and provider interviews, cost awareness data coupled with pharmacy education within the context of an incentivized program will produce reduced pharmacy expenditures at WACH for FY 00.

Statistical Tool: Student's T-test for significance will be used to detect significant differences as a function of the intervention. Comparisons will be made between services for the period of 1 Oct 98 through 1 Feb 99 and 1 Oct 99 through 1 Feb 00. Comparisons for the same period will be made among providers who were assigned to WACH during the pre-intervention and post-intervention periods as well.

Outcomes study

All comparisons discussed up to now are gross comparisons among providers. Although comparisons will be made within services and not among them, there is no mechanism to identify or compare any material differences in patient severity. Therefore, one specific disease state will be studied in detail to provide comparisons between providers that are more meaningful. Patients in one disease-state will be studied and normalized through a linear regression case-mix adjustment. The ICD-9 categories for illness severity will be employed to develop a weight for each patient. The disease-state to be examined will be diabetes mellitus (DM). Currently, there are five providers within the Internal Medicine (IM) Service that treat diabetes. Although there is not a system of empanelment at WACH (such a system is currently under implementation), there is sufficient "empanelment" with respect to these patients in that they generally fall under Internal Medicine. An interview with the Chief of IM revealed that the providers for this disease have attempted to follow the same patients throughout the management of the disease. In view of the new empanelment policy, this will become more of the norm in the future. However, pharmaceutical treatment management of DM is a product of the most recent provider whether that provider prescribed the medication or not. This is due to the dynamic

nature of the disease that requires constant assessment, monitoring, and modification of DM medications.

The subjects of the study are all patients seen with DM in NOV 1999 by the 5 Internal Medicine providers. Patients were identified by name in order only to determine total DM medication costs, but names were not included in the data analysis. Only the researcher had access to the names and patient confidentiality was preserved. The patients were assigned to one of the five providers, which was determined by the last provider they had seen. In many cases, patients may have been seen by more than one provider. Consequently, the study: (1) is to determine if there are any significant differences in patient populations of the current IM providers, (2) establishes a baseline for future comparisons either within IM or to other services, and (3) determines if there are relationships between severity and pharmaceutical cost.

Diabetes mellitus is a disease that may or may not have complications. The possible complications associated with this disease are:

Renal Manifestations	Ophthalmic Manifestations
Neurologic Manifestations	Unspecified Complications
Hyperglycemia	Nephropathy

Polyneuropathy

Proteinuria/albuminaria

Retinopathy

Each manifestation will be given equal weighting in the model. With respect to the insulin dependency issue the breakdown and weights are as follows:

1. Non-insulin dependent (adult onset or unspecified not stated as uncontrolled): Ordinal weight of 1.
2. Insulin dependent (juvenile and not stated as uncontrolled): Ordinal weight of 2.
3. Non-insulin dependent (adult onset or unspecified stated as uncontrolled): Ordinal weight of 3.
4. Insulin dependent (juvenile stated as uncontrolled): Ordinal weight of 4.

Coding methodology for severity is as follows:

1. Patients with a complication will be coded ordinally as 5.
2. Patients without mention of complication will be coded 1-4.

Additionally, hospital visits for DM will be used as well to further weight each patient's severity level. A further comparison of age and sex will conclude the case-mix analysis.

Thus, all the factors--age, sex, severity code, and clinic visits will be assigned equal weight. A total cost per patient of DM medications for the period 30 NOV 1998 through 30 NOV 1999 will be determined. The DM medications total cost in this study will be the total cost of any or all of the following medications: Glucotrol XL, glipizide, glyburide, metformin, and insulin. In all cases, a between groups comparison of means will be determined. Ostensibly, significant mean differences in the case-mix adjustment variables will be compared to any differences in mean total cost. Again, the education and cost feedback to the providers will be the independent variable.

The purpose of this study is to: (1) add credibility through case-mix adjustment that the overall hypothesis is correct; thus the cost awareness approach to pharmacy cost containment is sound and (2) to provide economic insight into second order affects that are related to DM medications. The second order effect is the number of clinic visits.

Hypothesis (2): There is no significant difference between groups of currently empaneled DM patients.

Data source: The Ambulatory Data System (ADS) database will provide the total number of DM cases by provider. Additionally,

WACH's ICD-9 Diagnosis database will provide the number of hospital admissions for this disease state.

Statistical Tool: Analysis of Variance (ANOVA) Single factor will be used as the primary tool to determine the relative differences in patient severity based on the weights determined above. It will also be used to compare the overall effect of the prescription cost to the various severity levels as well as the outcomes measure of hospital admissions. Specifically, it will determine if there is a relationship between total cost and the severity as determined by the severity weight and hospital admissions.

RESULTS

The results for Hypothesis 1 are broken down into monthly comparisons (October-February). An aggregate comparison between FY 99 and FY 00 total and average breakout for October through February is listed in Appendices C through F. In this section, each month's results includes the entire monthly summary of WACH pharmacy expenditures, the aggregate summary of those areas within the WACH network that received intervention (37 separate activities), and a comparison of the average prescription cost for

the latter group. The first table for each month will depict the entire WACH pharmacy projected budget and actual expenditures. The second table in each monthly breakout will capture only those areas under the purview of this study. For example, the costs incurred by the network providers or TAHC will not be included in these tables because the study did not involve them. Instead, these tables will concentrate on those areas that were affected. For the purposes of organization and identification, they total 37 different MEPRS activities. The third table for each month concentrates on the projected and actual average prescription cost per provider within the areas under the study. A one-tailed Students t-test for equal variance is used for total and average prescription cost comparisons between baseline FY 99 cost data and actual FY 00 costs.

October

Table 1 below illustrates the observed differences between the projected budget and the actual total cost expenditures. The difference and the actual October 99 expenses and the projected cost (Oct 98 incremented by 24 percent) is \$20,770 or 3.2 percent. This figure represents the aggregate savings in the first month of the study from those clinics and services within WACH including Tuttle and the network providers.

Table 1Macro-view of WACH Rx Expenditures (Budgeted v. Actual)

Projected Budget	\$649,022
Actual Expenditures	\$628,252
Difference (Savings)	\$20,770

The entire WACH budget (minus the outlying clinics and Supplemental Care) resulted in 37 separate MEPRs activities (n=37). The results are listed in Table 2 below. These groups were eliminated as they were not within the scope of the study and did not receive any intervention described in the “Remedy” section of the study. These activities formed the 2 groups--Projected (OCT 98 plus 24 percent) and Actual--OCT 99.

Table 2October Total Cost Comparisons (Affected Areas)

OCT 99 Actual Total Cost	Projected Cost (Decentralized Budget)	p-value
\$321,686	\$332,675	.48

n=37

Table 3 illustrates the observed differences between the average prescription costs of projected budget and the actual average prescription cost within the affected groups. The difference between the actual October 99 average and the projected average is \$.18 or .93 percent. This figure represents the aggregate savings measured in average prescription costs in the first month of the study from those clinics and services within WACH not including TAHC and the network providers. These activities formed the 2 groups--the projected costs (OCT 98 plus 24 percent) and the actual expenditures (OCT 99). A one-tailed Student's t-test for significance between the two totals (Projected and Actual) with the total MEPRS categories the same as above (n=37) and 2 degrees of freedom was not significant (p=.12).

Table 3

October Average Cost Comparisons(Affected Areas)

OCT 99 Actual AVG Cost	Projected Cost (Decentralized Budget	p-value
\$19.18	\$19.35	0.06

n=37

November

The difference between the actual November 99 expenses and the projected cost is (\$37,372) or (5.9) percent, which is illustrated in Table 4 below.

Table 4

Macro-view of WACH Rx Expenditures (Budgeted v. Actual)

Projected Budget	\$632,422
Actual Expenditures	\$669,794
Difference (Loss)	(\$37,372)

The 37 separate MEPRs activities (n=37) results are listed in Table 5 below.

Table 5

November Total Cost Comparisons (Affected Areas)

NOV 99 Actual Total Cost	Projected Cost (Decentralized Budget)	p-value
\$330,064	\$338,029	0.48

n=37

The aggregate effect in the affected areas is a cost savings of \$7,965 despite the fact that overall in November, there was a loss present. However, this difference was not significant ($p=0.48$).

Table 6 illustrates the observed differences between the average prescription costs of projected budget and the actual average prescription cost within the affected groups. The difference between the actual November 99 average and the projected average is \$1.29 or 6.5 percent. However, this difference was not significant ($p=0.12$).

Table 6

November Average Cost Comparisons(Affected Areas)

NOV 99 Actual AVG Cost	Projected Cost (Decentralized Budget	p-value
\$18.63	\$19.92	0.29

n=37

December

The difference between the actual December 99 expenses and the projected cost is \$99,311 or 14.3 percent. This figure represents

the aggregate savings in the third month of the study and is listed in Table 7 below.

Table 7

Macro-view of WACH Rx Expenditures (Budgeted v. Actual)

Projected Budget	\$691,944
Actual Expenditures	\$592,633
Savings	\$99,311

The 37 separate MEPRs activities (n=37) results are listed in Table 8 below. The aggregate effect in the affected areas is a cost savings of \$95,971. However, this difference was not significant ($p=0.30$).

Table 8

December Total Cost Comparisons (Affected Areas)

DEC 99 Actual Total Cost	Projected Cost (Decentralized Budget)	p-value
\$276,346	\$372,217	0.30

n=37

Table 9 illustrates the observed differences between the average prescription costs of projected budget and the actual average prescription cost within the affected groups. The difference between the actual December 99 average and the projected average is \$3.96 or 19 percent. However, this difference was not significant ($p=0.05$).

Table 9

December Average Cost Comparisons(Affected Areas)

DEC 99 Actual AVG Cost	Projected Cost (Decentralized Budget	p-value
\$16.50	\$20.46	0.05

n=37

January

Table 10 depicts the overall loss of \$9,897 based on a projected budget for the month of \$612,340. This total represents the overall WACH pharmacy expenditures.

Table 10Macro-view of WACH Rx Expenditures (Budgeted v. Actual)

Projected Budget	\$612,340
Actual Expenditures	\$622,237
Loss	(\$9,897)

Table 11 depicts the budgetary savings for the affected areas of the program. Within the affected areas of the program, there was \$16,890 savings achieved. Overall the projected budget for those areas affected under the program's interventional control was \$325,882. Total pharmacy expenditures were \$308,992. This delta was not statistically significant ($p=0.46$).

Table 11January Total Cost Comparisons (Affected Areas)

JAN 00 Actual Total Cost	Projected Cost (Decentralized Budget)	p-value
\$308,992	\$325,882	0.46

n=37

Table 12 illustrates the observed differences between the average prescription costs of projected budget and the actual

average prescription cost within the affected groups. The difference between the actual January average and the projected average is \$.91 or 5 percent. However, this difference was not significant ($p=0.14$).

Table 12

January Average Cost Comparisons(Affected Areas)

JAN 00 Actual AVG Cost	Projected Cost (Decentralized Budget	p-value
\$16.64	\$17.55	0.14

n=37

Case-Mix Adjustment

The results of Hypothesis 2--the mean comparisons of the DM patients along the factors: age, sex, severity, cost, and clinic visits are displayed in Table 13. There were no between group differences among any of the factors.

Table 13Case-Mix Adjustment

Factor	n	df	F	P-value	F Crit
Age	105	4	0.66	0.61	2.46
Sex	105	4	1.99	0.10	2.46
Severity	105	4	1.99	0.10	2.46
Cost	105	4	1.91	0.11	2.46
Clinic Visits	105	4	1.31	0.27	2.46

Discussion

The results for Hypothesis 1 indicate that there was some initial inertia, a steep learning curve, and strong long-term potential for the program. Although the project's pre-briefs in September 1999 thoroughly detailed the intent, the baseline, and the methodology, the actual learning and behavior modification began after the first month's feedback. During this period, many of the providers made remarks to the researcher indicating final understanding and acceptance of the project. The October savings and subsequent November deficit appear to be the periods where initial orientation and maximized learning occurred. During this interval, many of the feedback reports were modified in that they

included additional items that were tailored to each service's request. As modifications occurred in a timely manner, more enthusiastic interaction and provider participation followed.

Not stated in the study but highly critical, was the overriding number of questions regarding cost that were generated. Because many of the providers literally had no idea of the significance of the pharmacy cost overruns or of drug prices, many questions were directed towards the highly utilized and recurring drug costs. In general terms, most services' costs are a function of only a few drugs. Once the incentive and the tracking was in place, services asked for cost comparative data on these high profile pharmaceuticals and then drew their own clinical conclusions. In many cases drugs that did not, in the services' opinion, demonstrate significant superiority over another similar drug were changed.

An additional reason for lack of significant differences early on, other than the initial confusion due to a steep learning curve, is the fundamental principle of prescription methodology. This is not reserved to WACH, but rather it is DoD wide. Specifically, it is the general practice of a 90-day supply plus 3 refills. Essentially, there is 1-year's worth of prescriptions which may be terminated during the year, but 3-month's worth are lost at the first prescription fill. This practice builds some

inertia into the paradigm. Essentially, improvement for the first 3 months of the study may very well be partially mitigated by September's prescriptions. That is why December's results and the ending trend of the study are extremely encouraging. The fact that the results approached statistically significant differences in December's results illustrates the potential of the study. Although, the results in January show a loss, the data in January is not as reliable due to the reasons discussed earlier. True meaningful comparisons may be confounded due to the lack of historical data.

With regard to hypothesis 2, there are several interesting points. Essentially, there were no significant differences in the patient populations for the 5 providers. Because the n-size ranged from 11 to 28, the lack of significance could be attributed to insufficient case numbers. However, periodic interviews with the IM staff, revealed that there are several hundred DM cases. In the providers' collective opinion, there are no significant differences in severity. Thus, the researcher may conclude that the sample selected was truly representative.

The fact that there were no differences in patient severity, coupled with no significant differences in pharmaceutical cost, illustrates that conditions prior to the study were nearly optimal, in terms of case distribution and prudent prescription

practices. Initially, there was to be an inclusion and an analysis of all ER visits and ICU admissions for this disease-state and a correlation to the prescription dollar amount. However, there was only one ER visit and no ICU admissions. Thus, the fears that decreased prescription costs and the possibility of rationed pharmaceuticals would result in a corresponding deleterious effect on healthcare seem to be unfounded.

In fact, the conduct of the case-mix adjustment segment of the study revealed that there was a great deal of scrutiny and peer review on the part of the providers. Conversations with the IM providers revealed that the economic feedback was used as a further tool for peer review, in addition to economic monitoring and resource conservation.

Recommendations/Conclusions

Automation/Data issues

There were many data systems that were used heavily during the implementation of this project. Each has some value to the entire DoD system, but each had some issues that this study encountered. Because CHCS was primary data source for baseline data, the economic feedback, periodic inquiries on formulary data, provider profiling, and the fact that the researcher directly interfaced

with it, its capabilities will be discussed here with a fair degree of competency. All other data sources, such as TAMMIS, were used to verify existing CHCS data. Because of this relationship and the fact that the researcher did not directly interface with these systems, a competent assessment of these systems cannot be addressed.

CHCS

The CHCS system is a useful and powerful multi-functioning computer system. However, its pharmacy menu options and system, although good, are clearly not tailored for this type of study. The CHCS system does not provide a historical look that is captured. For example, average and total cost amounts which are collected on 1 October 1998 will differ from the same query for the same period of time that is collected 1 year later. As each pharmaceutical price is updated, it is updated retrospectively for any future reporting. Thus, 1998's data on total and average cost is only based on 1998 prices until the prices are updated. Once the prices are updated, any further queries will be for the same pharmaceuticals in the same volume that was prescribed, but at current prices. Thus, it was incumbent, upon the researcher, to use data that was captured in a timely manner when creating the baseline for this study. Fortunately, data for 3 of the 4 months

used as a baseline for comparison were collected at approximately the time the actual period was over--prior to cost updates.

Staff Cooperation/Participation

Staff cooperation was present from all levels at the outset of the program. However, as more and more utility was derived from the feedback, staff participation became an important value-added factor. Essentially, the staff was receptive, but somewhat reserved initially. Many providers wanted some meaningful measurements of efficiency, but past efforts that were related to the field of utilization management did not meet providers' expectations. Others, the researcher felt, did not appreciate the commitment from the hospital leadership until later stages in the program. Additionally, as the results of the project showed some promise and as the feedback got more detailed in terms of actual prescription usage and profiling of outliers, providers became more interested.

The competitive nature and the continuous effort toward self-improvement, both of which are characteristics of the WACH Staff, also positively impacted the program. Many in the WACH provider family voiced that they had wanted to improve their prescription efficiency; however, they had lacked meaningful data and meaningful, timely, and accurate economic feedback. Once

providers were made aware that some of the inertia at the beginning stages of the project was due to the 90-day initial prescription and 3 refill policies and practices, they stated that they recognized the logic of 30-day initial prescriptions coupled with a decision to either sustain the prescription, due to its clinical efficacy, or abandon it in favor of a new drug. Once providers had the entire picture of global cost awareness along with the single drug costs, they appeared to arrive at their own conclusions and adopt different prescription practices. Many viewed the program's efforts as verifying that cost was an issue. Prior to this, they attributed the less than optimal efforts as passive indicators that the pharmacy costs were not that important.

On another level, provider participation and involvement was oriented on achieving parity with private sector providers. Many providers at WACH want "realistic training." Whether a provider was planning to transition to the private sector or not, he/she wanted the same type of economic environment in the military that is more and more pervasive in the private sector. This is clearly a reflection of the WACH staff's belief that more and more the healthcare industry is going to adopt many HMO utilization and efficiency measurement practices.

Future of Project

Both the direct area of study and all ancillary outgrowths have enormous potential for the DoD. The direct linkage between competent, timely, and germane information from this study to the providers illustrates the desire for DoD healthcare providers to self-educate and engage in cost-effective behavior. Were this program to be adopted and adequately resourced, there are many opportunities for a much greater degree of savings either from the reductions in wasteful prescription practices or changes in drug usage to coincide with the Medical Usage Evaluation (MUE) program. Indeed, the study and its efforts began to verify that pharmaceutical usage issues are the important. Before this study, there were indications that this was not perceived to be the case. Once established as a priority, as it has been here, the potential for continued savings and corporate cultural change is clear. The degree of interest and the willingness to change practice behavior could be an epiphany of things to come.

The only issue is adequate resourcing. The study happily evolved into much more than was originally intended. Provider profiling and responding to the demand for both clinical information as well as cost-comparative data is truly a task best suited for a clinical pharmacist with a post-graduate degree and versatile knowledge in statistics and comparative analysis.

Despite the researcher's relative novice level of skill, widespread positive cooperation was prevalent. Despite the researcher's best efforts, many "targets of opportunity" were lost due to time. Additionally, the time lag for this program too truly realize its potential is 1-2 years. This is due to the complete revolutionary change necessary in the areas of corporate culture as well as organic support for a fully functioning proponentcy. Moreover, the opportunities for further research, as a function of this effort, are abundant. Other than continuing the project as it stands, the project could be expanded to those areas that were excluded in this effort.

On the note of expanding the project, a graphic depiction of the program's parameters as they currently exist is illustrated in Appendix G (Program Effectiveness Model). Clearly with only limited resources, efficacy was severely restricted. In fact, the program generally concentrated its efforts toward DPC and touched other areas as time permitted. As the program ascends from the base upward and researches more areas, more savings may be achieved. As it stands currently, the program affected only about one-half of the total pharmacy budget. As the level of effort and resources that are allocated toward the program are limited, the program's potential is determined by descending toward the base. Decentralization did not occur beyond WACH proper and its closely

attached Soldier Family Health Clinics (SFHCs). However, even if the program affected all areas possible, it would never, under current DoD policy, be capable of addressing the network providers, which roughly constitute one-third of the entire pharmacy budget.

The program could also be best served if there were more disease-state studies which not only could measure pharmaceutical effectiveness, but they could also serve as starting point for an entire new series of treatment algorithms. These algorithms could be used not only to standardize treatment, but their development could improve the P&T process for formal drug adoption guidelines.

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Appendix ANotional Decentralized Budget

NOTIONAL DECENTRALIZED BUDGET					FY 99	FY 99	FY 00
-	<u>Total Rxs</u>	<u>Total Cost</u>	<u>MONTHLY</u>	<u>PROJECTION</u>	<u>Avg Cost</u>	<u>PROJECTION</u>	
DOS							
ANESTHESIOLOGY	157	\$ 11,538.78	\$ 1,153.88	\$ 13,846.54	\$ 73.50	\$ 15,785.05	
GENERAL SURGERY	2200	\$ 36,086.92	\$ 3,608.69	\$ 43,304.30	\$ 16.40	\$ 49,366.91	
UROLOGY	1637	\$ 74,822.68	\$ 7,482.27	\$ 89,787.22	\$ 45.71	\$ 102,357.43	
OB/GYN	14754	\$ 161,481.62	\$ 16,148.16	\$ 193,777.94	\$ 10.94	\$ 220,906.86	
OPHTHALMOLOGY CLINIC	2746	\$ 43,619.13	\$ 4,361.91	\$ 52,342.96	\$ 15.88	\$ 59,670.97	
ORTHOPEDICS	1827	\$ 11,757.45	\$ 1,175.75	\$ 14,108.94	\$ 6.44	\$ 16,084.19	
PODIATRY	817	\$ 6,384.99	\$ 638.50	\$ 7,661.99	\$ 7.82	\$ 8,734.67	
PHYSICAL THERAPY	53	\$ 219.30	\$ 21.93	\$ 263.16	\$ 4.14	\$ 300.00	
ORAL SURGERY	100	\$ 4,142.61	\$ 414.26	\$ 4,971.13	\$ 41.43	\$ 5,667.09	
OTOLARYNGOLOGY	2533	\$ 31,533.48	\$ 3,153.35	\$ 37,840.18	\$ 12.45	\$ 43,137.80	
Totals		\$ 381,586.96	\$ 38,158.70	\$ 457,904.35		\$ 522,010.96	
DPC							
FAMILY PRACTICE	61696	\$ 915,179.74	\$ 91,517.97	\$ 1,098,215.69	\$ 14.83	\$ 1,251,965.88	
DERMATOLOGY CLINIC	3813	\$ 183,715.08	\$ 18,371.51	\$ 220,458.10	\$ 48.18	\$ 251,322.23	
INTERNAL MEDICINE	41545	\$ 1,064,860.09	\$ 106,486.01	\$ 1,277,832.11	\$ 25.63	\$ 1,456,728.60	
PEDIATRICS	17925	\$ 169,135.00	\$ 16,913.50	\$ 202,962.00	\$ 9.44	\$ 231,376.68	
OPTOMETRY	438	\$ 2,561.86	\$ 256.19	\$ 3,074.23	\$ 5.85	\$ 3,504.62	
TROOP MEDICAL CLINIC #1	9947	\$ 125,910.31	\$ 12,591.03	\$ 151,092.37	\$ 12.66	\$ 172,245.30	
TROOP MEDICAL CLINIC #2	5367	\$ 80,941.84	\$ 8,094.18	\$ 97,130.21	\$ 15.08	\$ 110,728.44	
TROOP MEDICAL CLINIC #3	10565	\$ 119,012.74	\$ 11,901.27	\$ 142,815.29	\$ 11.26	\$ 162,809.43	
Totals		\$ 2,661,316.66	\$ 266,131.67	\$ 3,193,579.99		\$ 3,640,681.19	
PREVENTIVE MEDICINE	4547	\$ 113,647.88	\$ 11,364.79	\$ 136,377.46	\$ 24.99	\$ 155,470.30	
DIAGNOSTIC RADIOLOGY	79	\$ 1,027.86	\$ 102.79	\$ 1,233.43	\$ 13.01	\$ 1,406.11	
EMERGENCY MEDICINE	5347	\$ 48,155.74	\$ 4,815.57	\$ 57,786.89	\$ 9.01	\$ 65,877.05	
BEHAVIORAL MEDICINE	6616	\$ 262,880.96	\$ 26,288.10	\$ 315,457.15	\$ 39.73	\$ 359,621.15	
DIAGNOSTIC RADIOLOGY	79	\$ 1,027.86	\$ 102.79	\$ 1,233.43	\$ 13.01	\$ 1,406.11	

Appendix BSample Letter to Service Chiefs

Dr-----

I have been circulating and briefing over the past 2 weeks of my notional decentralized budget for Rx expenditures. To date I believe I have talked to most of the departments and services about the overall plan and its intricacies. However, there are several areas that have not yet received the "break down". Consequently, here is your respective breakdown. I ask you to please share this information among your providers :

	<u>Total Rxs</u>	<u>Total Cost</u>	<u>MONTHLY</u>	<u>PROJECTION</u>	<u>Avg Cost</u>	<u>PROJECTION</u>	
PEDIATRICS	17925	\$ 169,135.00	\$ 16,913.50	\$ 202,962.00	\$ 9.44	\$ 231,376.68	

The last column is the decentralized budget as it applies to your service for the entire FY00, the Fiscal Year we have just entered which spans 1 October 1999 through September of 2000. My economic feedback to you each month will be monthly progression balanced against the "Projection Figures". Additionally, I will be providing you and your staff breakdown by provider (only the respective chiefs of each area will "see all providers". However, in keeping with the initiative, each provider will be afforded the opportunity to determine where they reside with regard to other providers within the same service. They will not know names of the other providers, but will be able to get a non-attributional look at the department/service picture. Additionally, no service will see another service's cost awareness data. This feedback is strictly for each service for cost awareness and information.

I am currently working on several areas for pharmaceutical information with regard to both general topics and topics specific to each service. The format for this will be newsletters and/or TDY speakers. Please feel free to give me any areas with regard to drug choice you or your providers may be interested in. I will do my best to give you what you ask for.

Lastly, I want to extend my appreciation for you cooperative value-added attitudes and genuine interest or at least tolerance. I look forward to working with you over the next several months on what I consider to be an exciting field of study.

Thank you,

CPT Heath

Appendix COctober Comparisons

	Oct-98		Oct-99		
	FY00 Projection	Avg Cost	TOT Cost	AVG Cost	TOT Cost % Change
AAAA INTERNAL MEDICINE	\$ 1,290.27	\$ 21.87	\$ 1,333.91	\$ 19.62	-3%
ABAA GENERAL SURGERY	\$ 71.68	\$ 3.77	\$ 120.84	\$ 6.71	-69%
ABFA ORAL SURGERY	\$ 9.24	\$ 4.63	\$ 39.10	\$ 4.34	-323%
ABKA UROLOGY	\$ 33.48	\$ 33.48	\$ 4.50	\$ 4.50	87%
ACAA GYNECOLOGY	\$ 2,079.73	\$ 16.50	\$ 1,101.63	\$ 8.22	47%
ACBA OBSTETRICS	\$ 209.91	\$ 7.24	\$ 1,154.17	\$ 4.77	-450%
ACBB LABOR & DELIVERY	\$ 108.05	\$ 2.77	\$ 64.28	\$ 2.22	41%
ADAA PEDIATRICS	\$ 104.66	\$ 5.23	\$ 119.19	\$ 7.45	-14%
AEAA ORTHOPEDICS	\$ 50.96	\$ 3.40	\$ 94.83	\$ 6.32	-86%
AFAA PSYCHIATRICS	\$ 991.44	\$ 19.07	\$ 273.10	\$ 8.81	72%
AGAA FAMILY PRACTICE MEDICINE	\$ 1,589.49	\$ 30.00	\$ 322.01	\$ 8.70	80%
AGDA FAMILY PRACTICE PEDIATRICS	\$ 51.51	\$ 8.58	\$ 13.39	\$ 3.35	74%
BAAA INTERNAL MEDICINE CLINIC	\$ 99,346.51	\$ 27.83	\$ 104,941.25	\$ 28.24	-6%
BAPA DERMATOLOGY CLINIC	\$ 18,974.50	\$ 57.50	\$ 7,590.26	\$ 22.19	60%
BBAA GENERAL SURGERY CLINIC	\$ 4,040.60	\$ 15.85	\$ 3,295.93	\$ 19.39	18%
BBDA OPHTHALMOLOGY CLINIC	\$ 5,856.45	\$ 18.24	\$ 3,008.11	\$ 15.59	49%
BBFA OTOLARYNGOLOGY CLINIC	\$ 3,353.89	\$ 17.20	\$ 4,082.46	\$ 17.91	-22%
BBIA UROLOGY CLINIC	\$ 13,248.54	\$ 78.39	\$ 4,894.52	\$ 34.96	63%
BCBA GYNECOLOGY CLINIC	\$ 4,468.97	\$ 19.26	\$ 2,787.81	\$ 24.24	38%
BCBB WELL WOMEN CLINIC GYN (WAC)	\$ 1,055.98	\$ 8.00	\$ 238.22	\$ 12.54	77%
BCCA OBSTETRICS CLINIC	\$ 7,843.50	\$ 8.52	\$ 14,932.53	\$ 17.05	-90%
BDAA PEDIATRICS CLINIC	\$ 18,544.16	\$ 10.27	\$ 22,840.00	\$ 12.04	-23%
BEAA ORTHOPEDICS CLINIC	\$ 1,308.00	\$ 8.49	\$ 865.38	\$ 6.23	34%
BEFA PODIATRY CLINIC	\$ 884.32	\$ 10.28	\$ 495.49	\$ 6.19	44%
BFAA PSYCHIATRIC CLINIC	\$ 23,701.77	\$ 50.75	\$ 27,834.12	\$ 45.11	-17%
BFDA MENTAL HEALTH CLINIC	\$ 1,882.08	\$ 40.92	\$ 2,071.70	\$ 27.26	-10%
BGAA FAMILY PRACTICE CLINIC	\$ 71,157.44	\$ 14.68	\$ 77,697.34	\$ 17.34	-9%
BHAE TROOP MEDICAL CL #1	\$ 10,490.54	\$ 14.16	\$ 11,822.29	\$ 13.19	-13%
BHAF TROOP MEDICAL CLINIC #2	\$ 10,795.64	\$ 18.61	\$ 7,857.83	\$ 16.10	27%
BHAG TROOP MEDICAL CLINIC #3	\$ 13,685.09	\$ 14.15	\$ 8,199.15	\$ 12.91	40%
BHBA MEDICAL EXAMINATION CLINIC	\$ 1,213.19	\$ 14.98	\$ 95.48	\$ 19.10	92%
BHCA OPTOMETRY CLINIC	\$ 66.59	\$ 5.56	\$ 156.16	\$ 7.81	-135%
BHFA COMMUNITY HEALTH CLINIC	\$ 335.67	\$ 2.50	\$ 28.60	\$ 0.77	91%
BHGA OCCUPATIONAL HEALTH CLINIC	\$ 5,471.70	\$ 88.25	\$ 5,173.39	\$ 41.72	5%
BIAA EMERGENCY MEDICAL CLINIC	\$ 5,391.16	\$ 10.61	\$ 3,887.83	\$ 8.86	28%
BLAA PHYSICAL THERAPY	\$ 31.62	\$ 5.27	\$ 4.50	\$ 2.25	86%
FBBA PREVENTIVE MEDICINE	\$ 2,936.90	\$ 19.72	\$ 2,245.62	\$ 5.14	24%
TOTALS	\$ 332,675.24	\$ 19.35	\$ 321,686.92	\$ 19.18	3%

Appendix DNovember Comparisons

	Nov-98		Nov-99		TOT Cost
	FY00				% Change
	Projection	AVG Rx	TOTAL COST	AVG RX	
AAAA INTERNAL MEDICINE	\$ 2,290.14	\$ 23.13	\$ 1,963.36	\$ 27.27	14%
ABAA GENERAL SURGERY	\$ 65.05	\$ 5.42	\$ 390.01	\$ 20.53	-500%
ABFA ORAL SURGERY	\$ 27.50	\$ 6.88	\$ 28.44	\$ 3.56	-3%
ABKA UROLOGY	\$ 43.93	\$ 14.64	\$ 149.71	\$ 29.94	-241%
ACAA GYNECOLOGY	\$ 2,120.98	\$ 17.39	\$ 1,480.92	\$ 10.01	30%
ACBA OBSTETRICS	\$ 375.10	\$ 6.47	\$ 1,419.93	\$ 3.84	-279%
ACBB LABOR & DELIVERY	\$ 117.45	\$ 3.67	\$ 160.42	\$ 3.91	-37%
ADAA PEDIATRICS	\$ 460.47	\$ 11.81	\$ 53.52	\$ 5.35	88%
AEAA ORTHOPEDICS	\$ 20.71	\$ 4.14	\$ 10.00	\$ 2.50	52%
AFAA PSYCHIATRICS	\$ 866.97	\$ 24.77	\$ 300.42	\$ 18.78	65%
AGAA FAMILY PRACTICE MEDICINE	\$ 443.94	\$ 17.76	\$ 801.29	\$ 10.54	-80%
AGDA FAMILY PRACTICE PEDIATRICS	\$ 89.90	\$ 9.99	\$ 80.71	\$ 5.77	10%
BAAA INTERNAL MEDICINE CLINIC	\$101,011.31	\$ 26.72	\$112,953.05	\$ 28.79	-12%
BAPA DERMATOLOGY CLINIC	\$ 10,057.59	\$ 29.94	\$ 8,051.82	\$ 22.75	20%
BBAA GENERAL SURGERY CLINIC	\$ 5,266.33	\$ 23.51	\$ 2,181.23	\$ 16.52	59%
BBDA OPHTHALMOLOGY CLINIC	\$ 5,677.13	\$ 21.92	\$ 4,126.47	\$ 16.77	27%
BBFA OTOLARYNGOLOGY CLINIC	\$ 3,629.41	\$ 15.38	\$ 2,612.98	\$ 11.17	28%
BBIA UROLOGY CLINIC	\$ 21,786.32	\$ 168.89	\$ 9,153.36	\$ 53.22	58%
BCBA GYNECOLOGY CLINIC	\$ 7,253.52	\$ 26.96	\$ 2,629.42	\$ 21.04	64%
BCBB WELL WOMEN CLINIC GYN (WAC)	\$ 1,358.22	\$ 8.18	\$ 208.59	\$ 13.04	85%
BCCA OBSTETRICS CLINIC	\$ 8,103.38	\$ 9.67	\$ 8,069.87	\$ 16.24	0%
BDAA PEDIATRICS CLINIC	\$ 12,707.61	\$ 8.31	\$ 15,863.26	#DIV/0!	-25%
BEAA ORTHOPEDICS CLINIC	\$ 1,262.83	\$ 8.48	\$ 1,542.80	\$ 8.21	-22%
BEFA PODIATRY CLINIC	\$ 989.52	\$ 12.53	\$ 662.90	\$ 21.38	33%
BFAA PSYCHIATRIC CLINIC	\$ 22,072.63	\$ 46.27	\$ 22,413.70	\$ 30.45	-2%
BFDA MENTAL HEALTH CLINIC	\$ 2,444.93	\$ 48.90	\$ 2,472.27	\$ 41.90	-1%
BGAA FAMILY PRACTICE CLINIC	\$ 86,187.13	\$ 18.10	\$ 81,911.54	\$ 16.68	5%
BHAE TROOP MEDICAL CL #1	\$ 13,015.64	\$ 15.91	\$ 14,716.83	\$ 12.86	-13%
BHAF TROOP MEDICAL CLINIC #2	\$ 9,413.40	\$ 18.39	\$ 10,294.97	\$ 17.13	-9%
BHAG TROOP MEDICAL CLINIC #3	\$ 12,599.71	\$ 13.56	\$ 12,032.00	\$ 12.92	5%
BHBA MEDICAL EXAMINATION CLINIC	\$ 659.87	\$ 12.22	\$ 32.50	\$ 6.50	95%
BHCA OPTOMETRY CLINIC	\$ 134.53	\$ 5.17	\$ 124.19	\$ 8.28	8%
BHFA COMMUNITY HEALTH CLINIC	\$ 208.87	\$ 1.59	\$ 53.20	\$ 1.24	75%
BHGA OCCUPATIONAL HEALTH CLINIC	\$ 315.39	\$ 4.10	\$ 7,629.72	\$ 35.99	-2319%
BIAA EMERGENCY MEDICAL CLINIC	\$ 4,912.93	\$ 9.91	\$ 3,087.84	\$ 7.35	37%
FBBA PREVENTIVE MEDICINE	\$ 39.06	\$ 0.21	\$ 401.30	\$ 33.44	-927%
TOTALS	\$338,029.39	\$ 19.92	\$330,064.54	\$ 18.63	2%

Appendix EDecember Comparisons

	Dec-98		Dec-99		
	FY00 Projection	Avg Cost	TOT Cost	AVG Cost	TOT Cost % Change
AAAA INTERNAL MEDICINE	\$ 1,910.54	\$ 23.01	\$ 1,178.25	\$ 19.00	38%
ABAA GENERAL SURGERY	\$ 193.37	\$ 4.20	\$ 109.65	\$ 4.77	43%
ABFA ORAL SURGERY	\$ 960.09	\$ 45.72	\$ 5.50	\$ 2.75	99%
ABKA UROLOGY	\$ 13.54	\$ 4.51	\$ -	\$ -	100%
ACAA GYNECOLOGY	\$ 1,248.00	\$ 11.67	\$ 2,670.33	\$ 16.48	-114%
ACBA OBSTETRICS	\$ 320.27	\$ 6.04	\$ 1,202.52	\$ 4.19	-275%
ACBB LABOR & DELIVERY	\$ -	\$ 19.84	\$ 127.99	\$ 9.14	0%
ADAA PEDIATRICS	\$ 173.77	\$ 5.99	\$ 58.24	\$ 5.29	66%
AEAA ORTHOPEDICS	\$ 9.30	\$ 3.10	\$ 97.55	\$ 8.13	-949%
AFAA PSYCHIATRICS	\$ 1,009.26	\$ 27.28	\$ 221.02	\$ 15.79	78%
AGAA FAMILY PRACTICE MEDICINE	\$ 730.65	\$ 18.74	\$ 543.07	\$ 13.25	26%
AGDA FAMILY PRACTICE PEDIATRICS	\$ 0.74	\$ 0.74	\$ 18.18	\$ 9.09	-2344%
BAAA INTERNAL MEDICINE CLINIC	\$ 107,424.92	\$ 28.15	\$ 86,155.42	\$ 24.70	20%
BAPA DERMATOLOGY CLINIC	\$ 19,149.17	\$ 55.82	\$ 8,365.46	\$ 23.43	56%
BBAA GENERAL SURGERY CLINIC	\$ 3,287.81	\$ 16.60	\$ 2,727.79	\$ 17.05	17%
BBDA OPHTHALMOLOGY CLINIC	\$ 5,347.81	\$ 18.64	\$ 2,775.81	\$ 15.34	48%
BBFA OTOLARYNGOLOGY CLINIC	\$ 4,408.61	\$ 18.92	\$ 3,246.48	\$ 13.70	26%
BBIA UROLOGY CLINIC	\$ 4,867.71	\$ 34.04	\$ 5,425.81	\$ 31.55	-11%
BCBA GYNECOLOGY CLINIC	\$ 7,233.70	\$ 24.35	\$ 2,192.41	\$ 17.68	70%
BCBB WELL WOMEN CLINIC (WACH)	\$ 1,827.33	\$ 10.27	\$ 122.04	\$ 20.34	93%
BCCA OBSTETRICS CLINIC	\$ 9,584.17	\$ 8.88	\$ 6,841.73	\$ 10.45	29%
BDAA PEDIATRICS CLINIC	\$ 15,362.17	\$ 8.73	\$ 17,297.31	\$ 9.32	-13%
BEAA ORTHOPEDICS CLINIC	\$ 1,249.03	\$ 7.96	\$ 1,619.08	\$ 10.38	-30%
BEFA PODIATRY CLINIC	\$ 690.06	\$ 8.52	\$ 394.80	\$ 9.18	43%
BFAA PSYCHIATRIC CLINIC	\$ 29,456.56	\$ 61.75	\$ 21,290.94	\$ 31.73	28%
BFDA MENTAL HEALTH CLINIC	\$ 1,983.01	\$ 37.41	\$ 2,339.76	\$ 30.00	-18%
BGAA FAMILY PRACTICE CLINIC	\$ 99,417.17	\$ 17.89	\$ 71,176.95	\$ 13.92	28%
BHAE TROOP MEDICAL CL #1	\$ 13,742.28	\$ 15.30	\$ 10,330.64	\$ 14.29	25%
BHAF TROOP MEDICAL CLINIC #2	\$ 8,655.15	\$ 15.19	\$ 9,132.35	\$ 17.13	-6%
BHAG TROOP MEDICAL CLINIC #3	\$ 12,636.24	\$ 17.36	\$ 9,749.42	\$ 12.71	23%
BHBA MEDICAL EXAMINATION CLINIC	\$ 762.77	\$ 15.90	\$ 87.60	\$ 43.80	89%
BHCA OPTOMETRY CLINIC	\$ 164.52	\$ 5.48	\$ 153.82	\$ 8.10	7%
BHFA COMMUNITY HEALTH CLINIC	\$ 195.25	\$ 2.08	\$ 47.77	\$ 1.54	76%
BHGA OCCUPATIONAL HEALTH CLINIC	\$ 6,714.31	\$ 119.90	\$ 2,574.86	\$ 20.93	62%
BIAA EMERGENCY MEDICAL CLINIC	\$ 7,473.08	\$ 14.57	\$ 4,689.09	\$ 7.96	37%
BLAA PHYSICAL THERAPY	\$ 33.48	\$ 5.58	\$ 21.60	\$ 2.70	35%
FBBA PREVENTIVE MEDICINE	\$ 3,980.80	\$ 19.80	\$ 1,355.02	\$ 2.69	66%
TOTALS	\$ 372,216.65	\$ 20.46	\$ 276,346.26	\$ 16.05	26%

Appendix FJanuary Comparisons

	Jan-99		Jan-00		
	FY00 Projection	Avg Cost	TOT Cost	AVG Cost	TOT Cost % Change
AAAA INTERNAL MEDICINE	\$ 2,500.30	\$ 34.25	\$ 1,717.99	\$ 14.68	31%
ABAA GENERAL SURGERY	\$ 172.65	\$ 5.75	\$ 37.30	\$ 4.66	78%
ABFA ORAL SURGERY	\$ -	\$ -	\$ -	\$ -	0%
ABKA UROLOGY	\$ -	\$ -	\$ -	\$ -	0%
ACAA GYNECOLOGY	\$ 1,174.26	\$ 8.77	\$ 2,049.85	\$ 12.20	-75%
ACBA OBSTETRICS	\$ 16.56	\$ 1.51	\$ 1,761.52	\$ 6.29	-10540%
ACBB LABOR & DELIVERY	\$ -	\$ -	\$ 46.00	\$ 4.60	0%
ADAA PEDIATRICS	\$ 74.79	\$ 3.94	\$ 102.09	\$ 6.38	-37%
AEAA ORTHOPEDICS	\$ 49.53	\$ 5.50	\$ 18.30	\$ 3.05	63%
AFAA PSYCHIATRICS	\$ 1,019.61	\$ 19.24	\$ 346.17	\$ 15.74	66%
AGAA FAMILY PRACTICE MEDICINE	\$ 505.82	\$ 16.31	\$ 1,220.83	\$ 14.71	-141%
AGDA FAMILY PRACTICE PEDIATRICS	\$ 3.71	\$ 3.71	\$ 9.59	\$ 3.20	-159%
BAAA INTERNAL MEDICINE CLINIC	\$ 93,380.88	\$ 24.73	\$ 98,254.84	\$ 25.45	-5%
BAPA DERMATOLOGY CLINIC	\$ 17,000.52	\$ 54.14	\$ 9,495.64	\$ 21.98	44%
BBAA GENERAL SURGERY CLINIC	\$ 3,399.59	\$ 14.72	\$ 2,785.97	\$ 14.07	18%
BBDA OPHTHALMOLOGY CLINIC	\$ 3,705.94	\$ 13.73	\$ 2,969.94	\$ 17.89	20%
BBFA OTOLARYNGOLOGY CLINIC	\$ 3,055.93	\$ 12.74	\$ 6,345.35	\$ 28.08	-108%
BBIA UROLOGY CLINIC	\$ 2,899.72	\$ 22.65	\$ 5,008.92	\$ 32.95	-73%
BCBA GYNECOLOGY CLINIC	\$ 3,647.78	\$ 16.36	\$ 2,286.42	\$ 21.37	37%
BCBB WELL WOMEN CLINIC (WACH)	\$ 1,412.99	\$ 8.46	\$ 76.04	\$ 10.86	95%
BCCA OBSTETRICS CLINIC	\$ 8,554.36	\$ 8.88	\$ 10,151.21	\$ 15.22	-19%
BDAA PEDIATRICS CLINIC	\$ 18,307.67	\$ 11.13	\$ 28,056.94	\$ 12.61	-53%
BEAA ORTHOPEDICS CLINIC	\$ 1,084.69	\$ 7.74	\$ 1,011.23	\$ 4.84	7%
BEFA PODIATRY CLINIC	\$ 565.69	\$ 6.66	\$ 385.15	\$ 5.20	32%
BFAA PSYCHIATRIC CLINIC	\$ 25,425.96	\$ 72.24	\$ 21,844.31	\$ 29.72	14%
BFDA MENTAL HEALTH CLINIC	\$ 1,647.23	\$ 29.95	\$ 3,642.57	\$ 37.55	-121%
BGAA FAMILY PRACTICE CLINIC	\$ 86,686.13	\$ 16.20	\$ 64,692.12	\$ 13.71	25%
BHAE TROOP MEDICAL CL #1	\$ 13,995.34	\$ 12.00	\$ 14,784.43	\$ 15.45	-6%
BHAF TROOP MEDICAL CLINIC #2	\$ 5,499.63	\$ 12.85	\$ 9,769.35	\$ 15.63	-78%
BHAG TROOP MEDICAL CLINIC #3	\$ 16,159.59	\$ 17.68	\$ 10,307.34	\$ 10.70	36%
BHBA MEDICAL EXAMINATION CLINIC	\$ 871.32	\$ 12.45	\$ -	\$ -	100%
BHCA OPTOMETRY CLINIC	\$ 206.66	\$ 6.46	\$ 302.86	\$ 8.19	-47%
BHFA COMMUNITY HEALTH CLINIC	\$ 196.14	\$ 2.31	\$ 53.33	\$ 1.24	73%
BHGA OCCUPATIONAL HEALTH CLINIC	\$ 5,833.01	\$ 97.22	\$ 2,669.25	\$ 17.33	54%
BIAA EMERGENCY MEDICAL CLINIC	\$ 4,189.10	\$ 6.92	\$ 4,815.75	\$ 7.11	-15%
BLAA PHYSICAL THERAPY	\$ 34.32	\$ 4.29	\$ 13.50	\$ 2.70	61%
FBBA PREVENTIVE MEDICINE	\$ 2,604.67	\$ 13.02	\$ 1,960.01	\$ 3.53	25%
TOTALS	\$ 325,882.10	\$ 17.55	\$ 308,992.11	\$ 16.64	5%

Appendix GProgram Effectiveness Model