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During fiscal years 2003 and 2004, Evans Army Community Hospital (EACH), Fort Carson, Colorado, spent almost $1 million on asthma related emergency department visits and hospital admissions for enrolled beneficiaries. As part of EACH's attempt to improve the quality of care for enrolled beneficiaries, this study provides a retrospective analysis and recommendations for improving compliance with Department of Defense Asthma Clinical Practice Guidelines (CPGs). The results of this study are based on a sample of the EACH enrolled asthma population over the age of six years (N = 1,887, n = 316, a = .05) and indicate an opportunity to reduce the number of asthma emergency department visits by over 50 percent and asthma hospital admissions by up to 100 percent. By reducing the number of emergency department visits and hospital admissions, EACH can potentially save $411,162 annually in direct and purchased care costs attributed to asthma. Recommendations derived from the analysis are for EACH to implement asthma CPGs, educate providers, implement an asthma management flow-sheet, establish protocols, policies, and monitoring mechanisms, and use pay-for-performance provider contracts. Engaging in the proposed recommendations will improve EACH's ability to provide the highest quality healthcare to all enrolled beneficiaries diagnosed with asthma.

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Asthma Management at Evans Army Community Hospital: Using Clinical Practice Guidelines to Improve Outcomes

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U.S. Army-Baylor University Graduate Program in Healthcare Administration

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Abstract

During fiscal years 2003 and 2004, Evans Army Community Hospital (EACH), Fort Carson, Colorado, spent almost $1 million on asthma related emergency department visits and hospital admissions for enrolled beneficiaries. As part of EACH's attempt to improve the quality of care for enrolled beneficiaries, this study provides a retrospective analysis and recommendations for improving compliance with Department of Defense Asthma Clinical Practice Guidelines (CPGs). The results of this study are based on a sample of the EACH enrolled asthma population over the age of six years (N = 1,887, n = 316, α = .05) and indicate an opportunity to reduce the number of asthma emergency department visits by over 50 percent and asthma hospital admissions by up to 100 percent. By reducing the number of emergency department visits and hospital admissions, EACH can potentially save the organization $411,162 annually in direct and purchased care costs attributed to asthma. Recommendations derived from the analysis are for EACH to implement asthma CPGs, educate providers, implement an asthma management flow-sheet, establish protocols, policies, and monitoring mechanisms, and use pay-for-performance provider contracts. Engaging in the proposed recommendations will improve EACH's ability to provide the highest quality healthcare to all enrolled beneficiaries diagnosed with asthma.

Asthma Management at Evans Army Community Hospital

Introduction

Conditions that Prompted the Study

The Deputy Commander for Administrative Services (DCAS) at Evans Army Community Hospital (EACH) recognized an increasing trend in the use of the emergency department by asthma patients and subsequent hospitalizations. The DCAS was concerned that EACH was not meeting established benchmarks for healthcare utilization of patients with chronic illnesses. As a result, the DCAS requested a study to examine EACH's utilization of emergency department visits and hospital admissions due to preventable diseases, specifically, asthma.[1] Additionally, the DCAS was interested in evaluating EACH's compliance with established asthma Clinical Practice Guidelines (CPGs).

Asthma is a highly prevalent and common chronic condition affecting an estimated 20.3 million Americans of all ages in 2001 (Centers for Disease Control and Prevention [CDC], 2001).

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[1] Asthma is a chronic inflammatory disorder of the airways, in which a susceptible individual experiences recurrent episodes of wheezing, coughing, chest tightness, and breathlessness. These episodes are associated with an obstruction in the airway prompted by certain triggers, such as dust mites, pollen, pet dander, smoke, or exercise (Kallenbach, Ludwig-Beymer, Welsh, Norris, & Giloth, 2003).

Nationally, in 1998, asthma accounted for over 2 million emergency department visits, 423,000 hospitalizations, and 5,438 deaths (CDC, 2001). Financial costs of asthma are as high as $14 billion per year in healthcare expenditures, including $4.6 billion in lost productivity (National Center for Quality Analysis [NCQA], 2004). Much of the $14 billion in healthcare expenditures associated with asthma result from hospitalizations and emergency department visits. Both are preventable events if the proper diagnosis, management, and treatment are utilized for asthmatic populations.

In response to the ever growing beneficiary population with asthma and rising healthcare costs, the Department of Defense (DoD) and Veterans Health Administration (VHA) realized the importance of adopting proven and effective evidence-based practice guidelines for asthma. In 1999, the DoD implemented CPGs for the diagnosis, treatment, and management of asthma. The CPGs for asthma were based on the guidelines established by the National Heart, Lung, and Blood Institute (NHLBI). The NHLBI's CPGs are focused on improving the diagnosis, treatment, and management of asthma. Proper diagnosis, treatment, and management of asthma reduces overall costs, improves standards of care, reduces lost work days or school days, and improves patient satisfaction (National Institutes of Health [NIH], 2001).

In September 2000, the DoD contracted with FMAS Corporation, a healthcare information company in Rockville, Maryland, to review several asthma management objectives in the Military Health System (MHS) and the outcomes resulting from the treatment of this population. The FMAS Corporation analyzed the level of compliance with asthma CPGs and quality of care improvements by 98 DoD Military Treatment Facilities (MTFs) following CPG implementation in 1999 (FMAS Corporation, 2000). The results were not encouraging, in that, of the 28 Army MTFs in the analysis, only four had implemented the CPGs in practice (FMAS Corporation, 2000). The MTFs that had implemented the CPGs were Eisenhower Army Medical Center, Martin Army Community Hospital, Blanchfield Army Community Hospital, and Moncrief Army Community Hospital (FMAS Corporation, 2000). Areas for improvement identified in the analysis were implementation of CPGs throughout the MHS, compliance with documentation of severity, compliance with patient education and self-management, and the provision of spirometry testing in high-risk patients (FMAS Corporation, 2000). The analysis performed by the FMAS Corporation demonstrates a considerable need for systems and processes to improve DoD MTF compliance with asthma CPGs.

The Army Medical Department (AMEDD) has implemented several innovations to improve compliance with the CPGs among Army MTFs. The AMEDD has established a website with the Army Medical

Department Quality Management Office (QMO) to publish MTF best practices, guidelines, metrics, algorithms, provider materials, pharmacy materials, patient education materials, and tool kits for the management of asthma. The QMO publishes innovations from several MTFs like Wurzburg, Brooke Army Medical Center, Fort Knox, Fort Sill, Eisenhower Army Medical Center, Walter Reed Army Medical Center, Fort Hood, Fort Campbell, and Langley Air Force Base. Those innovations include chart audit forms, templates for education programs, patient diary examples, standardized documentation forms, patient record markers, action plans, and education pathways (QMO, 2004).

The AMEDD has also sponsored several retrospective studies examining the Army's compliance with the NHLBI guidelines and the goals outlined in the NIH, Healthy People 2010 (HP2010).[2] In the AMEDD sponsored studies, the Army was the worst among the

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[2] Healthy People 2010 provides a framework for prevention for the Nation. It is a statement of national health objectives designed to identify the most significant preventable threats to health and to establish national goals to reduce these threats (NIH, 2001, n.p.). The HP2010 benchmark for asthma related admissions is 7.7 per 10,000 enrolled beneficiaries in a population health plan per year. The benchmark for emergency department visits for asthma is 50 per 10,000 enrolled beneficiaries per year.

DoD services and exceeded the HP2010 targets for emergency department visits, hospital admissions, and outpatient visits per 10,000 enrolled beneficiaries. These studies were designed to provide the AMEDD a snapshot of their compliance with asthma CPGs and areas for improvement.

One DoD sponsored study was conducted by the National Quality Management Program (NQMP) in 2002. The NQMP measured the ability of all DoD MTFs to manage enrolled beneficiaries with persistent asthma.[3] The NQMP found that in Fiscal Year (FY) 2002, the Army had 10 hospitalizations for asthma per 10,000 enrolled beneficiaries. Additionally, the NQMP found that the Army had 89 emergency department visits for asthma per 10,000 enrolled beneficiaries. In comparison, EACH utilization rates were 13.1 hospitalizations for asthma per 10,000 enrolled beneficiaries and 97.2 emergency department visits for asthma per 10,000 enrolled beneficiaries respectively, in FY 2003.

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[3] Persistent asthma is defined using Health Plan Employer Data Information Set (HEDIS) measures. These measures require a persistent asthmatic to meet one of the following criteria: one or more hospitalizations or emergency department visits for the diagnosis of asthma, four or more outpatient visits for asthma, and four or more prescriptions for asthma medications (FMAS Corporation, 2000).

Preventable emergency department visits are a salient issue within the MHS, as well as the United States health system. Often, MTF enrollees visit the emergency department for health issues that can be treated and managed within their assigned family practice, internal medicine, or pediatric clinic. This is especially true for asthma patients (C. Halle, personal communication, September 14, 2004). Most emergency department visits for acute exacerbations of asthma can be prevented. Therefore, with proper management and treatment of the disease, an MTF should have very few hospital admissions and emergency department visits for asthma related health issues (D. Tinkleman, personal communication, September 23, 2004).

Hospitalizations as a result of asthma, although less frequent, are much more expensive per occurrence than a typical emergency department visit. Billions of dollars are spent each year on preventable hospital admissions. In fact, in 2002, direct healthcare expenditures for asthma in the U.S. were $9.4 billion. Of the $9.4 billion, $4 billion (more than double the $1.6 billion spent in 1990) was attributed to asthma hospitalizations (American Lung Association [ALA], 2004). As a result, managed care organizations, health maintenance organizations, health insurers, and the MHS have all made fervent attempts to curb the number of inpatient beds occupied by their enrollees, as evidenced by the numerous research

studies examining ways to improve asthma outcomes. In February 2004, EACH performed an analysis of its enrolled asthmatic population for FY 2003.[4] Applying the ALA cost methodology using only hospitalizations for asthma, EACH has identified, using Medical Expense and Performance Reporting System (MEPRS) data for FY 2003, 67 total admissions with a primary diagnosis of asthma at a cost of $272,697.

In 2002, the ALA identified $762.3 million of the total $9.4 billion spent on asthma in the U.S. was spent on emergency department visits for acute asthma exacerbations. Again, more than double that of 1990 (ALA, 2004). This was attributed to a failure by the U.S. healthcare system to have standardized measures for diagnosing, treating, and managing asthma. The same failure can be applied to EACH. For example, EACH had 435

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[4] As a general rule, beneficiaries are active duty (AD) members, AD family members signed up for TRICARE Prime, and military retirees and their family members signed up for TRICARE Prime or Plus. Enrollment is an agreement between the eligible beneficiary and the MTF for assignment of a primary care manager and to receive available healthcare services at EACH (Department of the Army, 2001). EACH has very little control over the care for beneficiaries who choose not to enroll for care at EACH, therefore, this analysis should only include beneficiaries enrolled at EACH.

emergency department visits for acute asthma exacerbations for FY 2003. Costs of the 435 emergency department visits based on the MEPRS were $135,258 (Learned, 2004).[5] EACH also paid $10,131 for 51 emergency department visits and ambulance services in the purchased care area for EACH enrollees. Purchased care is any healthcare services provided outside the MHS that a claim is paid.

EACH examined institutional purchased care in FY 2003 for enrolled beneficiaries with a primary diagnosis of asthma and found that there were 15 admissions totaling 35 bed days, at a cost of $26,341 (Learned, 2004). Institutional services include hospital admissions through a civilian hospital emergency department. Total non-institutional purchased care for EACH enrolled beneficiaries was $98,104 for 2,678 services provided by civilian medical service providers outside of EACH. Non-institutional services includes facility charges, ambulance

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[5] MEPRS is a cost management system that accumulates and reports expenses, manpower, and workload performed by the DoD fixed military medical and dental treatment facilities. It is the basis for establishing a uniform reporting methodology. It provides consistent financial and operating performance data to assist managers who are responsible for healthcare delivery (Army MEPRS Program Office, 2004).

services, medical supplies, visits to civilian doctors' offices, radiological procedures, outpatient hospitals, and home care.

During the February 2004 audit of 106 EACH Disease Management Clinic (DMC) enrolled asthmatics, they found a total of 133 visits for asthma. [6] The chart audit revealed that 38 percent had severity documented, 18 percent had received an annual Pulmonary Function Test (PFT), 9 percent had a written action plan, and 100 percent of the identified persistent asthmatics were on controller medications (Beta-2 agonists, Leukotriene inhibitors, and inhaled or oral corticosteroids). Furthermore, of the 106 patients identified as asthmatics, 25 percent had not been properly diagnosed or were coded incorrectly and were excluded from the final results (Eustice, Halle, & Learned, 2004). The results of the audit identify a significant need for improvement in compliance with asthma CPGs for diagnosis, treatment, and management, even in the DMC. In August 2004, EACH established an Asthma Action Team, headed by Dr. Elaine Gonsior, Chief of the EACH Allergy Clinic, and Dr.

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[6] Disease management redirects the intervention efforts toward the outpatient setting for chronic disorders like asthma, using a more prospective approach to managing disease and preventing exacerbations (Konstvedt, 1996).

Rhonda Eustice, Clinical Pharmacist, in an attempt to improve the diagnosis, treatment, and management of asthmatics.

It is beneficial for EACH to be fiscally responsible and to make a concerted effort to avoid preventable emergency department visits, hospitalizations, and purchased care or services for its asthma population. With the implementation of the new TRICARE managed care support contracts, EACH will be more accountable for managing the amount of resources spent on its enrollee population. Funding for the MTF is provided by U.S. Army Medical Command (MEDCOM) to the regional medical commands. In EACH's case the regional medical command is Great Plains Regional Medical Command (GPRMC) at Fort Sam Houston, Texas. The funding comes down to the MTF in two branches; operations and management (Budget Activity Group [BAG] 1) and purchased care (BAG 2). Management of BAG 2 expenditures is important to EACH, because the hospital commander is responsible for managing and ensuring funds spent on purchased care. Additionally, it is likely that in the future the Tricare Management Activity will require overspending from BAG 2 to be decremented from the BAG 1 funding that is already obligated for things like personnel, equipment, contracts, among others (B. Robinson, personal communication, August 23, 2004). Therefore, it is in EACH's best interest to address potential problems with asthma costs before it causes budgetary issues.

Currently, without a comprehensive asthma management program, EACH spent at total of $438,038 in FY 2003 on preventable hospitalizations and emergency department visits for asthma in direct and purchased care, not including any quality of life variables (lost work or school days and productivity). If EACH can find a way to reduce these expenditures, it can use those cost savings for other valuable initiatives within the facility. Reduction in expenditures on asthma can be achieved by improving the diagnosis, treatment, and management of asthma through a concerted effort, from command to clerical level, to meet all asthma CPGs adopted by the DoD.

Statement of the Problem

EACH's problem is to determine its current level of compliance with asthma CPGs, its financial and quality impact, and how to achieve institution-wide support for a comprehensive asthma management program accomplishing the population health goals established by the DoD. Asthma accounts for the third highest number of preventable admissions at EACH and is costing the organization over four-hundred thousand dollars in avoidable direct costs (Eustice, et al., 2004).[7] With a properly diagnosed

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[7] The top two preventable admissions at EACH are Chronic Obstructive Pulmonary Disease and Pneumonia (Eustice, et al., 2004).

and managed asthma population, EACH could easily meet or exceed the HP2010 goals for asthma, significantly reduce costs, and improve the quality of care for its enrollees. Therefore, this project will examine EACH's compliance with the CPGs, the resulting outcomes, and identify strategies to gain institution-wide support for a comprehensive asthma management program based on asthma best practices.

Coding errors and improper diagnosis of asthma have raised serious questions about EACH's ability to meet the standards of care for asthma patients. Deficiencies in coding can cause the MTF to bill third-party insurers incorrectly and cost the organization a significant amount of operating income. For example, if a patient encounter or treatment is coded incorrectly, insurance companies will send the bill back to the MTF to be corrected, resulting in a significant increase in the time to receive reimbursement and administrative costs. Even more perplexing is the fact that some patients get diagnosed as asthmatic, but have never had any diagnostic testing performed to validate the diagnosis (C. Halle, personal communication, September 14, 2004). Frequently, patients present to the emergency department or their Primary Care Manager (PCM) with respiratory symptoms that may or may not be related to asthma and get incorrectly diagnosed based on the symptoms rather than

a measurable diagnostic test, like spirometry (C. Halle, personal communication, September 14, 2004).

Improper diagnosis during initial interactions with PCMs also negatively affects the readiness of active duty military patients. For example, Soldiers in the Army must meet physical readiness standards. Physical readiness standards require a Soldier to pass an annual physical fitness test in which running two-miles continuously is a mandatory event. However, a Soldier who just recently moved to the Colorado Springs area from Georgia will often experience difficulty breathing while exercising because of the significant increase in altitude. If this Soldier waits several months and goes to see his or her PCM and has expiratory wheezing, shortness of breath, and a history of allergies it is very likely that a diagnosis of asthma will be made (C. Halle, personal communication, September 14, 2004). The Soldier could then receive a Department of the Army Form (DA) 3349 physical profile, in accordance with Army Regulation (AR) 40-501, Standards of Medical Fitness, with a diagnosis of asthma. However, this Soldier has not been properly diagnosed by spirometry. The Soldier could be labeled as a "broken Soldier" by peers and superiors and has most likely been excluded from most readiness exercises. Moreover, the Soldier's commander attempts to expedite a Medical Evaluation Board (MEB) for a medical separation from the military so that he or she can get a

deployable replacement. Therefore, the Soldier never gets the opportunity to meet the readiness requirements through proper management of the disease.

Several diagnosis, treatment, and management strategies are identified in the asthma CPGs. First, lung function must be quantitatively measured by a PFT. Second, the appropriate medications must be prescribed for control and relief of asthma exacerbations. Third, patients must receive age specific education and self management strategies on the disease process. Fourth, asthma severity must be assessed and documented using mild, moderate, and severe persistence designations. Fifth, persistent asthmatics must have long-term controller medications prescribed. Sixth, asthma patients must have spirometry testing each 12 months. Finally, asthma patients must have written asthma management and treatment plans (FMAS Corporation, 2000). Therefore, by implementing a comprehensive asthma management program at EACH based on the established CPGs in conjunction with benchmark monitoring, EACH can achieve significant improvement in asthma outcomes and potential cost savings.

Literature Review

National Jewish Medical and Research Center (NJMRC) in Denver, Colorado was named the best respiratory hospital in the nation for the seventh consecutive year in the July 12, 2004 issue of *U.S. News and World Report*. NJMRC is widely known in

the medical community for its success in keeping even the most challenging asthmatics from experiencing exacerbations that limit daily functions and is considered the benchmark organization for asthma management. NJMRC published a study in February 2004 that explored the cost savings of implementing a disease management program for Colorado Medicaid eligible asthmatics. In October 2002, NJMRC screened asthmatics in Colorado's Medicaid program and obtained a sample of 258 patients who had asthma-related hospitalizations, emergency department visits, or both, and had total charges of greater than $500 from November 2001 until May 8, 2002 (NJMRC, 2004). Persistence distribution, or how difficult the asthma is to manage, was found in 39 percent of the cases of mild asthma, 37 percent with moderate asthma, and 24 percent with severe asthma. The period of study was from November 2002 to May 8, 2003 and was compared to the same time period for the previous year (baseline).

The following were included in the study. Each participant completed an asthma questionnaire and history with a nurse at NJMRC. Next, each participant received three education phone calls, at times chosen by the participant, from the Disease Specific Care Manager (DSCM) during the period of study (NJMRC, 2004). The DSCM would evaluate the participant's symptoms, medication usage, compliance, hospitalizations, emergency

department visits, missed work or school days, unscheduled office visits, and self-management (NJMRC, 2004). In addition to the care manager, each patient received detailed and customized asthma education. Finally, each participant received a symptom-based action plan with access to 24 hours per day, 7 days per week demand management telephone line (NJMRC, 2004).

The results of the study were monumental. During the six-month study period, total savings of the asthma management program were $202,991, after debiting the cost of the program (NJMRC, 2004). NJMRC calculated the Return on Investment (ROI) to be 3.15, meaning that for every dollar the Colorado Medicaid Program spends on the asthma management program; they receive $3.15 in cost savings (NJMRC, 2004). Additionally, there were other non-cost calculated benefits of the program. First, ". . . unscheduled physician office visits went down dramatically from 388 in the six-month period prior to program enrollment to 165 visits in the six-month period of the program" (NJMRC, 2004, p. 6). Missed work days for parents of children with asthma also decreased by close to 90 percent and patient satisfaction of the program was 93.8 percent. This study should be the model for any facility attempting to adequately manage an asthma population and contain costs associated with an increasingly prevalent chronic illness. According to Dr. David Tinkleman, Vice President of Health Initiatives at NJMRC, they are not doing

anything revolutionary, they are only following the established CPGs for asthma (personal communication, September 23, 2004).

Feifer, Verbrugge, Khalid, Levin, O'Keefe, and Aubert (2004) conducted a study in 2001 with the objective of determining, ". . . whether a population-based asthma disease management program, using broad-based educational interventions, can have a favorable impact on physician and patient adherence to guidelines-based care" (p. 93). The problem they identified was a severe under-use of controller medications and over-use of reliever (inhaled bronchodilators) medications. Feifer, et al. (2004) found that 33 percent of moderate to severe asthmatics may not be using controller medications. Adequate use of controller medications is considered to be the "gold standard" for asthma treatment. If controller medications are under-used, ". . . asthma is poorly controlled, symptoms can worsen, leading to increased healthcare utilization and costs" (Feifer, et al., 2004, p. 94).

In their intervention group, Feifer, et al. (2004) provided books on asthma, semi-annual newsletters, and checklists to their asthma patients in an attempt to improve asthma literacy. In addition, pollen count updates, refill reminders, and compliance reminders were sent to patients through the mail. Physicians were given asthma management flow-sheets to assist them in meeting CPGs for asthma. The flow-sheets contained

information on prescription tracking, peak-flow readings, severity levels, influenza vaccinations, and other action plan initiatives (Feifer, et al., 2004). Interventions resulted in a significant growth in use of controller medications among previous non-users. Moreover, self reported quality of life improved. Additionally, there were fewer emergency department visits, and fewer hospitalizations. Perhaps the most significant improvement occurred in the productivity area. Employed patients in the intervention group experienced a 46 percent reduction in lost productivity, which was based on a computation of missed workdays and reduced activity due to asthma symptoms (Feifer, et al., 2004).

In 2003, the Air Force's 90th Medical Group, in Cheyenne, Wyoming, won the Disease Management Association of America Excellence in Leadership Award for the best disease management program in the military. In that same year, they began placing special emphasis on preventive strategies to reduce the need for acute interventions for asthma (Lysinger, 2003). They placed initial focus on managing asthma properly. Primary care providers began by determining the appropriate asthma severity level and basing initial treatment on the assessed severity (Lysinger, 2003). Patients were to receive all pertinent diagnostic tests for asthma, then they would be referred to a nurse-run asthma program for education on asthma, environmental

triggers, control of triggers, self-management techniques, treatment goals, warning signs of exacerbations, medications and their delivery mechanisms, and peak-flow monitoring (Lysinger, 2003). Patients monitoring their own peak-flows were to document for two weeks in an asthma diary and follow-up with disease management for the development of an asthma action plan. Patients who had excessive variations in their peak flows were referred back to their PCM for further work-up (Lysinger, 2003).

In the FY 2000 baseline assessment, the 90th Medical Group identified only 113 patients with asthma. After implementation of the asthma management program, in 2003, the number more than doubled to 239. The use of controller medications increased from 47 percent to 92 percent, while 40 percent were on peak-flow meter monitoring, 90 percent received asthma education, and only seven hospitalizations occurred during the winter months (only one was due to asthma exacerbation). PCMs received reports on all asthma admissions within one working day of the admission. During the winter months, they implemented a cough and cold clinic so that patients would have the available appointments to discuss the triggers caused by infections and allergens (Lysinger, 2003). They also set up protocols with the pharmacy to provide medications to relieve sore throat, runny nose, cough, watery eyes, frequent sneezing, allergies, fever less than 102 degrees Fahrenheit, and/or laryngitis (Lysinger, 2003).

If those symptoms recurred, they were required to go to their PCM for care. The protocol resulted in 865 patients being seen during the winter/spring season. Monitoring of the quality for 3 months revealed no significant findings and the program saved the medical group $47,575 in civilian acute care visits related to asthma. Comprehensively, their initiatives to manage asthmatics in disease management resulted in a net annual cost savings of $100,366 after the cost of the program.

In September 2000, the FMAS Corporation analyzed improvements in asthma management for the MHS. This study was a pre/post-CPG implementation analysis. From 1999 to 2000, 25.5 percent of the MTFs in the MHS had implemented the CPGs for asthma. However, the results were still promising. Measure of lung function increased from 41.2 percent to 64.5 percent of the asthma patients and patient education and self-management increased from 19.1 percent to 26 percent of the asthma patients (FMAS Corporation, 2000). Significant improvement was identified in the areas of emergency department visits and hospital readmissions. The percentage of asthmatics who had not visited the emergency department in the previous year increased from 79.4 percent to 85.8 percent, while those with more than one visit decreased from 7.1 percent to 3.7 percent (FMAS Corporation, 2000). The results reflect a significant return for

a small number of compliant MTFs, soon after implementing the CPGs.

In 2002, ACS Federal Healthcare, Inc. conducted a study to measure the use of long-term controller medications to manage persistent asthma. Additional focus was on examining utilization of emergency department visits and hospitalizations for MHS beneficiaries associated with asthma (ACS Federal Healthcare, Inc., 2002). MHS beneficiaries from ages five to 56 years old with persistent asthma were the population of interest. The study identified 2,023 active duty (AD) personnel and 44,746 non-active duty (NAD) with persistent asthma. Utilization results for the Army were well above the HP2010 goals for hospitalizations and emergency room visits at 10 admissions annually per 10,000 beneficiaries and 89 emergency room visits annually per 10,000 beneficiaries.

Kallenbach, et al. (2003) described the results of using consistent comprehensive patient education materials, provider education, and other asthma management interventions to improve asthma outcomes. Several Chicago area hospitals improved patient education through the development of a pocket-sized patient education booklet and asthma fun and activity books. Additionally, they developed small group interactive studies for providers and standardized their provider and nursing respiratory care education programs. In an attempt to reduce

respiratory infections for asthmatics during the winter months, they sent reminders to every asthma patient to get their influenza vaccination each fall. Finally, they formed a partnership among the area healthcare organizations called the Chicago Asthma Consortium with the mission of reducing mortality and morbidity, improving quality of life, exchanging information, and solving problems associated with asthma management (Kallenbach, et al., 2003). The Chicago area healthcare organizations' efforts resulted in a 54 percent decline in asthma-related admissions, a 61 percent decrease in emergency department visits, a 30 percent increase in the use of asthma action plans, and a 40 percent increase in the use of peak-flow meters (Kallenbach, et al., 2003).

The literature review repeatedly demonstrates a correlation between asthma CPG compliance and a utilization of preventable health services by asthma populations. Additionally, research consistently shows that a healthcare organization can significantly reduce unnecessary costs by preventing exacerbations of asthma that lead to emergency department visits and hospitalizations. The evidence-based asthma CPGs are designed to improve quality of life for patients and lessen the impact of asthma on the ever-growing costs of healthcare in America. EACH should learn from the previous studies and use the

information to develop an effective and detailed asthma management program based on established CPGs.

Purpose

The purpose of this project is to identify evidence-based strategies to reduce hospitalizations and emergency department visits associated with asthma at EACH. Implementation of the already established CPGs and continuous monitoring should be used to accomplish the aforementioned goal. Full costs to the MTF as a result of the current asthma management procedures will be determined in order to establish a baseline cost to the organization. A comprehensive and detailed asthma management program will be developed for implementation within EACH to improve diagnosis and management of the asthma population. The primary hypothesis of the study is that a comprehensive and detailed asthma management program based on the DoD CPGs will result in more accurate diagnosis, treatment, and management leading to improved outcomes for the asthma population at EACH. The null hypothesis is that a comprehensive and detailed asthma management program based on the DoD CPGs will not result in more accurate diagnosis, treatment, and management of the asthma population at EACH, leading to an insignificant change in outcomes.

Methods and Procedures

Method of Analysis

The study will be a retrospective analysis of the interventions and outcomes of EACH's current asthma management systems and processes. The population of the study consists of all TRICARE Prime and TRICARE Plus enrollees at least 6 years of age or older at EACH with a diagnosis of asthma, using the International Classification of Diseases, Ninth Revision, Clinical Modification (ICD-9-CM) diagnosis codes 493.00 through 493.91. Additional demographics of the population include active duty military and their dependents, activated National Guard and Reserve Component Soldiers and their dependents, and military retirees. The period of study is for the FY 2004 beginning October 1, 2003 through September 30, 2004.

A chart audit checklist was developed using the DoD/VHA CPGs for asthma as the independent variables. The audit will be looking for documented medical history, physical exam, diagnostic tests, coding errors, asthma management, and finally, outcomes. Medical history includes documentation of triggers, allergies, family history of allergies, family history of asthma, and smoking history. Physical exam includes documented assessment of wheezing and allergic rhinitis. Diagnostic testing includes pre and post-bronchodilator PFTs with a Forced

Expiratory Volume reversibility of 12 percent.[8] Coding errors are expected based on previous chart audits. Asthma management includes documented asthma severity level, annual PFTs, use of controller medications, asthma education, an established personalized action plan updated every 12 months, influenza vaccinations, at least one preventive appointment in the past year, and whether the patient is enrolled in the EACH DMC.

Once the data collection is complete, the final step in the analysis is to identify the outcomes for each group in the study. Emergency department visits and hospitalizations, as well as amount of direct and purchased care costs in the last year will be the measure of success for EACH asthma management. Once the outcomes data are collected, the cost to the MTF will be determined for the properly diagnosed and not properly diagnosed groups.

Validity and Reliability

Validity refers to the extent to which the analysis will actually measure the success of compliance with asthma CPGs (Cooper & Schindler, 2003). The validity of the research model measuring the effectiveness of the current EACH asthma

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[8] Reversibility occurs when there is an increase in lung volume from baseline measurements after using a bronchodilator (C. Halle, personal communication, September 14, 2004).

diagnosis, treatment, and management process is based on a logical process through the utilization of appropriate data elements. By selecting the appropriate data elements to measure asthma diagnosis, treatment, and management effectiveness, an adequate conclusion can be achieved. The outcome variables chosen are consistent with previous literature measuring the success of healthcare organizations adopting asthma CPGs.

Reliability refers to the consistency of the results if the analysis were to be conducted by another party (Cooper & Schindler, 2003). The reliability of the research model depends on the accuracy of the data, or the ability of the coding to capture the proper diagnosis. However, mechanisms are in place to minimize the effects of coding errors. When coding errors are identified they will be recorded and eliminated from the sample because they would not meet the population criteria of being diagnosed with asthma. Although the accuracy of the data coded in the databases queried are not 100 percent accurate, it is the most reliable source of data available for analysis. Additionally, EACH has a data quality management control program that reviews data quality issues and reports to the executive committee on problems with data. This researcher is confident that the data collected will be valid and reliable for the purpose of this project.

Data Sources

A query was run through the Military Health System Management Analysis Tool (M2), which mines enrollee population data from the Standard Inpatient Data Record (SIDR) and Standard Ambulatory Data Record (SADR) databases, to provide the subjects of interest. The data pull revealed 1,887 enrollees at EACH who met the limiting criteria with their Family Member Prefix (FMP), the Sponsor's Social Security Number (SSSN), and enrollment status (Prime or Plus).

Once the population was determined (1,887), an adequate sample had to be identified for chart audits to collect data. The U.S. Army Audit Agency Statistical Sampling System Version 6.3 was used to determine the appropriate sample using a 95 percent confidence level, 5 percent sampling error, and a 50 percent maximum expected error rate. The maximum expected error rate was set at 50 percent because previous audits have revealed that it is possible for a much as 30 percent of the charts to have been coded incorrectly through transcription by medical coders. The sample size determined by the Statistical Sampling System to provide an adequate representation of the overall EACH asthma population was 316 enrollees. The number of charts to be audited was randomly selected using the same statistical sampling software for a sample size of 400 enrollees. Additional enrollee charts (84) were needed to ensure that 316 charts would

be available. The additional charts were necessary, because over the period of chart auditing some of the patients may have moved away from the area or charts may be checked out by either PCMs, Troop Medical Clinics, or the patients.

Ethics

All data are subject to the Health Insurance Portability and Accountability Act (HIPAA) regulations for Protected Health Information (PHI). Therefore, only the researcher and chart auditors will have access to the information necessary to conduct the study. When possible the personal identifiers will be cleaned from the database. Additionally, this researcher will ensure that all auditors sign non-disclosure and security statements for compliance and maintenance of ethical integrity. It is important to note that the ethical principles of beneficence (the requirement to do good) and non-maleficence (the requirement to do no harm) are the primary motives of this study. Therefore, the utmost respect will be maintained for patient privacy (Hollenbeck, 2004).

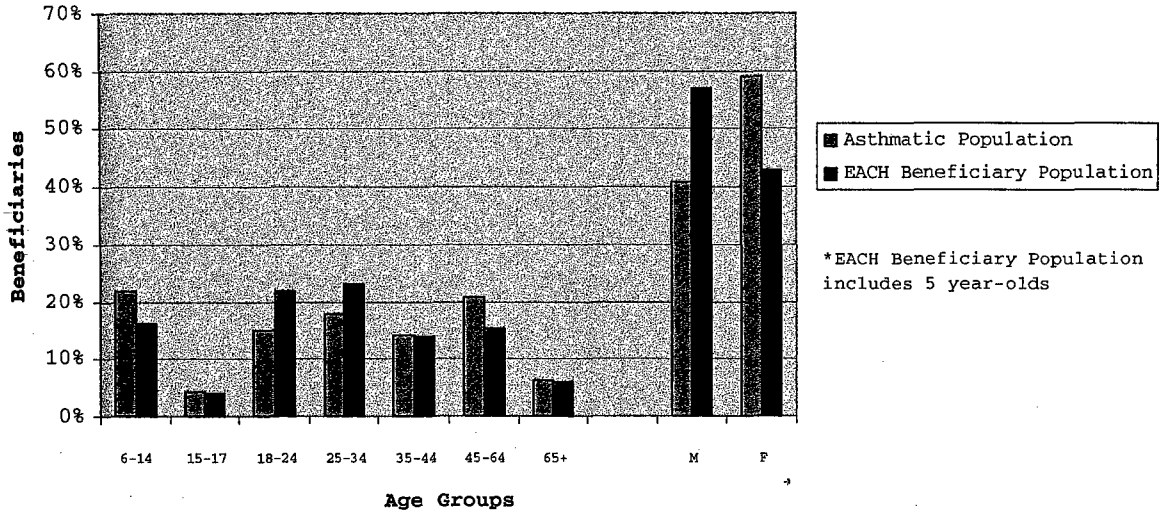
Results

The data for the study was obtained by a thorough audit of 316 outpatient records for patients identified as having a diagnosis of asthma from the M2 database. The audit occurred over a five-month period from October, 2004 through February, 2005. Findings of the chart audit were consistent with previous

literature and studies of compliance with asthma CPGs. As hypothesized, EACH is deficient in the use of spirometry for diagnosis and monitoring of the asthma disease process, educating newly and previously diagnosed asthmatics, prescribing controller medications for the proper reduction in inhaled bronchodilator bursts and asthma exacerbations, and developing asthma action plans with patients to achieve patient involvement in their own prevention of acute exacerbations. The aforementioned deficiencies attributed to a higher rate of emergency department visits and hospitalizations, exceeding the HP2010 benchmarks.

Figure 1 displays the EACH enrolled beneficiary and total asthmatic population demographics. The asthmatic population demographics are consistent with previous population health research on asthma in that there is a higher prevalence of asthma among females than males. "In 2002, the prevalence rate in females (81 per 1,000 persons) was almost 30 percent greater than the rate in males (62.6 per 1,000 persons)" (ALA, 2004, p. 5). This characteristic was also displayed in EACH's asthmatic population.

Figure 1. EACH Asthmatic and Total Enrolled Beneficiary Population Demographics by Percentage of Population

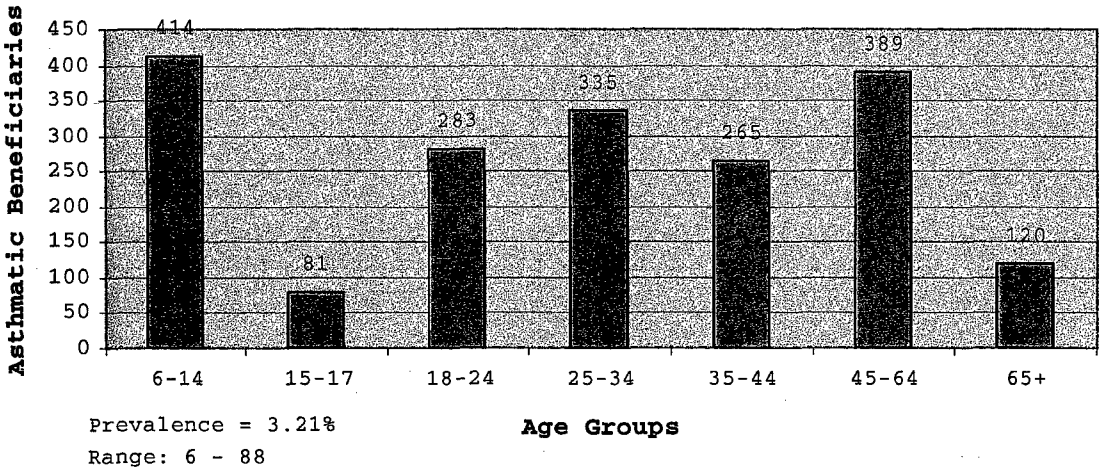


Data Source: M2 data query conducted in March, 2005

Figures 2, 3, and 4 depict the specific numerical demographics of the entire asthmatic population at EACH. The data includes those patients incorrectly coded as having asthma, because they could not be totally eliminated from the population using M2 data queries. Additionally, AD and retired beneficiaries in the asthmatic population could not be separated due to having the same family member prefix of "20." Asthma prevalence for EACH was 3.21 percent. Interestingly, EACH's prevalence rate is less than half of Colorado's asthma prevalence of 7.7 percent in 2002 (ALA, 2004). This is partly due to the significant active duty population, which has very low rates of asthma. Low rates are attributed to the Standards of Medical Fitness in AR 40-501. AR 40-501 requires Soldiers to

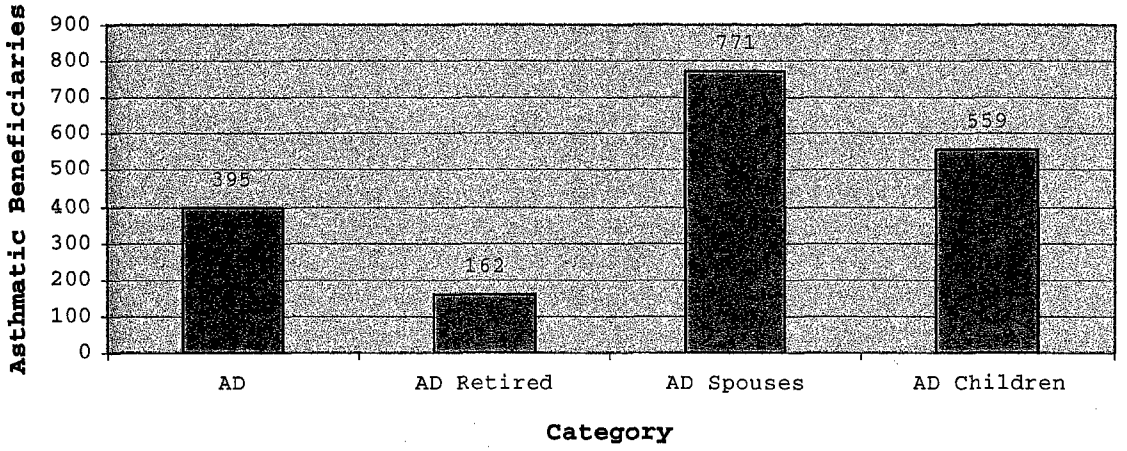
achieve physical fitness standards that most civilians do not have to meet. Additionally, during the recruiting process, a meticulous medical examination is conducted and anyone who has asthma is denied entrance into the military.

Figure 2. EACH Asthmatic Enrolled Beneficiary Demographics by Age Group



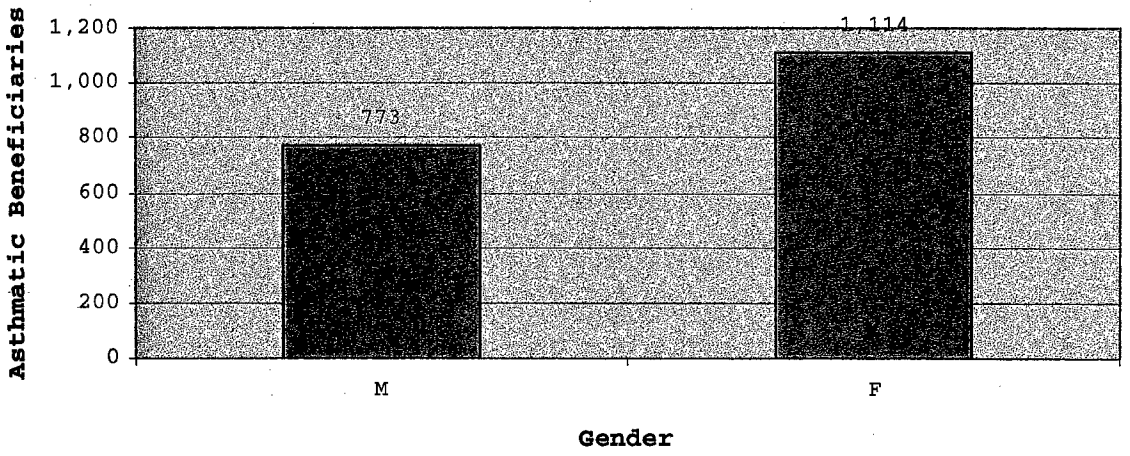
Data Source: M2 data query conducted in March, 2005

Figure 3. EACH Asthmatic Enrolled Beneficiary Demographics by Category



Data Source: M2 data query conducted in March, 2005

Figure 4. EACH Asthmatic Enrolled Beneficiary Demographics by Gender



Data Source: M2 data query conducted in March, 2005

Table 1 depicts the results of the audit of 316 outpatient records at EACH. Charts coded incorrectly as asthma totaled 51. Most of these patients had an emergency department or clinic visit for "Reactive Airway Disease," "Upper Respiratory Infection," and "Chronic Obstructive Pulmonary Disease." These healthcare services were not included in the data analysis. This type of coding error had already been identified by the DMC and the Chief of Patient Administration was aware of the problem. However, once the patient encounter had been coded for asthma, it cannot be changed. Therefore, when a database query is performed, these patients will still show up as having asthma. These charts coded incorrectly were not included in the CPG scoring. Incorrectly coded charts were included in the original

population and do not affect the accuracy and confidence of the sample.

Table 1. **Results of chart audit**

CPG Variables	Percentage	Raw
n		316
Coded Correctly	84%	265
Triggers	31%	82
Allergies	100%	265
Family History of Allergies Documented	5%	13
Family History of Asthma Documented	12%	31
Wheezing Assessed	49%	130
Allergic Rhinitis Documented	34%	90
*Baseline PFT Performed	30%	79
*Pre and Post - PFT Performed	27%	71
Chest X-Ray Documented	13%	35
Methacholine Challenge	1%	2
Allergy Consult	21%	55
Coding Errors	16%	51
*Severity Documented	33%	87
*PFT Every Year	6%	15
*Controllers Documented	62%	163
*Asthma Education	18%	48

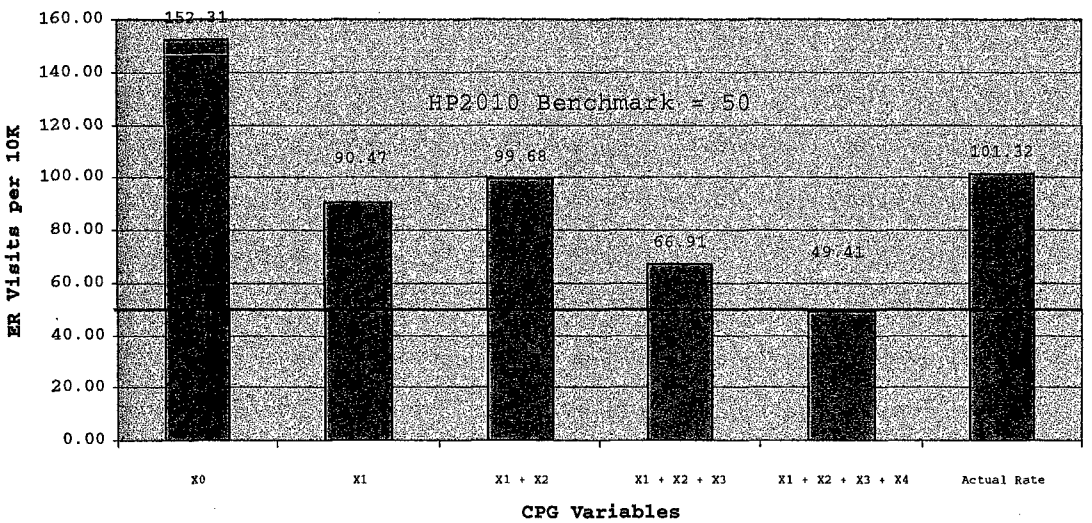
*Asthma Action Plan Completed	12%	33
Flu Vaccine Every Year	10%	27
Preventive Appointments	8%	22

Note: *HEDIS measures monitored by DoD and MEDCOM.

The following figures depict the outcomes associated with EACH's level of compliance with the asthma CPGs. The independent variables of interest are X_0 (patients who did not have a pre and post-bronchodilator PFT), X_1 (patients who did have a pre and post-bronchodilator PFT), X_2 (patients with a documented controller medication), X_3 (patients with documented asthma education), and X_4 (patients with a documented asthma action plan). In the sample of 265 correctly coded asthmatics (316 decremented by 51 coded incorrectly), there were 112 emergency department visits. Figure 5 depicts the HP2010 measures for emergency department visits per 10,000 beneficiaries in a population. The results in Figure 5 were obtained by applying the emergency department visits per asthmatic in the sample for each CPG variable to the enrolled asthmatic population at EACH. The calculations used are identified in Table 2. The emergency department visit rates per 10,000 beneficiaries in Figure 5 illustrate how many emergency department visits there would be if all asthmatics in the population displayed the CPG variable characteristic. For example, if all asthmatics enrolled at EACH

had a pre and post-bronchodilator PFT, controller medications, asthma education, and an asthma action plan, then there would be 49.41 emergency department visits per 10,000 enrolled beneficiaries at EACH. This brings EACH below the HP2010 benchmark of 50. However, if all asthmatics enrolled at EACH did not have any of the CPG variable characteristics, then there would be over three times (152.31) as many emergency department visits per 10,000 enrolled beneficiaries.

Figure 5. Projected Emergency Department Visits by CPG Variable Characteristics for EACH per 10,000 Enrolled Beneficiaries and Actual Rate



Data Source: Asthma sample chart audit conducted from October, 2004 through February, 2005

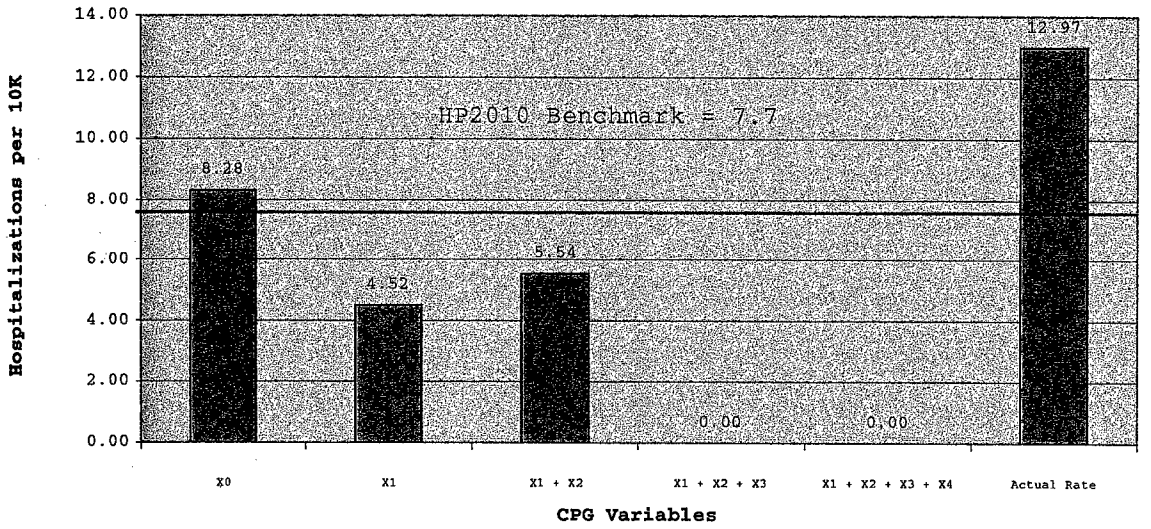
Table 2. **Emergency Department and Hospitalization Rate Calculations per Asthmatic**

CPG Variables	*n*	ER Visits	Hosp.	ER Rate	Hosp. Rate
X_0	194	92	5	0.4742	0.0258
X_1	71	20	1	0.2817	0.0141
$X_1 + X_2$	58	18	1	0.3103	0.0172
$X_1 + X_2 + X_3$	24	5	0	0.2083	0.0000
$X_1 + X_2 + X_3 + X_4$	13	2	0	0.1538	0.0000

Note: The asthmatic population enrolled at EACH is 1,585 (excluding those coded incorrectly) and a beneficiary population of 49,350.

Figure 6 illustrates the projected hospitalization rate per 10,000 enrolled beneficiaries at EACH if all asthmatics displayed the CPG variable characteristics. The projections were calculated using the per asthmatic hospitalization rate for the sample depicted in Table 2 and applying that rate to the 49,350 beneficiaries enrolled to EACH.

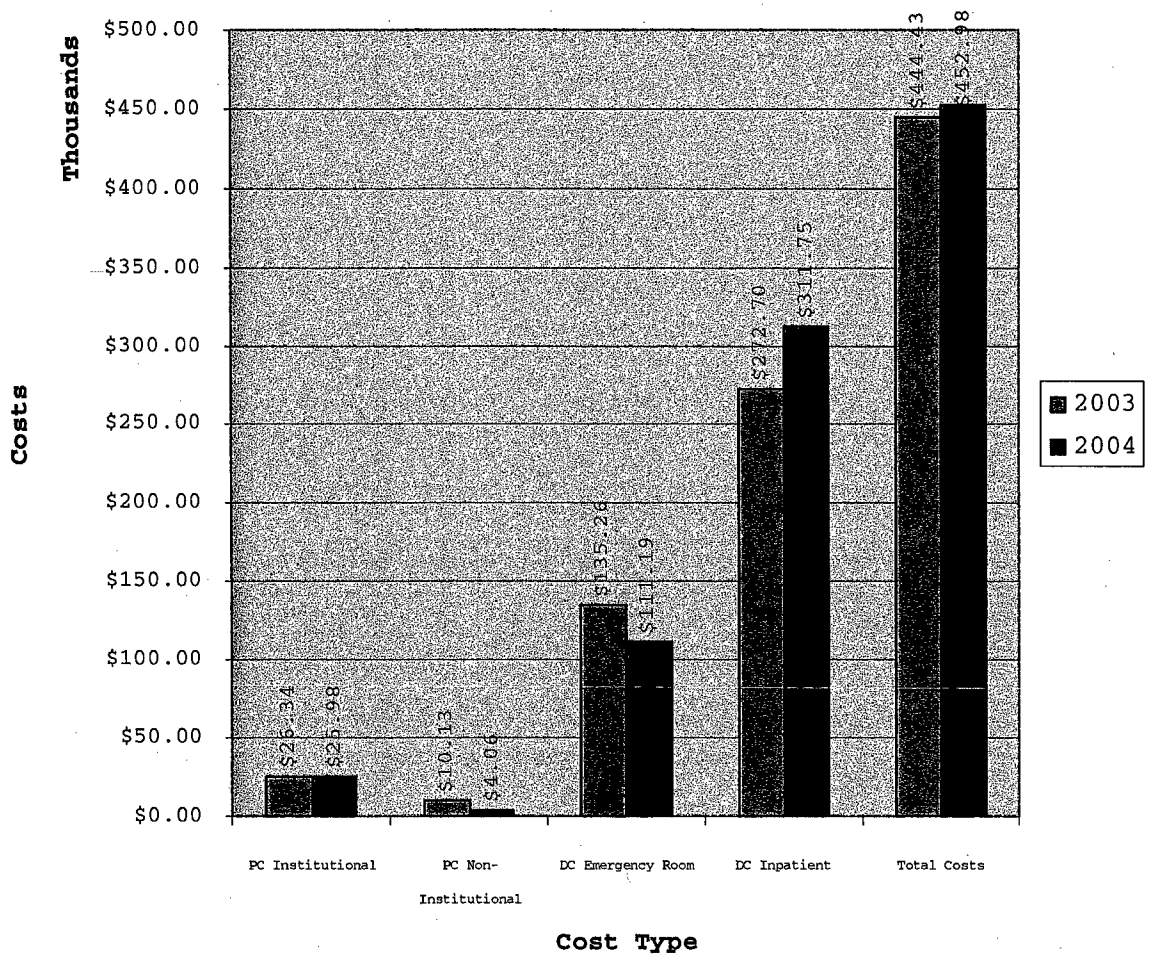
Figure 6. Projected Hospitalizations by CPG Variable Characteristics for EACH per 10,000 Enrolled Beneficiaries and Actual Rate



Data Source: Asthma sample chart audit conducted from October, 2004 through February, 2005

Figure 7 illustrates the actual direct and purchased care costs for EACH due to asthma hospitalizations, emergency department visits for FY 2003 and FY 2004. The costs include patient encounters which may have been coded incorrectly as asthma. For example, an emergency department visit for "Upper Respiratory Infection" was frequently coded as asthma; therefore was included in the total costs associated with asthma.

Figure 7. Actual Direct and Purchased Care Emergency Department and Hospitalization Costs Associated with Asthma by Fiscal Year

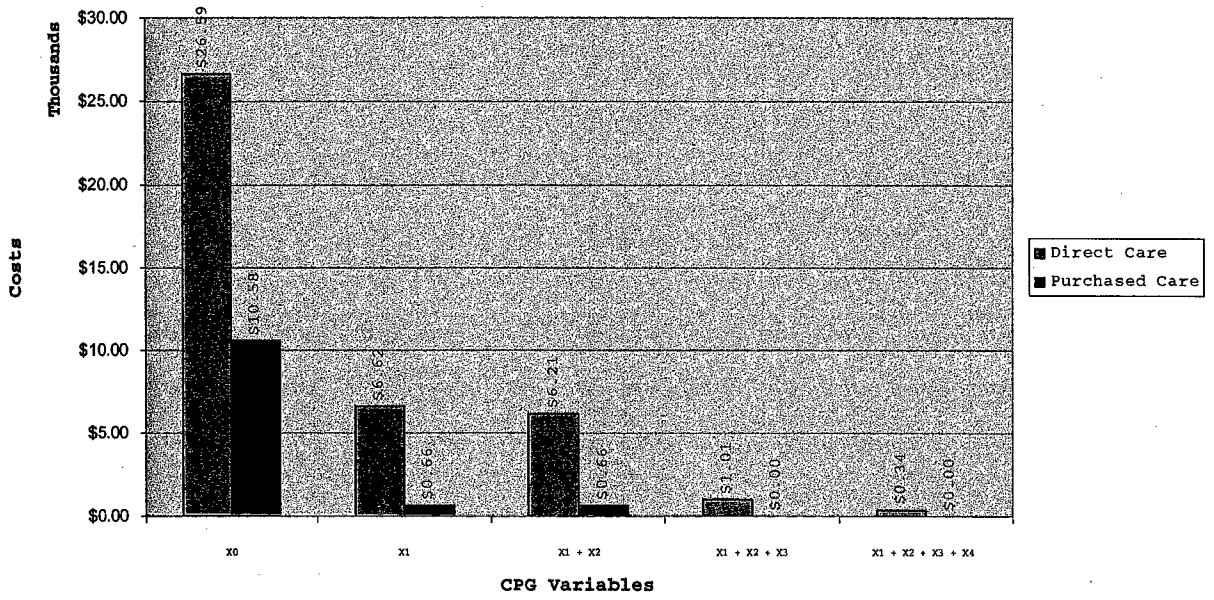


Data Source: M2 data query conducted in February, 2004 (FY03) and March, 2005 (FY04)

Figure 8 depicts actual direct and purchased care costs associated with the asthmatics in the study sample displaying the CPG variable characteristics. The method of analysis used was to identify those patients in the sample who did not have a pre and post- bronchodilator PFT and find the actual costs in FY 2004 associated with emergency department visits and hospitalizations associated with the acute exacerbations of

asthma. Costs significantly decreased when the CPG variables were used.

Figure 8. Actual Direct and Purchased Care Emergency Department and Hospitalization Costs Associated with CPG Variables in the Study Sample for FY 2004

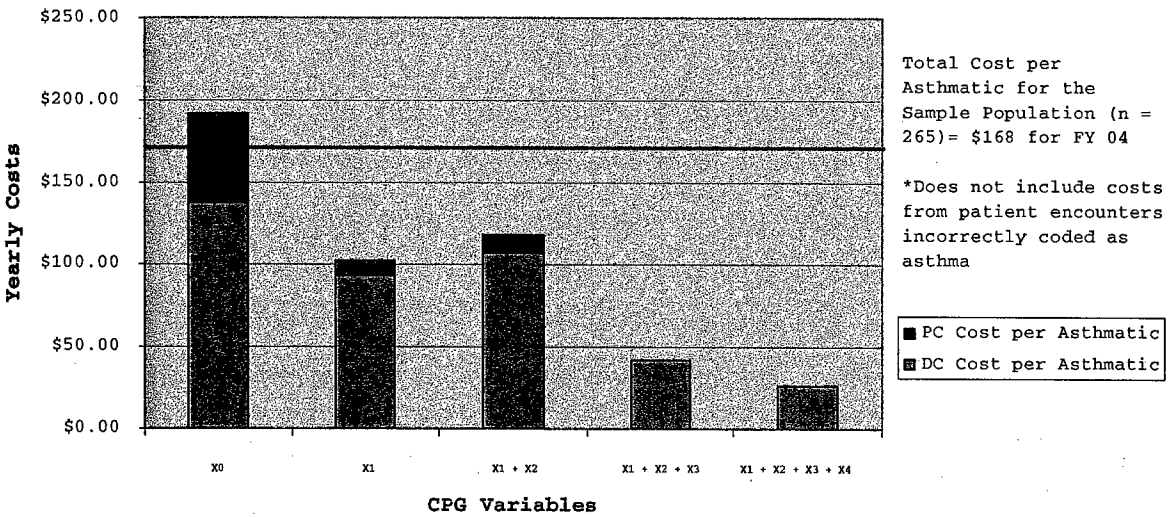


Data Source: M2 data query on sample patients conducted March, 2005

Figure 9 illustrates the per asthmatic costs associated with each CPG variable in the sample. These calculations can be applied to the population of asthmatics enrolled at EACH to project a total cost if every patient displayed the CPG variable characteristic. The cost per asthmatic calculation does not include any direct and purchased care outpatient costs (outpatient visits, home health care, outpatient diagnostic tests, etc.). The costs included are only those associated with

emergency department visits and hospitalizations for acute asthma exacerbations consistent with the focus of the research.

Figure 9. Total Emergency Department, Hospitalization, and Purchase Care Costs per Asthmatic in the Study Sample

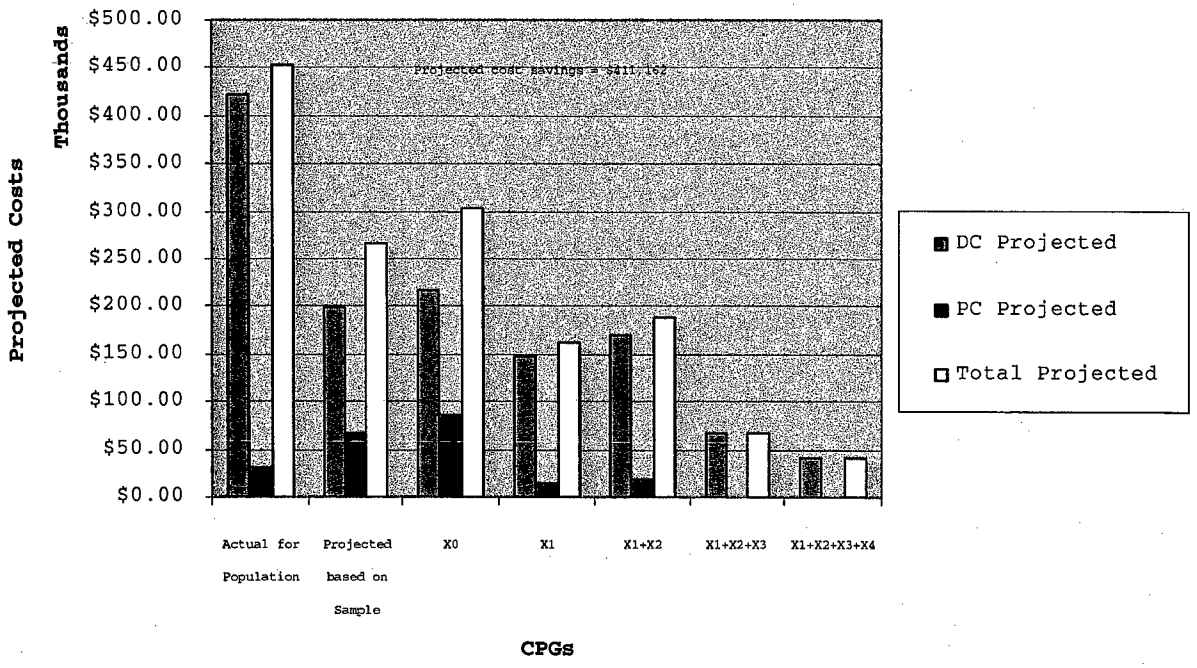


Data Source: M2 data query for costs associated with patients in the study sample and divided by the number of patients displaying the CPG variable characteristics, conducted March, 2005

Figure 10 depicts the actual costs for the population and projected total costs if every asthmatic in the population displayed the CPG variable characteristics. This was calculated using the per asthmatic costs from figure 5 and applying those costs to the asthmatic population at EACH. "Projected based on sample" is the projected total costs using the sample cost data. The "actual for population" yields a much higher ratio of direct care costs to purchased care. The higher ratio is attributed to the significant number of patient encounters coded incorrectly

at EACH. Therefore, the projected total cost savings takes into account a reduction in asthma associated costs due to proper coding of patient encounters.

Figure 10. Projected Cost Savings by CPG Implementation at EACH



Data Source: M2 data query using findings in the study sample and total population of asthmatics, conducted March 2005

Discussion

In order to gain insight into the use of CPGs with asthmatic populations and their associated outcomes, this researcher conducted extensive interviews with hospital staff, clinic personnel, other MTFs, the TRICARE managed care contractor's office, the Multi-Service Market Office, and the top respiratory hospital in the U.S. located in Denver,

Colorado. This led to a logical separation of asthma management and outcomes into three distinct focus areas. The first focus area was proper diagnosis (pre and post-bronchodilator PFT, physical assessment, family history, and additional diagnostic procedures). The second concerns management of the disease (controller medication use, documentation of severity, allergy testing, asthma education, yearly spirometry and preventive appointments, and asthma action planning). The third emphasized asthma management outcomes (emergency department usage, hospital admissions, and other quality of life factors).

In order to evaluate the focus areas, a statistically significant sample needed to be extracted from the asthmatic population enrolled at EACH. This was accomplished by obtaining the Sponsor Identifications (SSSNs) for all asthmatics enrolled at EACH and then randomly selecting 316 charts from that population. These charts were requested from EACH's Outpatient Records Department, who pulled the charts for auditing and audited using the Outpatient Record Chart Audit Form in Appendix B. A check mark was placed in each block when the item was identified in the outpatient record. Once the audits were completed, the data were entered into a Microsoft Excel spreadsheet and coded "1" for each item that was identified in the outpatient record and "0" for items that were not found in the outpatient record. Appendix E shows the raw data collected

during the chart audit with personal identifiers removed for privacy. Each section of Appendix E; Diagnosis, Management, and Outcomes, has a total at the bottom of the table with a summation of the number of charts with identified items. The totals were then used to calculate a percentage of the sample displaying the characteristics of each item. Table 1 in the Results section displays the percentages of outpatient records with item characteristics.

Diagnosis

Proper diagnosis of asthma is perhaps the most important intervention when analyzing the data of this research. It is very difficult to successfully manage any asthma population without using the proper diagnostic tools. The "gold standard," as determined by the NHLBI, for accurate diagnosis of asthma is the pre and post-bronchodilator PFT. This researcher uses the NHLBI CPGs for asthma to define the diagnostic variables as a pre and post-bronchodilator PFT and physical assessment (triggers, wheezing, allergic rhinitis, allergies, smoking, and chest x-rays).

After examining the diagnostic variables, the data demonstrated a strong correlation between emergency department visits and hospitalizations and having had a pre and post-bronchodilator PFT. If one compares the two groups (one without pre and post-bronchodilator PFT and one with pre and post-

bronchodilator PFT), those patients who had a pre and post-bronchodilator PFT were almost half as likely to have an emergency department visit or hospitalization for acute exacerbations of asthma. This is an important finding and gives solid credibility to the previous research by the NHLBI to recommend that a pre and post-bronchodilator PFT be made the "gold standard" for diagnosis of asthma. At EACH, only 27 percent of the patients with a diagnosis of asthma have had a pre and post-bronchodilator PFT.

A pre and post-bronchodilator PFT, however, is not the only procedure used to diagnose asthma. In some cases, a patient may actually have asthma even though the pre and post-bronchodilator PFT may not show 12 percent reversibility in their Forced Expiratory Volume. In such cases, further testing is necessary. Exercise PFTs and Methacholine Challenges can be used in addition to the pre and post-bronchodilator PFT to definitively diagnose asthma when the Forced Expiratory Volume is less than 12 percent, but the patient continues to display asthma symptoms. In this study, Methacholine Challenges were rarely used by physicians. Only two patients in the sample had a Methacholine Challenge documented in their outpatient record.

Physical assessment and a good history are also important in proper diagnosis of asthma. Although, triggers (allergies, cold air, cigarette smoke, dust mites, and pet dander) are

extremely important in identifying what might be causing the exacerbations or acute respiratory responses, nevertheless, they were only documented in 31 percent of the records. Furthermore, respiratory wheezing is the primary physical indicator that a patient may have asthma, however, assessment of wheezing was only documented in 49 percent of the records. Allergic rhinitis is also a frequent indicator accompanying an asthma diagnosis. It was documented in 34 percent of the records. Surprisingly, family history was rarely documented. Asthma and allergies often have a familial connection and it is very important to document whether another family member has a history of asthma (C. Halle, personal communication, September 14, 2004). Identification of a familial history of asthma provides additional objective data to guide the physician in proper diagnosis of a patient's health problem.

The NHLBI places significant importance on compliance with the diagnostic guidelines for asthma. Compliance for EACH has not been sufficient in diagnosis using the established "gold standard." Comparing outcomes for patients who received proper diagnosis versus those who did not, validates the NHLBI recommendations for proper diagnosis. This research found higher emergency department visit and hospitalization rates for asthma patients not diagnosed in accordance with the guidelines for

asthma. Therefore, proper diagnosis should be a priority for any healthcare institution.

Management

Once a proper diagnosis is made, the work does not stop. Physicians must treat the disease properly. The NHLBI defines asthma management criteria as the use of controller medications, allergy management, severity assessment, asthma education, and asthma action planning. Asthma is a chronic disease and requires disease management to mitigate potential adverse outcomes.

Controller medications and inhaled bronchodilators used in combination are the standard of care for medication management of asthma. Controller medications include Beta-2 agonists, Leukotriene modifiers, and corticosteroids. In the sample, 62 percent of the patients coded correctly for asthma had a controller medication documented in their record. Used properly, controller medications can be very effective at reducing the use of inhaled bronchodilators for acute asthma exacerbations. The avoidance of acute onset of symptoms, where the patients cannot breathe effectively, is the primary goal of asthma management.

Asthma is often accompanied and triggered by environmental allergies. Allergy testing may be appropriate to identify allergens that can trigger an acute exacerbation. Allergy consults appear to be an under-utilized tool to assist patients

in managing their disease and keeping them from having acute exacerbations.

Assessment and documentation of the disease severity is important for identifying the appropriate controller medication and the dosage for each patient. Severity ranges from mild to moderate to severe persistence. The amount of care necessary to manage a mild persistence asthmatic compared to a severe persistence asthmatic is very different. Mild persistence asthmatics often avoid acute exacerbations by only taking a controller medication and avoiding environmental triggers. While severe persistence asthmatics require much higher doses of controller medications, frequent use of inhaled bronchodilator bursts, and extensive care to control environmental triggers. While severity should be documented for every asthmatic, our study sample yielded only a 33 percent compliance with this requirement.

Because asthma medications are notoriously difficult to use they require extensive education. The goals of asthma education are several. First, instruct the patients on proper disease monitoring and recognizing when and how to seek treatment. Second, optimize patient treatment plans to follow clinical pathways and ensure regular follow-ups. Third, help patients to understand the disease process to include triggers. Fourth, ensure that the patients understand the proper use of oral and

inhaled asthma medications. HP2010 sets the benchmark for asthma education at 30 percent of an asthmatic population. Regardless, this should be done for every asthmatic. In the study sample, only 18 percent of the records had asthma education documented. Management without education is seemingly impossible.

Improper use of medications could worsen the effect the disease has on a patient. While auditing the sample population outpatient records, patients often told providers that they were taking their controller medications as needed. Controller medications are not prescribed as needed and must be taken every day as prescribed. Taking medications improperly can result in far more adverse outcomes and lowers the level of protection that asthmatic patients need. First, patients believe that they have a level of protection from acute attacks, when they really do not, because the medication is not being taken properly. Second, they will not take the same precautions to avoid triggers if they think the medications will keep them from having an attack. Finally, they may need more hospital visits due to misuse, because they will need to use their medication more frequently to avoid attacks.

Asthma action planning is an important process for patients to understand and properly manage their disease. Every persistent asthmatic should have an asthma action plan. The asthma action plan includes measures for avoiding acute

exacerbations and provides a written plan for what they should do if they find themselves in an asthma attack. The action plan is primarily an extension of asthma education in a written, self-management form. The asthma action plan also provides helpful information for the provider during preventive appointments. The provider should discuss how well the patient has been doing at managing the disease and avoiding acute exacerbations. Then, together, the patient and provider will adjust the treatments and management techniques to maximize effectiveness of the treatment regimen.

Asthma management following the proper diagnostic procedures can be very helpful in reducing adverse outcomes. In this study, adverse outcomes like emergency department visits and hospitalizations were lower in the sample that received proper management. Therefore, one can deduce that by implementing asthma management recommendations in a healthcare system will improve outcomes for patients with asthma.

Outcomes

The measure of success for any disease management program is its outcomes. Outcomes are the result of several processes involved in the care of a patient. This researcher has addressed the processes (proper diagnosis using spirometry, proper treatment using controller medications, and proper management using asthma education and action planning) in the previous

sections. In this study, outcomes are based on the HP2010 goals established by the NIH and adopted by the DoD. Emergency department visits, hospitalizations, and quality of life issues are the outcomes in this study. To gain institutionalal support and determine the fiscal impact on the organization, costs associated with the outcomes are also addressed in the study.

A good measure of the success of asthma management is the number of emergency department visits for a particular population. As previously mentioned, the NIH established benchmarks for emergency department visits for asthmatic populations in 1999 through the HP2010 report. The HP2010 benchmark for emergency department visits is 50 per 10,000 beneficiaries in a population of interest. In FY 2004, EACH's actual emergency department visit rate for asthmatics was 101.32 per 10,000 beneficiaries. Using the data analysis of the audit of outpatient records, if all asthmatics enrolled at EACH had a pre and post-bronchodilator PFT, controller medications, asthma education, and a documented asthma action plan, then the emergency department visit rate would drop to 49.41 per 10,000 beneficiaries. This finding is significant because it quantifies the effect CPGs have on outcomes like emergency department visits. Additionally, it brings EACH's clinical performance within the HP2010 metric.

Two important weaknesses in using the HP2010 emergency department visit benchmark for an MTF exist. First, unlike civilian emergency department visits, there is no cost to the beneficiaries for using the emergency department for all of their healthcare needs. Outside the MHS, civilians must pay for health insurance, co-pays for emergency department visits, the entire cost of the emergency department visit, or qualify for government healthcare benefits like Medicaid or Medicare. In the MHS, regardless of income, almost all care is free of charge to qualifying beneficiaries. Therefore, there are no disincentives for patients to use the more efficient and effective primary care venue in lieu of the emergency department.

The emergency department is a more convenient venue for MHS beneficiaries than primary care appointments, because they are accessible 24 hours per day and do not need an appointment. Convenience is the incentive for patients to use the emergency department instead of their PCMs in family practice, internal medicine, and pediatrics. Another factor affecting emergency department visits is that military personnel have unique requirements that civilians do not have. Military personnel deploy, often leaving spouses and children behind. The spouses essentially become single parents and this makes getting time off from work more difficult in order to take children to appointments or to make their own appointment. Another military

unique factor regarding emergency department visits is that military personnel often need healthcare providers to approve limitations or releases from duty for medical reasons. For example, a military member, who has an asthma attack in the middle of the night, cannot perform his or her physical fitness training with the unit in the morning. Therefore, the military member must go to the emergency department in the middle of the night to obtain a provider's approval to miss physical training. These scenarios are unique to the MHS and must be considered when benchmarking to civilian healthcare organizations.

Hospitalizations per 10,000 beneficiaries is another HP2010 benchmark that is used to assess a healthcare organization's ability to properly manage an asthmatic population. The HP2010 benchmark is 7.7 hospitalizations per 10,000 beneficiaries. The actual rate for the entire asthmatic population enrolled at EACH is 12.97 per 10,000 beneficiaries. In the study sample, the hospitalization rate was 7.27 per 10,000 beneficiaries. A 44 percent difference between the actual for the population versus the actual for the sample leads this researcher to conclude that there is some variability in the hospitalizations among the EACH asthma population influencing the study results. However, data obtained from the analysis of the sample quantifies the positive affect CPGs have on total hospitalizations for asthma. Implementation of only pre and post-bronchodilator PFTs yields a

hospitalization rate of 4.52 per 10,000 beneficiaries. The result of the hospitalization analysis demonstrates the effectiveness of CPGs in reducing costly hospitalizations in an asthmatic population.

Quality of life is the most difficult measure to quantify, but should be addressed in any assessment of an asthma management or disease management program. Patients should receive the care that is within recommended standards of practice. Recommended standards in this case are CPGs. The CPGs are developed using evidence-based medicine. Research quantifying the best interventions for improving the lives of asthmatics is robust. Elements of quality of life can include being more productive at work, having fewer missed school or work days, being able to exercise more often and with increased intensity, having fewer asthma attacks, and others. These quality of life elements were not measured in this study. However, the assumption can be made that improving the management of asthma and decreasing emergency department visits and hospitalizations will have a positive affect on quality of life elements.

Everything a hospital does should somehow seek to improve the lives of the patients being treated. In the case of asthma, lives are improved by having desirable outcomes. Emergency department visits and hospitalizations are the quality measures

established by the NIH through HP201 and should be evaluated by any healthcare institution with an asthma population. Patients being treated in accordance with practice standards and CPGs should have relatively few emergency department visits and rarely a hospitalization for asthma. In this study, outcomes are improved dramatically by implementing the CPGs for asthma. Therefore, this research can be used to justify CPG implementation at EACH and in the MHS.

Recommendations and Conclusions

The following recommendations can be made from the results and analysis of this study. First, CPGs should be implemented throughout the organization. Second, providers must be educated on the process of diagnosing, treating, and managing asthmatics, and achieving compliance with CPGs. Third, an easy-to-use, robust asthma management flow-sheet must be implemented for use in the outpatient clinics and placed in the outpatient records in a location easily accessible by providers. Fourth, protocols and new policies must be established by the command group at EACH and implemented throughout the facility. Fifth, progress must be monitored on a quarterly basis and posted for all providers to see. Finally, emergency department visit and hospitalization rates for asthma should be added to performance-based provider contracts.

Implement CPGs

The DoD and MEDCOM have mandated all MTFs to implement the DoD/VHA CPGs for asthma. Individual MTFs do not have the flexibility to partially implement the CPGs. They must incorporate them into their current practices. The CPGs for asthma are based on an abundance of scientific studies and expert panels identifying each measure as evidence-based best practices. Although all of the CPGs should be implemented, the CPGs most necessary are performing pre and post-bronchodilator PFTs, prescribing controller medications, providing asthma education, and developing asthma action plans for each patient. These elements of the CPGs are being monitored by MEDCOM through various data reporting venues, such as Population Health Operational Tracking and Optimization Portal (PHOTO)[9], Integrated Clinical Database (ICDB) or Health-e-Forces, [10]

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[9] PHOTO is an MHS data mart that provides health plan performance measures for MHS executives consisting of performance, outcomes, satisfaction, and cost effectiveness (MHS Help Desk, 2005).

[10] ICDB is a disease management and health promotion program that mines data from CHCS and provides a graphical user interface for documenting and monitoring patient populations electronically in real-time (Basu, 2005).

and the MHS Population Health Portal (MHSPHP).[11] The implementation of CPGs in the facility should not require any additional staff or resources, only a shift in treatment approach with potential and current asthma patients.

Educate Providers

The process of educating providers on the use of the DoD/VHA CPGs and initial data from this study has already begun. In March 2005, the Asthma Action Team provided an in-service during hospital "grand rounds," where many providers became aware of the negative implications associated with not complying with current evidence-based practices. Several case studies were presented by Dr. Elaine Gonsior, Chief of the EACH Allergy Clinic, providing useful information on how to use the CPGs for patients presenting with various symptoms. Clinic chiefs expressed a genuine desire to implement CPGs into their clinic practices. Ongoing education will be conducted by the Asthma Action Team and Disease Management in each individual clinic to ensure maximum exposure to the educational opportunity. This

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[11] MHSPHP is a tri-service, web-based tool that generates action and prevalence lists for clinical preventive services and disease management at the provider and clinic level (LeVee, 2004).

recommendation required no additional staff or resources, only additional time from the Disease Management staff.

Implement an Asthma Management Flow-sheet

One of the main complaints by providers is they do not have enough time in a primary care appointment to perform a comprehensive review of a patient's outpatient record and to provide the necessary care that the patient requires. This researcher can attest to the amount of time it takes to review an outpatient record for compliance with CPGs. Medical records are typically disorganized and conducting documentation reviews are cumbersome. On average, one chart would take 10 to 15 minutes to review for pre and post- bronchodilator PFTs, allergy testing, asthma severity, asthma education, asthma history, and asthma action plans. This researcher recommends using an asthma management flow-sheet (Appendix C) to be located in the outpatient record directly under the master problem list. The asthma management flow-sheet incorporates the CPGs for asthma on one form and provides a mechanism for monitoring the diagnosis, treatment, and management of the disease. By making the process of finding information and documenting interventions easier, the flow-sheet can significantly reduce the amount of time it takes a provider to comply with the CPGs and increase the likelihood that compliance will improve.

The asthma management flow-sheet was developed using the Wurzburg MEDDAC flow-sheet (MCEUW OP 32), the DoD/VHA Clinical Practice Guidelines for Adults and Children Age 6 Years and Over (found on the QMO Webpage), and through collaboration with the Asthma Action Team at EACH. Once the Asthma Action Team is satisfied with the final product of the asthma management flow-sheet, it will be staffed through the command group for recommendations and approval. Once approved by the medical records committee, coordination will be made with publications to have the form reproduced for distribution to the clinics. The clinics will then be briefed on how to use the form.

The best documentation option would be to include a template, using this form, in the Composite Healthcare System II (CHCS II).[12] Currently, ICDB contains a Graphical User Interface (GUI) that has options to document healthcare services provided pertaining to the CPGs for asthma. Furthermore, ICDB uses data from CHCS. When a provider logs into ICDB, the patients' appointments for that day reflect their primary complaint. The provider can click on the patient's name and see all previous

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[12] CHCS II is the medical and dental clinical information system that generates and maintains a comprehensive, life-long, computer based patient record for each MHS beneficiary (Clinical Information Technology Program Office, 2005).

lab tests, diagnoses, and medications. Additionally, there is an option for documenting compliance with CPGs for illnesses like asthma, diabetes, chronic obstructive pulmonary disease, pneumonia, hypertension, and others. ICDB can be a useful option in lieu of paper documentation. However, the providers would have to switch between two software programs in order to document a patient encounter. Providers must document their encounters in CHCS II, and then they would have to switch to ICDB to document the CPG data. ICDB is optimal for data queries and population health monitoring, but it would be more time consuming for the providers than a paper flow-sheet.

Establish Protocols, Policies, and Monitor Progress

This researcher has discussed with key personnel several protocols to be implemented at EACH. If the protocols are accepted, MEDDAC policies need to be written and implemented to ensure compliance. Protocols are based on those implemented by NJMRC in Denver, Colorado. The protocols discussed are; automatic referrals within 24 hours to the DMC for any asthmatic seen in the emergency department or who has a hospitalization, close monitoring of asthma outcomes by the asthma nurse in the DMC, individualized disease management for all moderate to severe persistent asthmatics, and change of location for PFT results, asthma action plans, and asthma management flow-sheets in the outpatient records.

NJMRC's asthma management program utilized a program in which, when an asthmatic patient had a visit to any local emergency department, NJMRC was notified and automatically scheduled the patient an appointment with their care manager in the asthma clinic. This researcher proposes having a representative from the DMC attend the nursing morning report each day. The purpose would be to find out if any patients were seen in the emergency department the previous evening for asthma related issues. Once a patient is identified, the asthma nurse in the DMC would contact the patient and schedule an appointment in the DMC. This recommendation would provide a mechanism for identifying asthmatics who need more individualized care and asthma education. Future emergency department visits should be significantly decreased by improving access to preventive care in the DMC. This recommendation should require no additional resources because the personnel are already employed in the DMC.

The DMC recently hired a nurse to take over asthma management in the clinic. The cost of the asthma nurse is $78,576 per year including salary and benefits as a GS11-06. Responsibilities of the asthma nurse should include monitoring the organization's compliance with CPGs, noting emergency department visits and hospitalizations for asthmatics, and providing individualized disease management for moderate to severe persistent asthmatics. The asthma nurse would review

patient records for pre and post-bronchodilator PFTs, controller medications, asthma education, and asthma action plans and determine deficiencies. Once deficiencies are identified, the asthma nurse would refer the patient to the appropriate provider to schedule a pre and post-bronchodilator PFT or prescribe appropriate controller medications. Additionally, the asthma nurse would provide asthma education and action planning for the asthmatics. Finally, the asthma nurse should collect data on EACH's asthma population to provide feedback to the clinic providers regarding compliance with CPGs and the HP2010 and HEDIS measures.

Progress monitoring should include graphs of baseline measures, which are included in Table 1 along with the outcome measures of emergency department visits and hospitalizations for asthma. A database of asthmatics with emergency department visits and hospitalizations should be developed with fields for their last preventive appointment occurred, spirometry dates, prescription information, asthma action plan updates, and influenza shot information. The database would be managed by the DMC and reviewed each month for delinquencies. When delinquencies are identified, the DMC should contact the patient to schedule an appointment. The only increase in resources needed for these recommendations will be the supplies used during spirometry. The equipment and personnel are already in

place to handle the additional workload. The costs of increasing supplies are minimal.

Pay-for-Performance Contracts

EACH has begun contracting providers to compensate for the additional workload projected for the relocation of the 2nd Brigade of the 2nd Infantry Division. In these contracts, there is a 5 percent withholding of pay for meeting certain productivity benchmarks. These benchmarks are based on the Medical Group Management Association guidelines for Relative Value Unit (RVU) production per Full-Time Equivalent provider. The premise is that when a provider meets the established benchmark for RVU production, the provider receives a portion of the 5 percent withhold. This researcher recommends using this principle of pay-for-performance, but it should be tied to outcomes in addition to productivity. The measure of success for these providers will be the HP2010 benchmarks for asthma emergency department visits and hospitalizations. A potential weakness for this recommendation is that most patients do not see their assigned PCM when they have an appointment. However, this researcher would recommend that asthma patients only see their assigned PCM. This recommendation comes from the need for patients with chronic illness to receive consistent care from the same provider. A patient-provider team relationship can be established and facilitate ownership of the patients' health

status. Mutual ownership can significantly improve compliance among asthma patients.

This study provided solid quantitative data suggesting the need for a more comprehensive asthma management program at EACH. EACH was only 27 percent compliant with the "gold standard" for diagnosis of asthma, 62 percent compliant with prescribing controller medications, 18 percent compliant with providing asthma education, and 12 percent compliant with coordinating the development of an asthma action plan. EACH's partial compliance resulted in an emergency department visit rate of 101.32 per 10,000 enrolled beneficiaries at EACH for FY 2004, which was more than two times the HP2010 benchmark. Hospitalizations were 12.97 per 10,000 enrolled beneficiaries at EACH for FY 2004, which was almost twice the HP2010 benchmark. This study revealed that by complying with the asthma CPGs established by the NHLBI, EACH could reduce emergency department visits and hospitalizations for asthma by over 50 percent and up to 100 percent respectively. The reduction in emergency department visits and hospitalizations could potentially save EACH $411,162 annually in avoided costs.

Additionally, this study provides suggestions for improving the systems and processes to achieve more desirable outcomes for the asthmatics enrolled at EACH. Over the past two years, EACH has missed opportunities to avoid significant costs at almost .5

percent of its entire annual budget of $107 million. Cost savings for the organization can be attained through a minimal increase in current expenditures. Most of the cost savings comes from a shift in focus from past practices of diagnosing and managing asthmatics to current best-practices based on scientific evidence. The ultimate goal of any healthcare organization should be to provide the best care to its beneficiaries and improve their quality of life. Implementing the CPGs for asthma will accomplish those two goals, while also optimizing the use of hospital resources.

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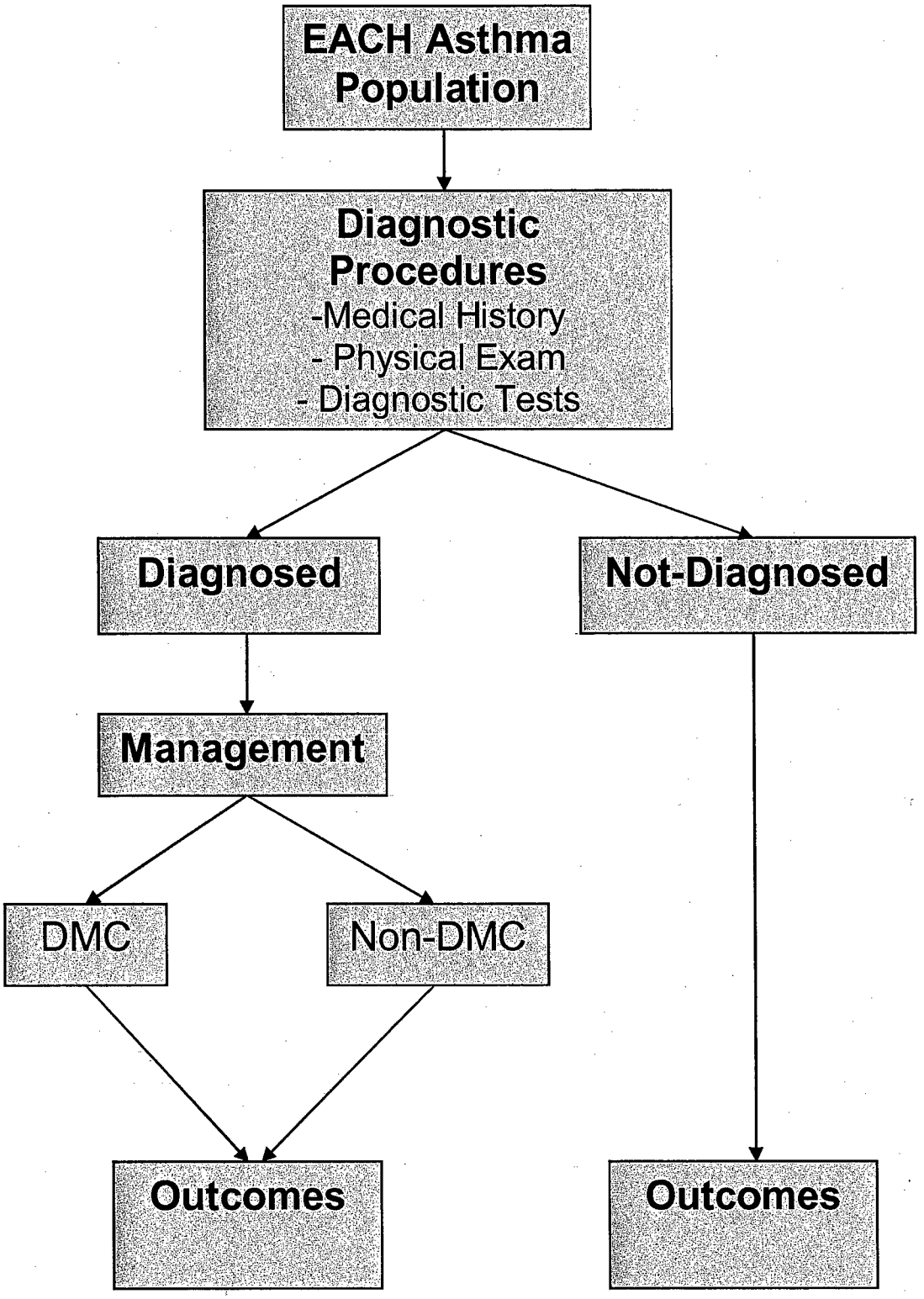
APPENDIX A. Model for Asthma Management Analysis



APPENDIX B. Outpatient Record Chart Audit Form

Patient Prefix and Last 4 _____

Diagnosis	Yes
Medical History	
Triggers	☐
Allergies	☐
Family History of Allergies	☐
Family History of Asthma	☐
Smoking History	☐
Physical Exam	
Wheezing	☐
Allergic Rhinitis	☐
Diagnostic Tests	
Pulmonary Function Test (baseline)	☐
Pre/Post-bronchodilator PFT	☐
CXR	☐
Methacholine	☐
Allergy Consult	☐
Coding Error	☐

Outcomes	
ER Visits in last FY	☐
Hospitalizations in last FY	☐
Bed Days	☐
Unit	☐
Lost School Days in last FY	☐
Lost Work Days in last FY	☐
Amount for Purchased Care	☐

Management	Yes
Severity Documented	☐
PFT every 12 months	☐
Controller Meds for Persistent Asthma	☐
Asthma Education	☐
Action Plan Established/Updated Q 12 mo.	☐
Flu Vaccine	☐
1 Preventive Appt in past year	☐
DMC Enrollee	
number of cancelled appointments in last FY	☐
number of no shows in last FY	☐
did not follow up with DMC	☐

APPENDIX C. Proposed MEDDAC Asthma Management Flowsheet

Evans Army Community Hospital
1650 Cochrane Circle
Fort Carson, Colorado 80921

Adult
Asthma Clinical Practice Guideline
Flowsheet

Diagnosis

History: Persistent dyspnea, chronic or episodic wheezing, cough and/or chest tightness, personal or family history of allergic or atopic dermatitis.
Physical: Wheezing, prolong expiration, decreased breath sounds, or may be normal between exacerbations.
PFT: Pre and Post – Bronchodilator spirometry must be done to confirm diagnosis. If normal and symptoms persist, exercise challenge and/or methacholine challenge may be done.

PFT completed. Date _____ (Repeat every year). Additional dates: _____
Evaluate Triggers. Circle those that apply: allergies, pets, smoking, GERD, cold, exercise, URIs. Skin testing should be done for patients with allergic symptoms.
Smoking cessation offered. Yes / No
Family History of Asthma / Allergies (circle those that apply).
EFMP needed. Yes / No
MEB needed. Yes / No
Influenza Vaccine. Date _____ (Repeat every year unless contraindicated).
Asthma Education (available in Disease Management Clinic). Date _____
Moderate to Severe Persistent Asthmatics should be referred to DMC.
CXR for first asthma attack. Date _____
Controller Medications Prescribed. List medications here: _____

Determine Classification

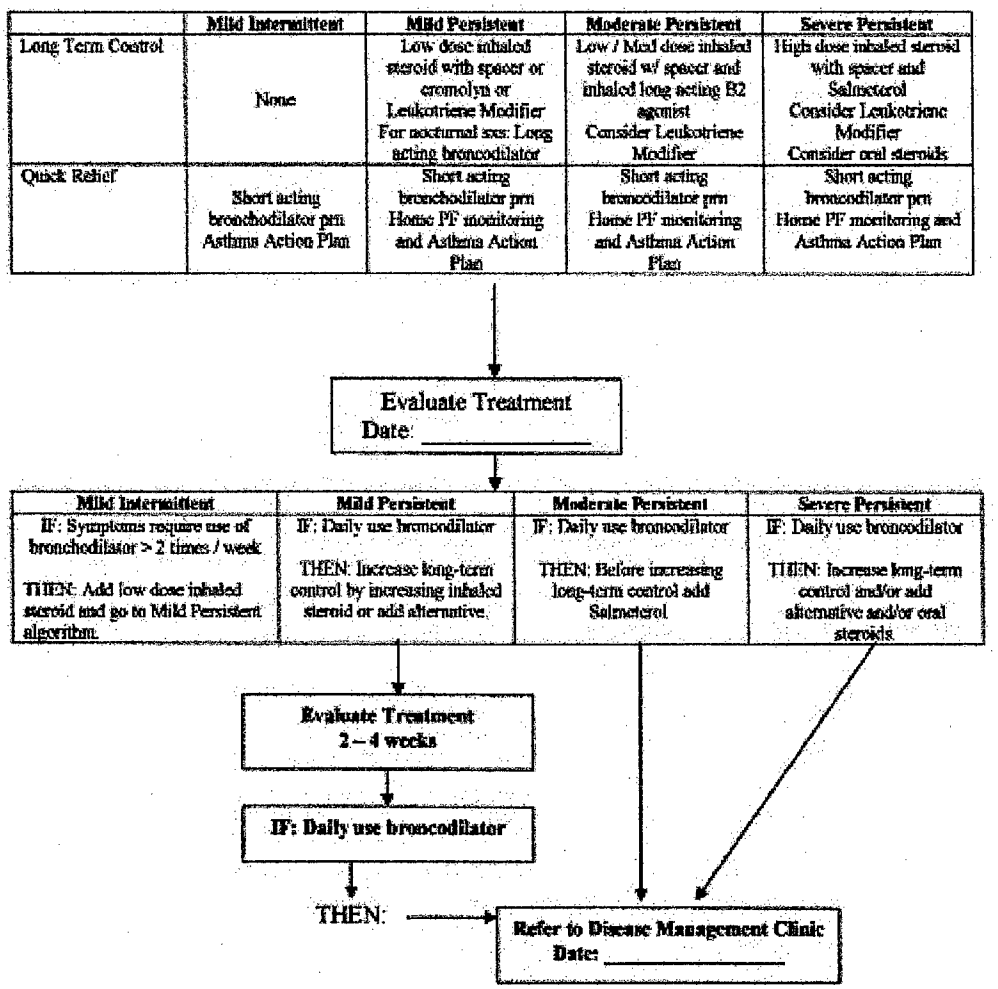
	Mild Intermittent	Mild Persistent	Moderate Persistent	Severe Persistent
Symptoms Day Night	0 – 2 / week < 2 nights / week	3 – 6 / week > 2 times / month	Daily > 1 night / week	Continuous
Exacerbations	Brief: hours - days	May affect activities	> 2 / week affect sleep or activities	Frequent
FEV1 / peak flow	> 80% of predicted	> 80% of predicted	60 – 80 % predicted	< 60% predicted
Peak flow variability	< 20%	20 – 30%	> 30%	> 30%
Other	Asymptomatic and normal PF between exacerbations		Daily use B2 agonist	Limited physical activity

Follow-up Appointment
Date: _____

Addressograph

MEDDAC Form _____

This practice guideline is adopted from the DOD/VA Clinical Practice Guidelines (based on the National Institute for Health CPGs) for the Diagnosis and Management of an Adult Asthmatic Dated April 1999.



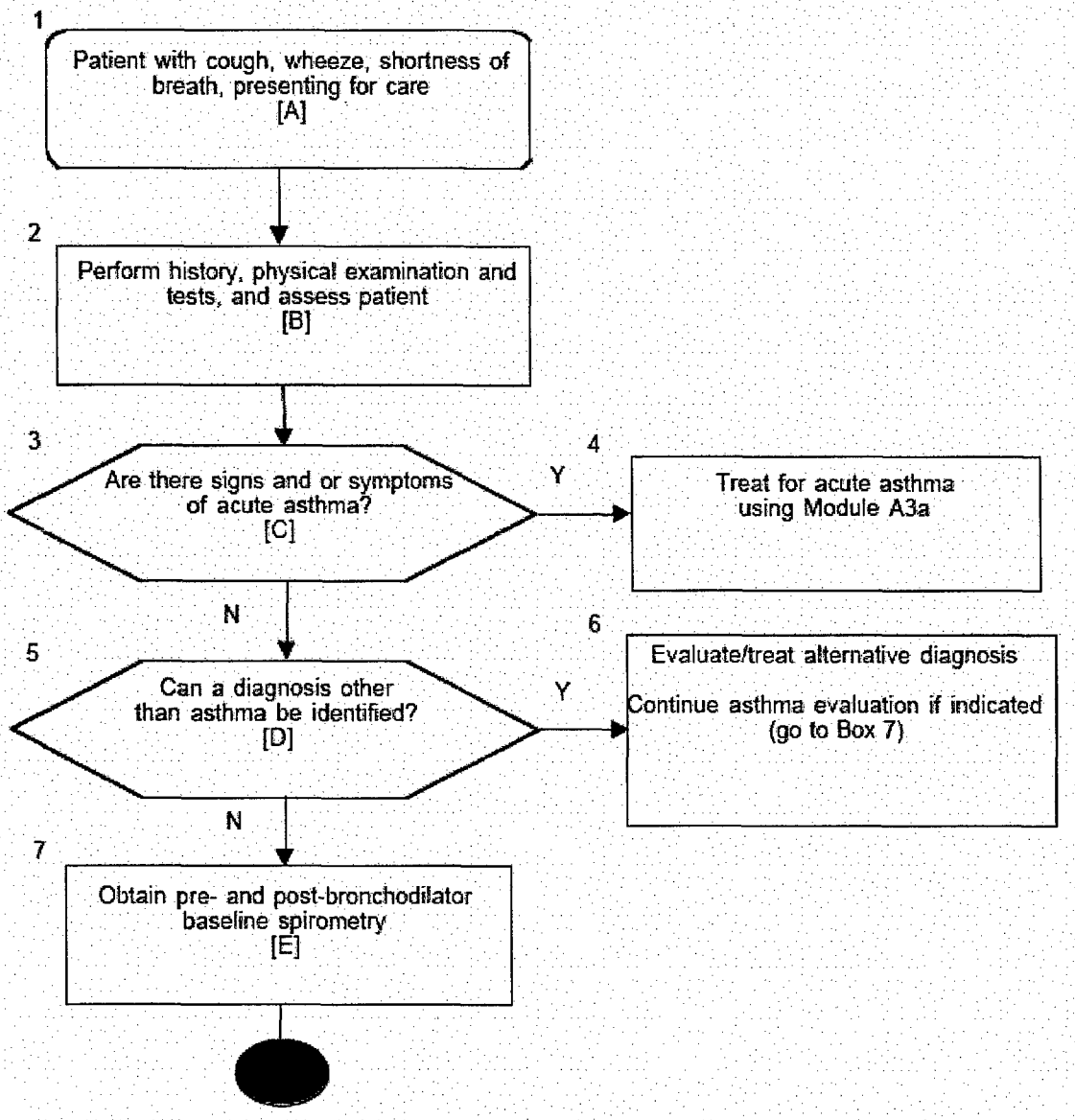
MEDDAC Form _____

This practice guideline is adopted from the DOD/VA Clinical Practice Guidelines (based on the National Institute for Health CPGs) for the Diagnosis and Management of an Adult Asthmatic Dated April 1999.

APPENDIX D. Adult Asthma Management Algorithm

Algorithm A1a: 1 of 3

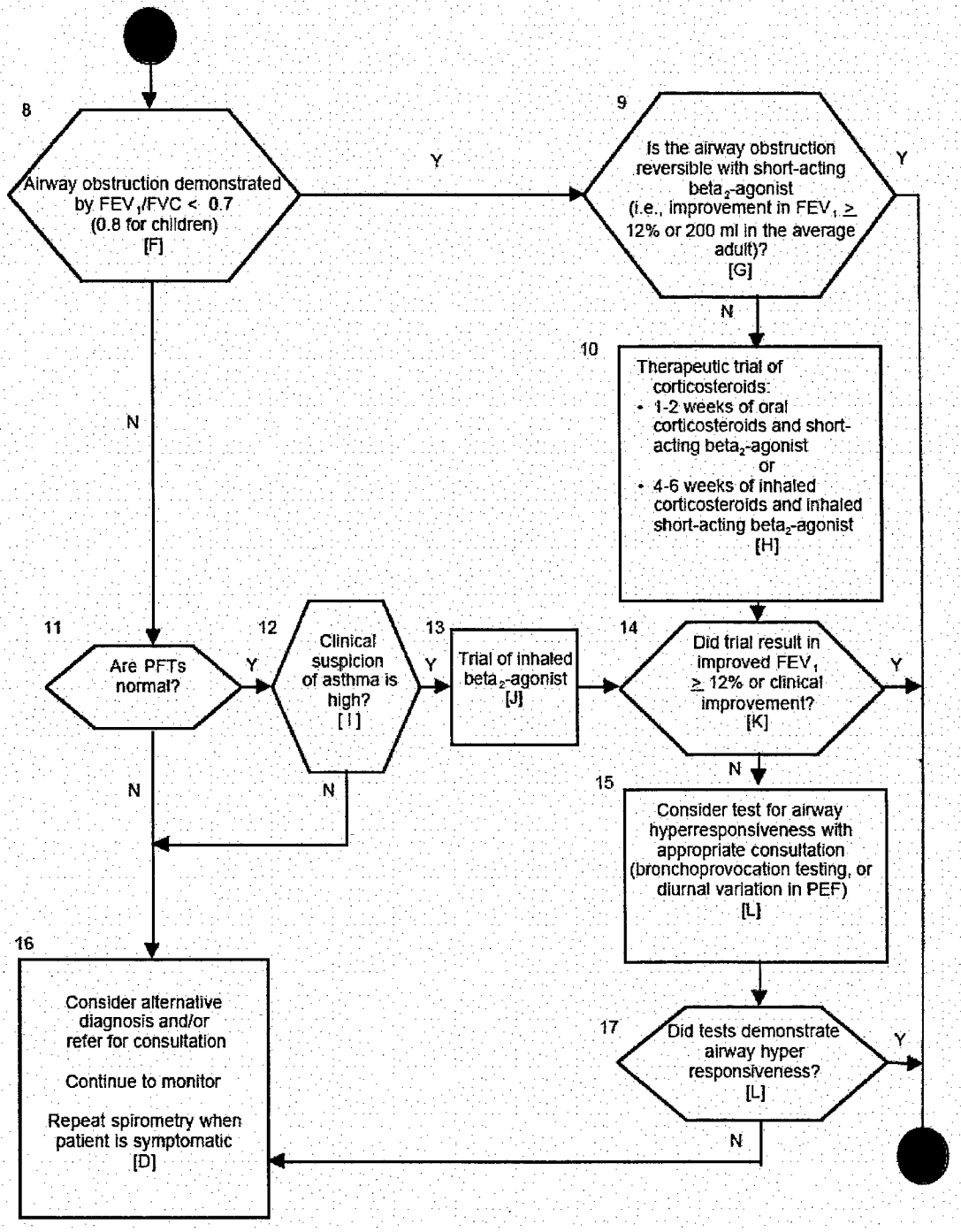
Asthma Diagnosis and Initial Management for Adults and Children Age 6 Years and Over



Source: Quality Management Directorate, United States Army MEDCOM & The Office of Quality and Performance, VHA, Washington, DC

Algorithm A1a: 2 of 3

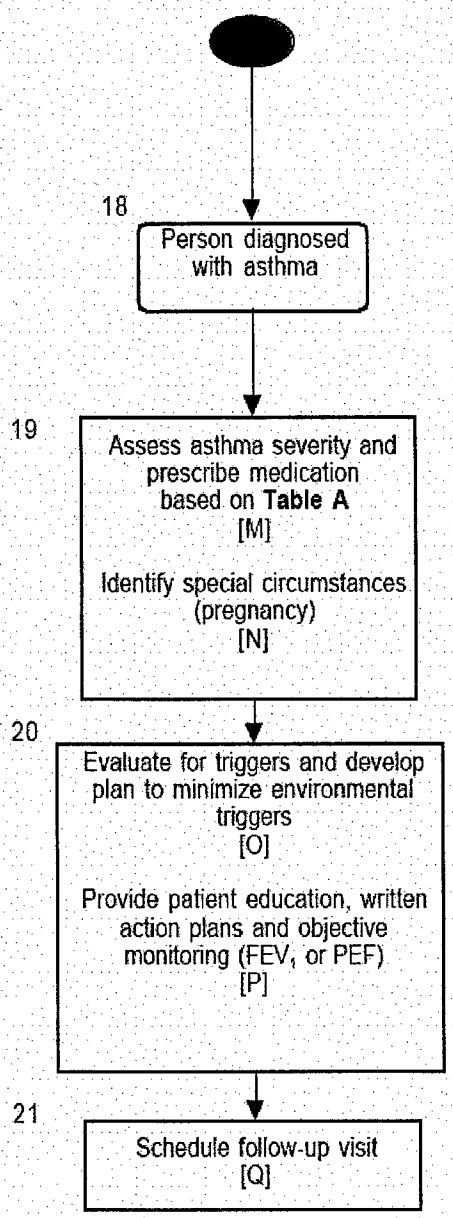
Asthma Diagnosis and Initial Management for Adults and Children Age 6 Years and Over



Source: Quality Management Directorate, United States Army MEDCOM & The Office of Quality and Performance, VHA, Washington, DC

Algorithm A1a: 3 of 3

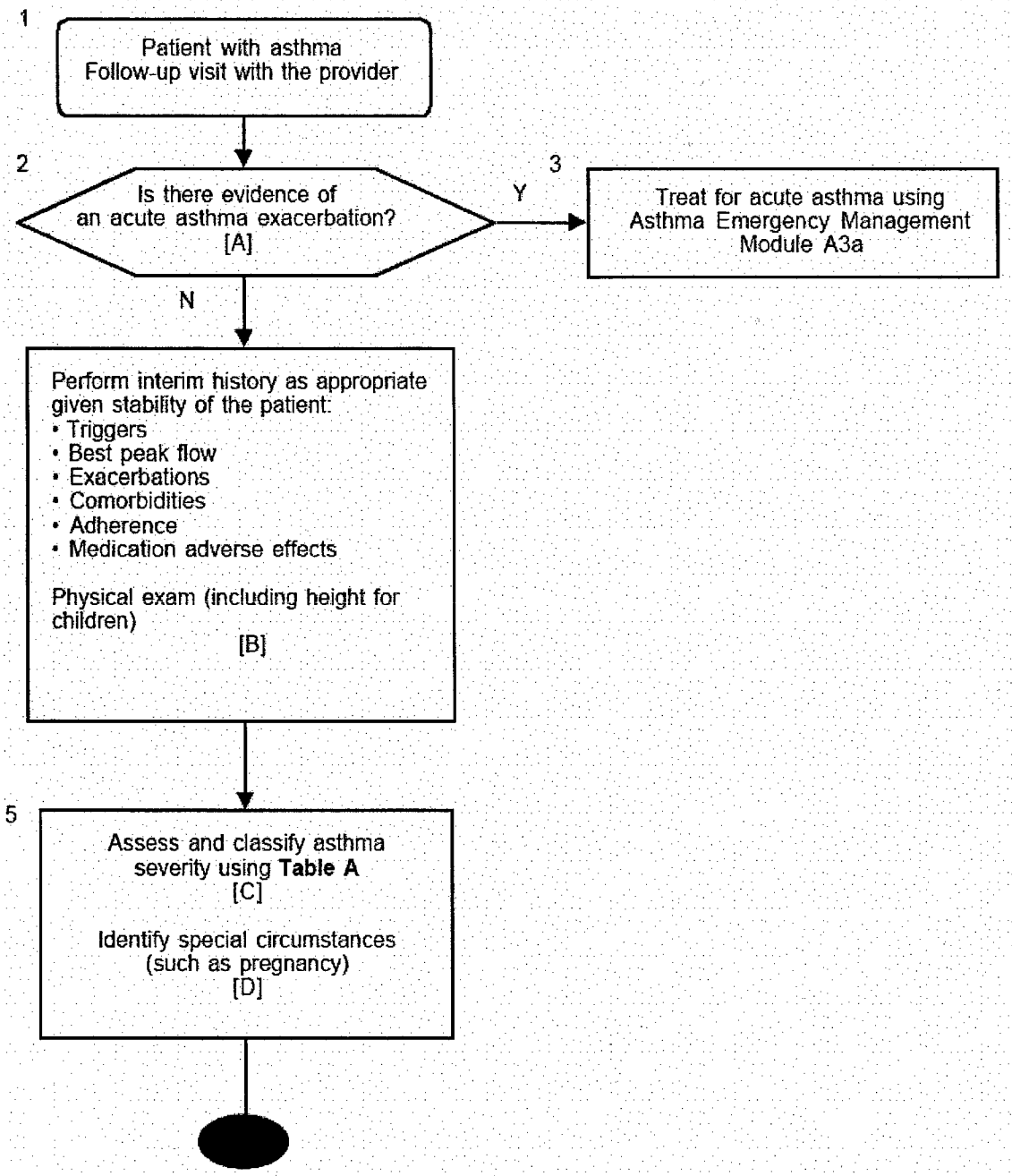
Asthma Diagnosis and Initial Management for Adults and Children Age 6 Years and Over



Source: Quality Management Directorate, United States Army MEDCOM & The Office of Quality and Performance, VHA, Washington, DC

Algorithm A2a: 1 of 3

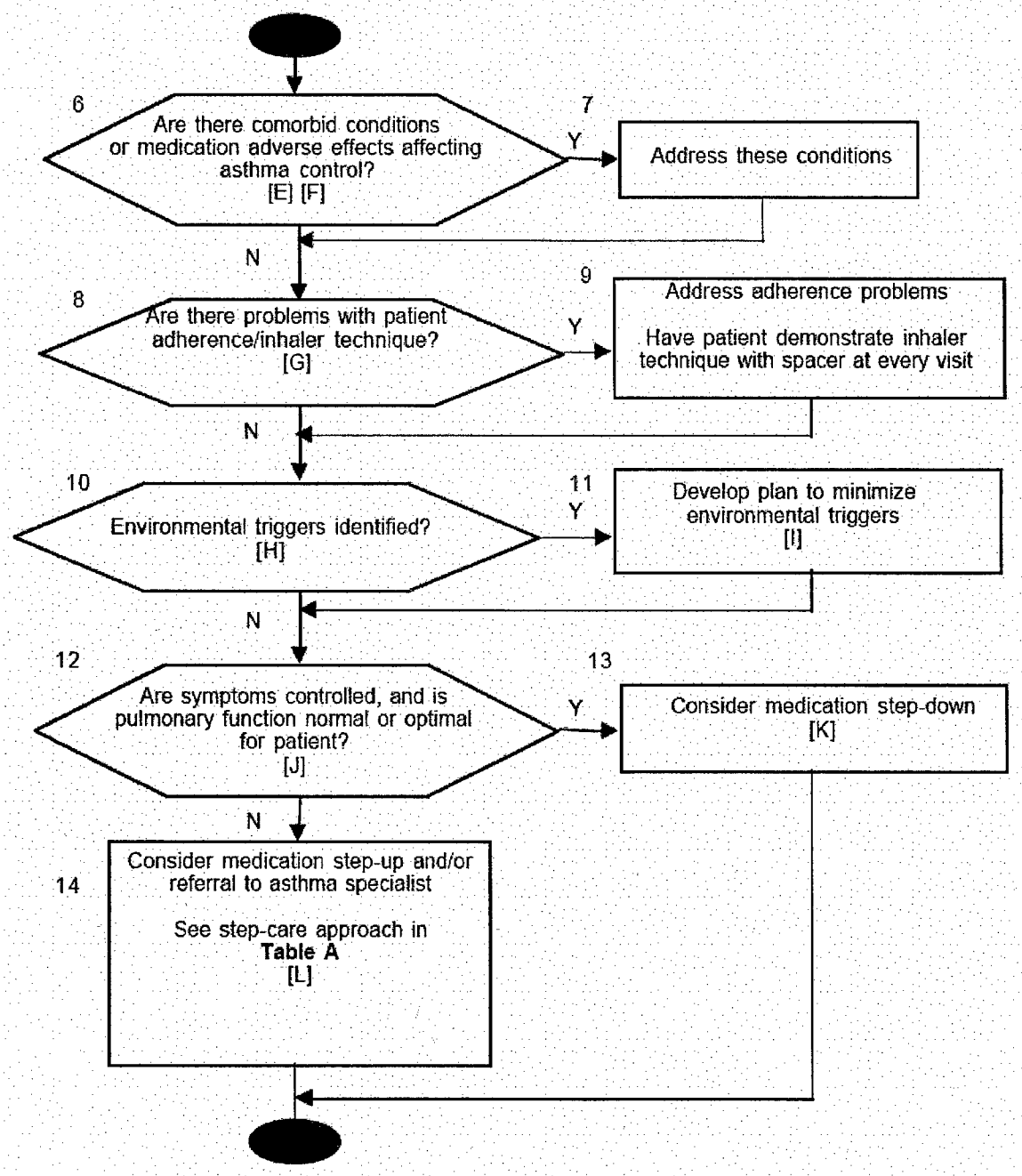
Asthma Treatment Follow-up Management for Adults and Children Age 6 Years and Over



Source: Quality Management Directorate, United States Army MEDCOM & The Office of Quality and Performance, VHA, Washington, DC

Algorithm A2a: 2 of 3

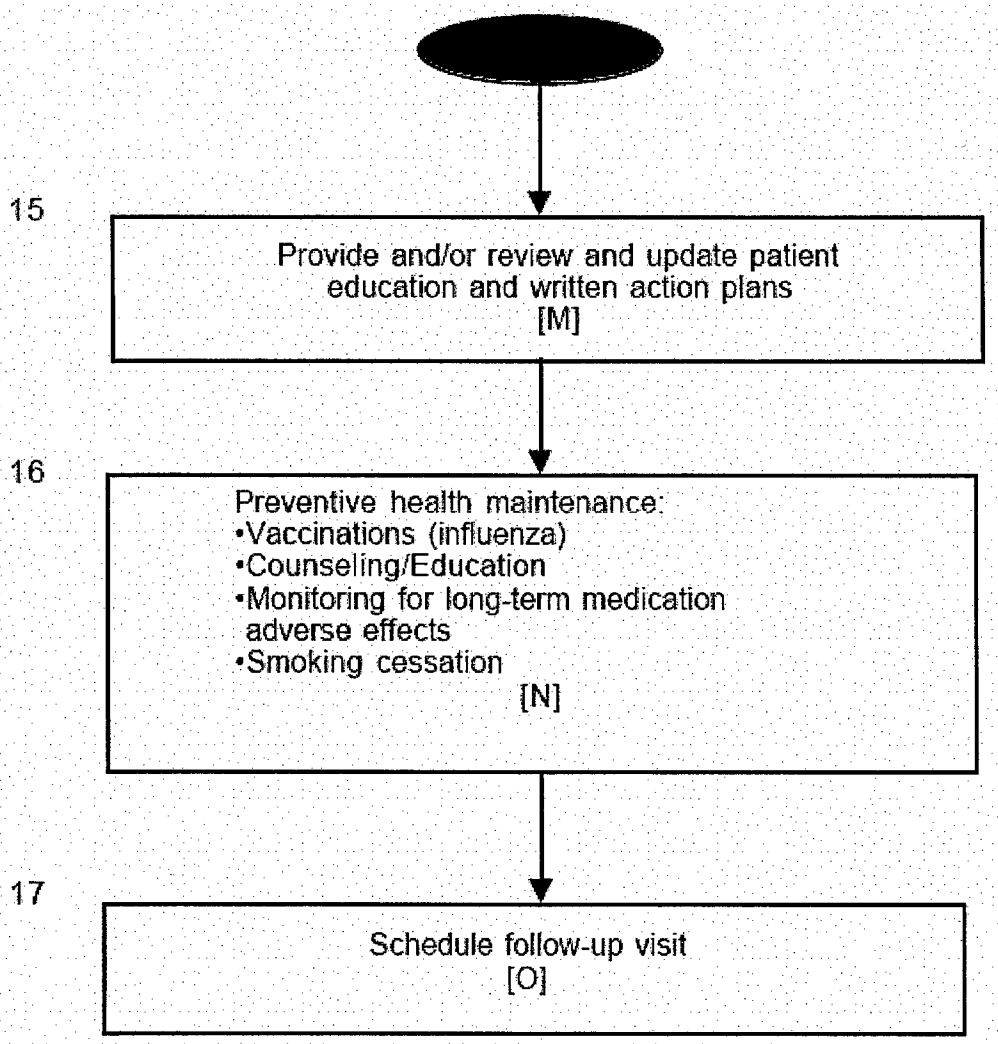
Asthma Treatment Follow-up Management for Adults and Children Age 6 Years and Over



Source: Quality Management Directorate, United States Army MEDCOM & The Office of Quality and Performance, VHA, Washington, DC

Algorithm A2a: 3 of 3

Asthma Treatment Follow-up Management for Adults and Children Age 6 Years and Over



Source: Quality Management Directorate, United States Army MEDCOM & The Office of Quality and Performance, VHA, Washington, DC

APPENDIX E. Outpatient Record Audit Data

Diagnosis

Chart Number	Triggers	Allergies	FHx Allergy	FHx Asthma	Smoking	Wheezing	Allergic Rhinitis	Baseline PFT	Pre/Post PFT	CXR	Methacholine	Allergy Consult
1	0	1	0	0	1	0	0	0	0	0	0	0
2	0	1	0	0	1	0	0	0	0	0	0	0
3	0	1	0	0	1	0	0	0	0	0	0	0
4	0	1	0	0	1	0	0	0	0	0	0	0
5	0	1	0	0	1	0	0	0	0	0	0	0
6	0	1	0	0	1	0	0	0	0	0	0	0
7	0	1	0	0	1	1	0	0	0	0	0	0
8	1	1	0	0	1	1	1	1	0	0	0	0
9	0	1	0	0	1	0	1	1	0	0	0	0
10	0	1	0	0	1	0	0	0	0	0	0	0
11	0	1	0	0	1	0	0	1	0	0	0	0
12	0	1	0	0	1	0	0	0	0	0	0	0
13	0	1	0	0	1	0	0	1	0	0	0	0
14	1	1	0	0	1	0	0	1	0	0	0	0
15	0	1	0	0	1	0	0	0	0	0	0	0
16	0	1	0	0	1	0	0	0	0	0	0	0
17	0	1	0	0	1	0	0	0	0	0	0	0
18	0	1	0	0	1	0	0	0	0	0	0	0
19	1	1	0	0	1	0	0	0	0	0	0	0
20	0	1	0	0	1	1	0	0	0	0	0	1
21	0	1	0	0	1	0	1	0	0	0	0	0
22	0	1	0	0	1	0	0	0	0	0	0	0
23	0	1	0	0	1	0	0	0	0	0	0	0
24	1	1	0	0	1	1	0	0	0	0	0	0
25	0	1	0	0	1	0	0	0	0	0	0	0
26	0	1	0	0	1	0	0	0	0	0	0	0
27	1	1	0	0	1	1	0	0	0	0	0	0
28	0	1	0	0	1	1	0	0	0	0	0	0
29	0	1	0	0	1	1	0	0	0	0	0	0
30	1	1	1	1	1	0	0	0	0	0	0	1
31	1	1	0	0	1	0	0	0	0	0	0	0
32	0	1	0	0	1	0	0	0	0	0	0	0
33	0	1	0	0	1	0	0	0	0	0	0	0
34	0	1	0	0	1	0	1	0	0	0	0	0
35	0	1	0	0	1	0	0	0	0	0	0	0
36	1	1	1	1	1	1	1	0	0	0	0	0
37	0	1	0	0	1	0	0	1	0	0	0	0
38	0	1	0	0	1	0	0	0	0	0	0	0
39	0	1	0	0	1	0	0	0	0	0	0	0
40	0	1	0	0	1	0	0	0	0	0	0	0
41	0	1	0	0	1	0	0	0	0	0	0	0
42	1	1	0	0	1	0	1	0	0	0	0	0
43	0	1	0	0	1	1	1	1	0	0	0	0
44	0	1	0	0	1	0	0	0	0	0	0	0
45	0	1	0	0	1	0	1	0	0	0	0	0
46	0	1	0	0	1	0	0	1	0	0	0	0
47	0	1	0	0	1	0	1	0	0	0	0	0
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117	0	1	0	0	1	0	0	0	0	0	0	0
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151	0	1	0	0	1	0	0	1	0	1	0	0
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157	0	1	0	0	1	1	1	1	0	0	0	1
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176	0	1	1	0	1	1	0	1	0	0	0	1
177	0	1	0	0	1	1	1	0	0	1	0	0
178	0	1	0	0	1	1	0	1	0	0	0	0
179	0	1	0	0	1	0	0	0	0	1	0	0
180	0	1	0	0	1	0	0	0	0	0	0	0
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192	0	1	0	0	1	0	1	1	0	0	0	1
193	0	1	0	0	1	0	0	0	0	0	0	0
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195	0	1	0	0	1	0	0	0	0	0	0	0
196	0	1	0	0	1	1	1	0	0	0	0	0
197	0	1	0	1	1	0	0	0	0	0	0	0
198	0	1	0	0	1	0	0	0	0	0	0	0
199	0	1	1	0	1	0	0	0	0	0	0	0
200	0	1	0	0	1	1	0	1	0	1	0	1
201	0	1	0	0	0	0	0	0	0	0	0	0
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203	0	1	0	0	1	1	0	0	0	1	0	0
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242	0	1	0	1	1	1	0	0	0	1	0	0
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307	1	1	0	0	1	1	1	1	1	1	0	0
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312	0	1	0	1	0	1	0	0	1	1	0	0
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314	1	1	1	0	1	1	1	0	0	1	0	0
315	1	1	0	1	1	1	1	1	0	1	0	0
316	1	1	0	0	1	1	1	0	0	0	0	0
Totals	**83**	**316**	**13**	**35**	**306**	**136**	**94**	**81**	**71**	**37**	**2**	**57**

Management

Chart Number	Severity	PFT Q12 months	Controllers	Education	Action Plan	Flu Vaccine	Prev. Appt QYR	DMC
1	0	0	0	0	0	0	0	0
2	0	0	0	0	0	0	0	0
3	0	0	0	0	0	0	0	0
4	0	0	0	0	0	0	0	0
5	0	0	0	0	0	0	0	0
6	0	0	0	0	0	0	0	0
7	0	0	0	0	0	0	0	0
8	1	0	1	0	0	0	0	0
9	0	0	0	0	0	0	0	0
10	0	0	0	0	0	0	0	0
11	1	0	1	1	0	0	0	0
12	0	0	0	0	0	0	0	1
13	0	0	0	0	0	0	0	0
14	1	0	1	0	0	0	0	0
15	0	0	0	0	0	0	0	0
16	0	0	0	0	0	0	0	0
17	0	0	0	0	0	0	0	0
18	0	0	0	0	0	0	0	0
19	0	0	1	0	0	0	0	0
20	0	0	1	0	0	0	0	0
21	0	0	0	1	0	0	0	0
22	0	0	1	0	0	0	0	0
23	0	0	0	0	0	0	0	0
24	1	0	1	1	0	0	0	0
25	0	0	1	0	0	0	0	0
26	0	0	0	0	0	0	0	0
27	0	0	0	1	0	0	0	0
28	1	0	1	0	1	0	0	0
29	0	0	0	0	0	0	0	0
30	1	0	1	1	0	0	0	0
31	0	0	0	0	0	0	0	0
32	0	0	1	1	0	0	0	0
33	0	0	1	1	0	1	1	0
34	0	0	0	0	0	0	0	0
35	0	0	0	0	0	0	0	0
36	1	0	1	0	0	0	0	0
37	0	0	1	1	0	0	0	0
38	0	0	0	0	0	0	0	0
39	0	0	0	0	0	0	0	0
40	0	0	0	0	0	0	0	0
41	0	0	0	0	0	0	0	0
42	0	0	0	0	0	0	0	0
43	0	0	1	0	0	0	0	0
44	0	0	0	0	0	0	0	0
45	0	0	1	0	0	0	0	0
46	0	0	0	0	0	0	0	0
47	0	0	1	0	0	1	0	0
48	0	0	0	0	0	0	0	0
49	0	0	0	0	0	0	0	0

50	0	0	1	0	0	0	0	0
51	0	0	0	0	0	0	0	0
52	0	0	0	0	0	0	0	0
53	0	0	0	0	0	0	0	0
54	1	0	1	0	1	0	0	1
55	0	0	1	0	0	0	0	0
56	0	0	0	0	0	1	0	0
57	0	0	1	1	0	0	0	0
58	0	0	0	0	0	0	0	0
59	0	0	0	0	0	0	0	0
60	0	0	1	0	0	0	0	0
61	0	0	0	0	0	0	0	0
62	0	0	0	0	0	0	0	0
63	1	0	1	0	0	0	0	0
64	0	0	0	0	0	0	0	0
65	0	0	0	0	0	0	0	0
66	1	0	0	0	0	0	0	0
67	1	0	1	0	0	0	0	0
68	0	0	0	0	0	0	0	0
69	0	0	0	0	0	0	0	0
70	0	0	0	0	0	0	0	0
71	0	0	0	0	0	0	0	0
72	0	0	0	0	0	0	0	0
73	0	0	1	0	0	0	0	0
74	0	0	1	0	0	0	0	0
75	0	0	0	0	0	0	0	0
76	0	0	0	0	0	0	0	0
77	0	0	0	0	0	0	0	0
78	0	0	0	0	0	0	0	1
79	0	0	0	0	0	0	0	0
80	0	0	0	0	0	0	0	1
81	0	0	0	0	0	0	0	0
82	0	0	0	0	0	0	0	0
83	0	0	0	0	0	0	0	0
84	0	0	0	0	0	0	0	0
85	0	0	0	0	0	0	0	0
86	0	0	1	0	0	0	0	0
87	0	0	0	0	0	0	0	0
88	0	0	0	0	0	0	0	0
89	0	0	0	0	0	0	0	0
90	0	0	0	1	0	1	0	1
91	0	0	0	0	0	0	0	0
92	0	0	0	0	0	0	0	0
93	0	0	0	0	0	0	0	0
94	0	0	0	0	0	0	0	0
95	0	0	0	0	0	0	0	0
96	0	0	0	0	0	0	0	0
97	0	0	0	0	0	0	0	0
98	0	0	0	0	0	0	0	0
99	0	0	0	0	0	0	0	0
100	0	0	0	0	0	0	0	0
101	0	0	0	0	0	0	0	0
102	0	0	1	1	1	0	0	0
103	0	0	1	0	0	0	0	0

104	1	0	1	1	1	0	1	0
105	0	0	1	1	1	0	0	0
106	0	0	0	0	0	0	0	0
107	0	0	1	1	1	0	0	0
108	0	0	1	0	0	0	0	0
109	1	0	1	0	0	0	1	0
110	0	0	0	0	0	0	1	0
111	0	0	0	0	0	0	0	0
112	0	0	1	0	0	0	0	0
113	1	0	1	1	1	0	0	1
114	0	0	1	0	0	1	0	0
115	0	0	0	0	0	0	0	1
116	0	0	0	0	0	0	0	0
117	0	0	0	0	0	0	0	0
118	0	0	1	0	0	0	0	0
119	0	0	0	0	0	0	0	0
120	0	0	1	0	0	0	0	0
121	0	0	0	0	0	0	0	0
122	0	0	0	0	0	0	0	0
123	1	0	1	0	0	0	0	0
124	0	0	1	1	1	0	0	0
125	1	0	1	1	1	0	0	1
126	1	0	1	1	1	0	0	0
127	0	0	1	0	0	0	0	0
128	0	0	0	0	0	0	0	0
129	0	0	1	0	0	0	0	0
130	1	0	1	0	1	0	0	0
131	0	0	1	0	1	0	0	0
132	0	0	1	1	0	0	0	0
133	0	0	0	0	0	0	0	0
134	0	0	0	0	0	0	0	0
135	0	0	1	0	0	0	0	0
136	1	0	1	1	1	0	1	0
137	0	0	0	0	0	0	1	0
138	0	0	0	0	0	0	0	0
139	0	0	1	0	0	0	0	0
140	0	0	0	0	0	0	0	0
141	0	0	0	0	0	0	0	0
142	0	0	1	0	0	0	0	0
143	0	0	0	0	0	0	0	0
144	0	0	1	0	0	0	0	0
145	0	0	1	0	0	0	0	0
146	0	0	1	0	0	0	0	0
147	0	0	0	0	0	0	0	0
148	0	0	0	0	0	0	0	0
149	0	0	0	0	0	0	0	0
150	0	0	0	0	0	0	0	0
151	0	0	1	0	0	0	0	0
152	0	0	0	0	0	0	0	0
153	0	0	0	0	0	0	0	0
154	0	0	1	0	0	0	0	0
155	1	0	1	0	1	0	0	0
156	0	0	0	0	0	0	0	0
157	1	0	1	0	0	0	0	0

158	1	0	1	0	0	0	0	0
159	0	0	1	0	0	0	0	0
160	0	0	1	0	0	0	0	0
161	0	0	1	0	0	0	0	0
162	0	0	0	0	0	0	0	0
163	0	0	0	0	0	0	0	0
164	0	0	0	0	0	0	0	0
165	0	0	1	0	0	0	0	0
166	0	0	1	0	0	1	0	0
167	0	0	1	0	0	0	0	0
168	0	0	0	0	0	0	0	0
169	0	0	0	0	0	0	0	0
170	0	0	1	0	0	0	0	0
171	0	0	0	0	0	0	0	0
172	0	0	0	0	0	0	0	0
173	0	0	0	0	0	0	0	1
174	1	0	1	0	0	0	0	0
175	1	0	0	0	0	0	0	0
176	0	0	1	0	0	1	0	0
177	0	0	1	0	0	0	0	0
178	0	0	1	0	0	0	0	0
179	1	0	1	0	0	0	0	0
180	0	0	0	0	0	0	0	0
181	1	0	0	0	0	0	0	1
182	0	0	0	0	0	0	0	0
183	0	0	0	0	0	0	0	0
184	0	0	0	0	0	0	0	0
185	0	0	1	0	0	0	0	0
186	0	0	1	0	0	0	0	0
187	1	0	0	0	0	0	0	0
188	0	0	0	0	0	0	0	0
189	0	0	1	0	0	0	0	0
190	0	0	0	0	0	0	0	0
191	0	0	0	0	0	0	0	0
192	0	0	0	0	0	0	0	0
193	0	0	1	0	0	0	0	0
194	0	0	0	0	0	0	0	0
195	0	0	0	0	0	0	0	0
196	0	0	0	0	0	0	0	0
197	0	0	0	0	0	0	0	0
198	0	0	0	0	0	0	0	0
199	1	0	0	0	0	0	0	0
200	0	0	1	0	0	0	0	0
201	0	0	0	0	0	0	0	0
202	0	0	0	0	0	0	0	0
203	0	0	1	0	0	0	0	0
204	0	0	1	0	0	0	0	0
205	0	0	1	0	0	0	0	0
206	0	0	1	0	0	0	0	0
207	1	0	1	0	0	0	0	0
208	0	0	0	0	0	0	0	0
209	0	0	0	0	0	0	0	0
210	0	0	0	0	0	0	0	0
211	1	0	1	0	0	0	0	0

212	0	0	0	0	0	0	0	0
213	1	0	1	0	0	0	0	0
214	1	0	1	0	1	0	1	0
215	0	0	1	0	0	0	0	0
216	1	0	1	1	1	0	0	0
217	0	0	1	0	0	0	0	0
218	0	0	1	0	0	0	0	0
219	0	0	1	0	0	0	0	0
220	0	0	1	0	0	1	0	0
221	0	0	0	0	0	0	0	0
222	1	0	1	0	0	1	0	0
223	1	0	1	0	0	1	0	0
224	0	0	0	0	0	0	0	0
225	0	0	1	0	0	0	0	0
226	1	0	0	0	0	1	0	0
227	1	0	1	0	0	0	0	0
228	0	0	0	0	0	1	0	0
229	0	0	0	0	0	1	0	0
230	1	0	1	0	0	0	0	0
231	1	0	1	0	0	0	0	0
232	1	0	1	0	1	1	0	1
233	1	0	1	0	0	1	0	0
234	0	0	1	0	0	0	0	0
235	0	0	0	0	0	0	0	0
236	1	0	0	0	0	0	0	0
237	1	0	1	0	0	0	0	0
238	0	0	1	0	0	0	0	0
239	0	0	0	0	0	0	0	0
240	0	0	1	0	0	0	0	0
241	1	0	1	0	0	0	0	0
242	0	0	0	0	0	0	0	0
243	1	1	0	1	0	0	1	1
244	0	0	0	0	0	0	0	0
245	1	0	1	1	0	0	1	0
246	0	0	1	0	0	0	0	0
247	1	0	1	0	0	0	0	0
248	1	1	1	0	0	0	1	0
249	1	0	1	0	0	0	0	0
250	1	1	1	0	0	0	1	0
251	0	0	1	0	0	0	0	0
252	1	0	1	1	1	0	0	1
253	1	1	0	1	1	0	1	1
254	0	0	1	0	0	0	0	0
255	0	0	0	0	0	0	0	0
256	0	0	0	0	0	0	0	0
257	1	0	1	0	0	0	0	0
258	0	0	1	0	0	0	0	0
259	0	1	1	1	0	0	1	0
260	0	0	1	0	0	0	0	0
261	0	0	1	0	0	0	0	0
262	0	0	0	0	0	0	0	0
263	0	0	0	0	0	0	0	0
264	0	0	0	0	0	0	0	0
265	1	1	1	1	0	0	1	0

266	0	0	0	0	0	0	0	0
267	0	0	0	0	0	0	0	0
268	1	0	1	1	1	0	0	1
269	0	0	1	0	0	0	0	0
270	1	0	1	0	0	0	0	0
271	0	0	1	1	1	0	0	0
272	1	0	1	1	1	0	0	0
273	1	0	1	0	0	0	0	0
274	0	0	1	0	0	0	0	0
275	0	0	1	1	1	0	0	0
276	0	0	1	1	1	0	0	0
277	0	0	1	1	1	0	0	0
278	0	0	1	0	0	0	0	0
279	1	0	1	1	0	1	0	0
280	1	0	1	1	1	0	1	1
281	0	0	1	0	0	0	0	0
282	1	1	1	1	1	0	1	0
283	1	0	1	1	0	1	1	1
284	0	0	0	0	0	0	0	0
285	0	0	1	0	0	0	0	0
286	0	0	1	0	0	0	0	0
287	1	0	1	1	0	0	0	0
288	1	0	1	0	0	0	0	0
289	1	1	1	1	0	0	0	0
290	1	0	1	1	1	0	1	1
291	1	0	0	0	0	0	1	0
292	1	0	1	1	0	0	0	0
293	0	0	1	0	0	0	0	0
294	1	0	1	0	0	1	0	0
295	1	1	1	1	0	1	0	0
296	1	0	1	0	0	0	0	0
297	0	0	1	0	0	0	0	0
298	0	0	0	0	0	1	0	0
299	1	1	1	1	1	1	1	0
300	1	0	1	1	1	1	0	0
301	1	0	1	0	0	1	0	0
302	1	0	1	0	0	0	0	0
303	0	0	1	0	0	1	0	0
304	1	0	1	0	0	0	0	0
305	1	0	1	1	0	0	0	0
306	1	1	1	0	0	1	0	1
307	1	1	1	0	0	0	0	0
308	1	0	1	0	0	0	0	0
309	1	1	1	0	0	1	0	0
310	1	1	1	0	1	1	1	1
311	0	0	1	0	0	1	0	0
312	1	0	1	1	0	0	0	0
313	1	1	1	1	1	1	1	1
314	1	0	1	0	0	0	0	0
315	1	0	1	1	1	0	0	0
316	1	0	1	0	0	0	0	0
Totals	**87**	**15**	**165**	**48**	**33**	**29**	**22**	**21**

Outcomes

Chart Number	ER Visits	Hospitalizations	Bed Days	Unit	Direct Care ($)	Purchased Care ($)
1	0	0	0	0	0	0
2	0	0	0	0	0	0
3	0	0	0	0	0	0
4	0	0	0	0	0	0
5	0	0	0	0	0	0
6	1	0	0	0	232.41	0
7	0	0	0	0	0	0
8	0	0	0	0	0	0
9	0	0	0	0	0	0
10	0	0	0	0	0	0
11	0	0	0	0	0	0
12	0	0	0	0	0	0
13	0	0	0	0	0	0
14	0	0	0	0	0	0
15	0	0	0	0	0	0
16	0	0	0	0	0	0
17	0	0	0	0	0	0
18	0	0	0	0	0	0
19	0	0	0	0	0	0
20	0	0	0	0	0	0
21	2	0	0	0	342	0
22	0	0	0	0	0	0
23	0	0	0	0	0	0
24	0	0	0	0	0	0
25	0	0	0	0	0	0
26	0	0	0	0	0	0
27	3	1	3	5E	4030.61	884.25
28	0	0	0	0	0	0
29	0	0	0	0	0	0
30	0	0	0	0	0	0
31	0	0	0	0	0	0
32	0	0	0	0	0	0
33	1	1	1	CH	0	3490.48
34	2	0	0	0	0	423.31
35	0	0	0	0	0	0
36	1	0	0	0	232.41	0
37	0	0	0	0	0	0
38	0	0	0	0	0	0
39	0	0	0	0	0	0
40	0	0	0	0	0	0
41	0	0	0	0	0	0
42	0	0	0	0	0	0
43	1	0	0	0	245.59	0

44	0	0	0	0	0	0
45	1	0	0	0	0	209.16
46	0	0	0	0	0	0
47	0	0	0	0	0	0
48	0	0	0	0	0	0
49	0	0	0	0	0	0
50	0	0	0	0	0	0
51	0	0	0	0	0	0
52	0	0	0	0	0	0
53	0	0	0	0	0	0
54	0	0	0	0	0	0
55	0	0	0	0	0	0
56	0	0	0	0	0	0
57	0	0	0	0	0	0
58	0	0	0	0	0	0
59	0	0	0	0	0	0
60	0	0	0	0	0	0
61	0	0	0	0	0	0
62	0	0	0	0	0	0
63	0	0	0	0	0	0
64	1	0	0	0	232.1	0
65	0	0	0	0	0	0
66	0	0	0	0	0	0
67	0	0	0	0	0	0
68	0	0	0	0	0	0
69	0	0	0	0	0	0
70	0	0	0	0	0	0
71	0	0	0	0	0	0
72	0	0	0	0	0	0
73	0	0	0	0	0	0
74	0	0	0	0	0	0
75	0	0	0	0	0	0
76	0	0	0	0	0	0
77	0	0	0	0	0	0
78	0	0	0	0	0	0
79	0	0	0	0	0	0
80	3	0	0	0	618.36	0
81	0	0	0	0	0	0
82	1	0	0	0	245.59	0
83	0	0	0	0	0	0
84	1	0	0	0	232.41	0
85	0	0	0	0	0	0
86	4	0	0	0	1470.91	0
87	0	0	0	0	0	0
88	0	0	0	0	0	0
89	1	0	0	0	218.92	0
90	1	0	0	0	218.92	0
91	1	0	0	0	218.92	0

92	1	0	0	0	330.59	0
93	4	0	0	0	245.59	178.75
94	0	0	0	0	0	0
95	0	0	0	0	0	0
96	0	0	0	0	0	0
97	0	0	0	0	0	0
98	0	0	0	0	0	0
99	0	0	0	0	0	0
100	0	0	0	0	0	0
101	0	0	0	0	0	0
102	0	0	0	0	0	0
103	1	0	0	0	290.5	0
104	0	0	0	0	0	0
105	0	0	0	0	0	0
106	0	0	0	0	0	0
107	0	0	0	0	0	0
108	0	0	0	0	0	0
109	0	0	0	0	0	0
110	0	0	0	0	0	0
111	0	0	0	0	0	0
112	0	0	0	0	0	0
113	3	0	0	0	235.52	1233.09
114	0	0	0	0	0	0
115	1	0	0	0	111.79	0
116	0	0	0	0	0	0
117	0	0	0	0	0	0
118	0	0	0	0	0	0
119	0	0	0	0	0	0
120	1	0	0	0	179.34	0
121	0	0	0	0	0	0
122	0	0	0	0	0	0
123	0	0	0	0	0	0
124	0	0	0	0	0	0
125	0	0	0	0	0	0
126	0	0	0	0	0	0
127	1	0	0	0	257.21	0
128	0	0	0	0	0	0
129	0	0	0	0	0	0
130	3	0	0	0	622.36	0
131	0	0	0	0	0	0
132	0	0	0	0	0	0
133	0	0	0	0	0	0
134	0	0	0	0	0	0
135	0	0	0	0	0	0
136	1	0	0	0	247.14	0
137	0	0	0	0	0	0
138	0	0	0	0	0	0
139	0	0	0	0	0	0

140	0	0	0	0	0	0
141	0	0	0	0	0	0
142	0	0	0	0	0	0
143	1	0	0	0	218.92	0
144	0	0	0	0	0	0
145	0	0	0	0	0	0
146	1	0	0	0	0	109.29
147	0	0	0	0	0	0
148	0	0	0	0	0	0
149	0	0	0	0	0	0
150	0	0	0	0	0	0
151	0	0	0	0	0	0
152	0	0	0	0	0	0
153	0	0	0	0	0	0
154	0	0	0	0	0	0
155	0	0	0	0	0	0
156	0	0	0	0	0	0
157	0	0	0	0	0	0
158	5	0	0	0	920.68	0
159	0	0	0	0	0	0
160	0	0	0	0	0	0
161	0	0	0	0	0	0
162	0	0	0	0	0	0
163	0	0	0	0	0	0
164	0	0	0	0	0	0
165	1	0	0	0	248.7	0
166	0	0	0	0	0	0
167	0	0	0	0	0	0
168	0	0	0	0	0	0
169	0	0	0	0	0	0
170	0	0	0	0	0	0
171	0	1	1	5E	3390.63	0
172	0	0	0	0	0	0
173	1	0	0	0	111.79	0
174	1	0	0	0	0	115.00
175	0	0	0	0	0	0
176	0	0	0	0	0	0
177	0	0	0	0	0	0
178	0	0	0	0	0	0
179	0	0	0	0	0	0
180	0	0	0	0	0	0
181	0	0	0	0	0	0
182	1	0	0	0	123.08	0
183	0	0	0	0	0	0
184	0	0	0	0	0	0
185	0	0	0	0	0	0
186	0	0	0	0	0	0
187	0	0	0	0	0	0

188	0	0	0	0	0	0
189	0	0	0	0	0	0
190	0	0	0	0	0	0
191	0	0	0	0	0	0
192	0	0	0	0	0	0
193	0	0	0	0	0	0
194	0	0	0	0	0	0
195	0	0	0	0	0	0
196	0	0	0	0	0	0
197	0	0	0	0	0	0
198	0	0	0	0	0	0
199	0	0	0	0	0	0
200	0	0	0	0	0	0
201	0	0	0	0	0	0
202	0	0	0	0	0	0
203	2	0	0	0	524.06	0
204	1	0	0	0	190.07	0
205	0	0	0	0	0	0
206	0	0	0	0	0	0
207	0	0	0	0	0	0
208	1	0	0	0	111.79	0
209	0	0	0	0	0	0
210	1	0	0	0	218.92	0
211	1	0	0	0	245.59	0
212	1	0	0	0	182.55	0
213	0	0	0	0	0	0
214	0	0	0	0	0	0
215	0	0	0	0	0	0
216	0	0	0	0	0	0
217	0	0	0	0	0	0
218	0	0	0	0	0	0
219	0	0	0	0	0	0
220	0	0	0	0	0	0
221	0	0	0	0	0	0
222	0	0	0	0	0	0
223	0	0	0	0	0	0
224	0	0	0	0	0	0
225	0	0	0	0	0	0
226	1	0	0	0	245.59	0
227	0	0	0	0	0	0
228	0	0	0	0	0	0
229	0	0	0	0	0	0
230	0	0	0	0	0	0
231	4	0	0	0	708.54	146.97
232	9	0	0	0	1922.78	0
233	2	1	1	5E	2885.74	0
234	1	0	0	0	244.03	0
235	0	0	0	0	0	0

236	1	1	0	CH	207.63	560.00
237	2	0	0	0	244.03	1270.42
238	1	0	0	0	218.92	0
239	0	0	0	0	0	0
240	2	0	0	0	433.09	0
241	0	0	0	0	0	0
242	2	0	0	0	478	0
243	1	0	0	0	218.92	0
244	0	0	0	0	0	0
245	0	0	0	0	0	0
246	1	0	0	0	207.63	0
247	1	0	0	0	135.78	0
248	0	0	0	0	0	0
249	1	0	0	0	124.97	0
250	0	0	0	0	0	0
251	0	0	0	0	0	0
252	0	0	0	0	0	0
253	0	0	0	0	0	0
254	0	0	0	0	0	0
255	0	0	0	0	0	0
256	0	0	0	0	0	0
257	0	0	0	0	0	0
258	0	0	0	0	0	0
259	0	0	0	0	0	0
260	0	0	0	0	0	0
261	2	0	0	0	257.21	658.10
262	0	0	0	0	0	0
263	0	0	0	0	0	0
264	1	0	0	0	186.98	0
265	0	0	0	0	0	0
266	0	0	0	0	0	0
267	0	0	0	0	0	0
268	1	0	0	0	97.62	0
269	0	0	0	0	0	0
270	0	0	0	0	0	0
271	0	0	0	0	0	0
272	0	0	0	0	0	0
273	0	0	0	0	0	0
274	0	0	0	0	0	0
275	0	0	0	0	0	0
276	0	0	0	0	0	0
277	0	0	0	0	0	0
278	0	0	0	0	0	0
279	0	0	0	0	0	0
280	0	0	0	0	0	0
281	0	0	0	0	0	0
282	0	0	0	0	0	0
283	2	0	0	0	426.05	0

284	0	0	0	0	0	0
285	0	0	0	0	0	0
286	0	0	0	0	0	0
287	0	0	0	0	0	0
288	0	0	0	0	0	0
289	0	0	0	0	0	0
290	0	0	0	0	0	0
291	0	0	0	0	0	0
292	0	0	0	0	0	0
293	0	0	0	0	0	0
294	0	0	0	0	0	0
295	0	0	0	0	0	0
296	0	0	0	0	0	0
297	0	0	0	0	0	0
298	0	0	0	0	0	0
299	0	0	0	0	0	0
300	0	0	0	0	0	0
301	0	0	0	0	0	0
302	0	0	0	0	0	0
303	0	0	0	0	0	0
304	2	0	0	0	572.83	0
305	1	0	0	0	245.59	0
306	0	0	0	0	0	0
307	2	0	0	0	464.82	0
308	1	1	1	5E	2676.89	0
309	1	0	0	0	257.21	0
310	1	0	0	0	248.7	0
311	1	0	0	0	248.7	0
312	0	0	0	0	0	0
313	1	0	0	0	245.59	0
314	3	0	0	0	706.97	631.54
315	1	0	0	0	248.7	0
316	4	0	0	0	502.8	1328.84
Totals	**112**	**6**	**7**	**N/A**	**$33,208.28**	**$11,239.20**

APPENDIX F. Cost Data for FY 2003

Direct Care Hospitalizations

Admitting Clinic	DRG	DRG Description	Enrollment Site Parent	Enrollment Site Parent Name	Dispositions	Full Cost	Variable Cost
Pediatrics	098	BRONCHITIS & ASTHMA AGE 0-17	0032	FT CARSON - EVANS ACH	27	$99,899.46	$70,584.48
FP Pediatrics	098	BRONCHITIS & ASTHMA AGE 0-17	0032	FT CARSON - EVANS ACH	12	$37,166.23	$26,331.86
Medical ICU	097	BRONCHITIS & ASTHMA AGE >17 W/O CC	0032	FT CARSON - EVANS ACH	6	$32,193.66	$23,499.36
Medical ICU	098	BRONCHITIS & ASTHMA AGE 0-17	0032	FT CARSON - EVANS ACH	4	$18,457.91	$13,163.80
Medical ICU	088	CHRONIC OBSTRUCTIVE PULMONARY DISEASE	0032	FT CARSON - EVANS ACH	2	$17,974.50	$13,162.72
FP Medicine	098	BRONCHITIS & ASTHMA AGE 0-17	0032	FT CARSON - EVANS ACH	3	$8,577.00	$6,198.81
FP Medicine	096	BRONCHITIS & ASTHMA AGE >17 W CC	0032	FT CARSON - EVANS ACH	1	$7,434.02	$5,259.71
Medical ICU	096	BRONCHITIS & ASTHMA AGE >17 W CC	0032	FT CARSON - EVANS ACH	1	$5,784.37	$4,414.13
FP Medicine	097	BRONCHITIS & ASTHMA AGE >17 W/O CC	0032	FT CARSON - EVANS ACH	4	$11,184.82	$8,350.66
Medical ICU	097	BRONCHITIS & ASTHMA AGE >17 W/O CC	0032	FT CARSON - EVANS ACH	1	$4,947.59	$3,646.05
Medical ICU	096	BRONCHITIS & ASTHMA AGE >17 W CC	0032	FT CARSON - EVANS ACH	1	$3,957.51	$2,969.58
Medical ICU	097	BRONCHITIS & ASTHMA AGE >17 W/O CC	NONE	NONE	2	$11,567.26	$8,374.14
Internal Medicine	097	BRONCHITIS & ASTHMA AGE >17 W/O CC	NONE	NONE	1	$4,947.59	$3,646.05
FP Medicine	097	BRONCHITIS & ASTHMA AGE >17 W/O CC	NONE	NONE	1	$4,089.97	$2,937.01
Pediatrics	098	BRONCHITIS & ASTHMA AGE 0-17	0252	PETERSON AFB - 10TH MED GRP	1	$4,515.59	$3,144.71
Pediatrics	098	BRONCHITIS & ASTHMA AGE 0-17	0033	USAF ACADEMY - 10TH MED GROUP	1	$4,515.59	$3,144.71
				TOTAL	**67**	**$272,697.48**	**$195,683.07**

Source: M2 Data Query by Brenda Learned (2004)

Direct Care Emergency Department Visits

Enrollment Site Parent	Enrollment Site Name	Encounters	Variable Cost	Full Cost
0032	FT CARSON - EVANS ACH	325	$80,857.74	$101,534.54
0273	AHC FT. MCPHERSON	1	$118.63	$146.01
8987	AHC PATCH BKS	1	$251.47	$316.40
0109	BROOKE AMC-FT. SAM HOUSTON	1	$326.28	$410.06
7200	BUCKLEY AFB - 460 MDS	2	$257.65	$323.39
0048	FT BENNING - MARTIN ACH	1	$246.49	$310.30
0110	FT HOOD - DARNALL ACH	1	$246.49	$310.30
0122	FT LEE - KENNER AHC	1	$135.59	$169.66
0075	FT LEONARD WOOD - L. WOOD ACH	1	$145.95	$182.54
0064	FT POLK - BAYNE-JONES ACH	1	$246.49	$310.30
0057	FT RILEY - IRWIN ACH	2	$564.26	$709.76
6904	MANAGED CARE CNTRCTR-REGION 04	2	$654.41	$822.40
6907	MANAGED CARE CNTRCTR-REGION 07	1	$329.22	$413.71
6908	MANAGED CARE CNTRCTR-REGION 08	5	$1,337.30	$1,678.17
0004	MAXWELL AFB - 42ND MED GRP	1	$313.74	$394.45
NONE	NONE	52	$12,381.28	$15,551.37
0252	PETERSON AFB - 10TH MED GRP	26	$6,466.39	$8,119.28
0437	SCHOFIELD BARRACKS AHC	2	$627.48	$788.89
6207	TRICARE OUTPATIENT-CLAIRMONT	1	$325.19	$408.69
6214	TRICARE OUTPT CLINIC VA BEACH	1	$118.63	$146.01
0052	TRIPLER AMC-FT SHAFTER	1	$313.74	$394.45
0033	USAF ACADEMY - 10TH MED GROUP	5	$1,199.95	$1,507.47
0117	WILFORD HALL - 59TH MED WING, LACKLAND	1	$246.49	$310.30
	TOTAL	**435**	**$107,710.86**	**$135,258.45**

Purchased Care Institutional

Provider Zip	DRG	DRG Description	Admission Date	Admission Type	Provider City	RWP	Admissions	Bed Days	Amount Paid
80907	097	BRONCHITIS & ASTHMA AGE >17 W/O CC	3/23/2003	Emergency	COLORADO SPRINGS	0.55	1	1	$1,249.74
80909	088	CHRONIC OBSTRUCTIVE PULMONARY DISEASE	10/12/2002	Emergency	COLORADO SPRINGS	0.95	1	6	$3,198.90
80909	097	BRONCHITIS & ASTHMA AGE >17 W/O CC	11/2/2002	Emergency	COLORADO SPRINGS	0.55	1	1	$1,263.24
80909	098	BRONCHITIS & ASTHMA AGE 0-17	1/30/2003	Emergency	COLORADO SPRINGS	0.41	1	3	$1,386.79
80909	098	BRONCHITIS & ASTHMA AGE 0-17	3/12/2003	Emergency	COLORADO SPRINGS	0.41	1	2	$1,386.79
80909	098	BRONCHITIS & ASTHMA AGE 0-17	6/29/2003	Emergency	COLORADO SPRINGS	0.41	1	2	$1,542.49
80909	098	BRONCHITIS & ASTHMA AGE 0-17	8/21/2003	Emergency	COLORADO SPRINGS	0.41	1	2	$1,542.49
80909	098	BRONCHITIS & ASTHMA AGE 0-17	9/9/2003	Emergency	COLORADO SPRINGS	0.41	1	2	$1,542.49
80909	098	BRONCHITIS & ASTHMA AGE 0-17	9/17/2003	Emergency	COLORADO SPRINGS	0.41	1	2	$1,542.49
72015	098	BRONCHITIS & ASTHMA AGE 0-17	5/28/2003	Emergency	BENTON	0.41	1	1	$1,161.71
78648	098	BRONCHITIS & ASTHMA AGE 0-17	10/1/2002	Emergency	LULING	0.41	1	3	$1,511.71
33155	098	BRONCHITIS & ASTHMA AGE 0-17	3/4/2003	Emergency	MIAMI	0.41	1	2	$3,051.87
15212	098	BRONCHITIS & ASTHMA AGE 0-17	4/30/2003	Emergency	PITTSBURGH	0.41	1	3	$1,481.70
62781	097	BRONCHITIS & ASTHMA AGE >17 W/O CC	1/3/2003	Emergency	SPRINGFIELD	0.55	1	3	$1,997.14
74074	098	BRONCHITIS & ASTHMA AGE 0-17	3/19/2003	Emergency	STILLWATER	0.41	1	2	$2,481.82
					TOTAL	**7.11**	**15**	**35**	**$26,341.37**

Purchase Care Non-Institutional (ER)

Provider Specialty	Provider Location	Place Of Service	Number of Visits	Number of Services	Amount Paid
General Practice	COLORADO SPRINGS	Emergency Room-Hospital	13	13	$1,054.62
General Practice	COLORADO SPRINGS	Emergency Room-Hospital	4	4	$267.07
Radiology	COLORADO SPRINGS	Emergency Room-Hospital	0	3	$31.58
General Practice	AUGUSTA	Emergency Room-Hospital	1	1	$56.58
Miscellaneous	BENTON	Emergency Room-Hospital	1	1	$85.13
General Practice	CORUNNA	Emergency Room-Hospital	1	1	$56.11
General Practice	CUMBERLAND	Emergency Room-Hospital	1	1	$58.61
General Practice	DOWNEY	Emergency Room-Hospital	1	1	$64.39
General Practice	HUDSON	Emergency Room-Hospital	1	1	$95.97
General Practice	IRON MOUNTAIN	Emergency Room-Hospital	1	1	$93.84
General Practice	KINGMAN	Emergency Room-Hospital	1	1	$59.17
General Practice	KINSTON	Emergency Room-Hospital	1	1	$87.57
Pediatrics	LAUREL	Emergency Room-Hospital	1	1	$87.17
General Practice	MORRIS	Emergency Room-Hospital	1	1	$25.90
General Practice	MUSKEGON	Emergency Room-Hospital	1	1	$61.14
Family Practice	NORTH RICHLAND HILLTX	Emergency Room-Hospital	1	1	$58.37
General Practice	OCEANSIDE	Emergency Room-Hospital	1	1	$92.67
Facility Charges	OROVILLE	Emergency Room-Hospital	5	17	$609.31
General Practice	OROVILLE	Emergency Room-Hospital	1	1	$26.90
Pediatrics	POCATELLO	Emergency Room-Hospital	1	1	$24.44
General Practice	PUEBLO	Emergency Room-Hospital	1	1	$58.14
Family Practice	QUINTER	Emergency Room-Hospital	1	1	$24.86
General Practice	RUTLAND	Emergency Room-Hospital	1	1	$56.66
General Practice	SAINT JOSEPH	Emergency Room-Hospital	1	1	$86.23
General Practice	SAINT LOUIS	Emergency Room-Hospital	1	1	$57.94
General Practice	SPRINGFIELD	Emergency Room-Hospital	3	3	$202.68
Facility Charges	SPRINGFIELD	Emergency Room-Hospital	1	1	$56.92
General Practice	SUN CITY	Emergency Room-Hospital	1	1	$59.35
General Practice	SUNNYSIDE	Emergency Room-Hospital	1	1	$58.51
Internal Medicine	WARE	Emergency Room-Hospital	1	1	$27.53
Family Practice	WAYCROSS	Emergency Room-Hospital	1	1	$56.58
		Total	**51**	**66**	**$3,741.94**

Purchase Care Non-Institutional (Ambulance Services)

Provider Specialty	Provider Location	Place Of Service	Number of Visits	Number Services	Amount Paid
Ambulance Service Supplier	COLORADO SPRINGS	Ambulance-Land	0	40	$5,053.26
Ambulance Service Supplier	AURORA	Ambulance-Land	0	9	$1,338.02
Ambulance Service Supplier	WINCHESTER	Ambulance-Land	0	3	$222.50
		Total	**0**	**49**	**$6,391.28**

APPENDIX G. Cost Data for FY 2004

Direct Care Hospitalizations

Admitting Clinic	DRG	DRG Description	Enrollment Site Parent	Enrollment Site Parent Name	Dispositions	Full Cost	Variable Cost
Internal Medicine IP	096	BRONCHITIS & ASTHMA AGE >17 W CC	0032	FT CARSON - EVANS ACH	1	$8,655.57	$6,296.77
Internal Medicine IP	097	BRONCHITIS & ASTHMA AGE >17 W/O CC	0032	FT CARSON - EVANS ACH	1	$2,414.70	$1,879.58
Medical ICU	096	BRONCHITIS & ASTHMA AGE >17 W CC	0032	FT CARSON - EVANS ACH	4	$36,883.25	$27,400.39
Medical ICU	097	BRONCHITIS & ASTHMA AGE >17 W/O CC	0032	FT CARSON - EVANS ACH	2	$19,057.18	$14,033.17
Medical ICU	098	BRONCHITIS & ASTHMA AGE 0-17	0032	FT CARSON - EVANS ACH	7	$50,094.61	$36,689.71
Pediatrics IP	088	CHRONIC OBSTRUCTIVE PULMONARY DISEASE	0032	FT CARSON - EVANS ACH	1	$5,862.94	$4,538.61
Pediatrics IP	098	BRONCHITIS & ASTHMA AGE 0-17	0032	FT CARSON - EVANS ACH	19	$85,650.00	$62,563.42
FP Medicine IP	097	BRONCHITIS & ASTHMA AGE >17 W/O CC	0032	FT CARSON - EVANS ACH	3	$7,244.10	$5,638.74
FP Medicine IP	097	BRONCHITIS & ASTHMA AGE >17 W/O CC	0032	FT CARSON - EVANS ACH	1	$3,695.33	$2,795.78
FP Pediatrics IP	098	BRONCHITIS & ASTHMA AGE 0-17	0032	FT CARSON - EVANS ACH	5	$12,913.26	$9,462.02
Medical ICU	088	CHRONIC OBSTRUCTIVE PULMONARY DISEASE	0059	MCCONNELL AFB - 22ND MED GRP	1	$9,854.86	$7,470.20
Medical ICU	096	BRONCHITIS & ASTHMA AGE >17 W CC	0252	PETERSON AFB - 21ST MED GRP	1	$4,630.14	$3,556.77
Medical ICU	098	BRONCHITIS & ASTHMA AGE 0-17	0252	PETERSON AFB - 21ST MED GRP	1	$10,643.22	$7,744.08
Pediatrics IP	098	BRONCHITIS & ASTHMA AGE 0-17	0252	PETERSON AFB - 21ST MED GRP	1	$3,633.36	$2,700.06
Pediatrics IP	098	BRONCHITIS & ASTHMA AGE 0-17	6906	MANAGED CARE CNTRCTR-REGION 06	1	$3,633.36	$2,700.06
Pediatrics IP	098	BRONCHITIS & ASTHMA AGE 0-17	6910	MANAGED CARE CNTRCTR-REGION 10	1	$6,799.62	$4,854.06
Internal Medicine IP	088	CHRONIC OBSTRUCTIVE PULMONARY DISEASE	NONE	NONE	1	$4,957.47	$3,864.95
Internal Medicine IP	096	BRONCHITIS & ASTHMA AGE >17 W CC	NONE	NONE	1	$9,706.36	$7,012.54
Internal Medicine IP	097	BRONCHITIS & ASTHMA AGE >17 W/O CC	NONE	NONE	1	$2,414.70	$1,879.58
Medical ICU	097	BRONCHITIS & ASTHMA AGE >17 W/O CC	NONE	NONE	1	$7,541.93	$5,685.26
Pediatrics IP	098	BRONCHITIS & ASTHMA AGE 0-17	NONE	NONE	4	$13,342.74	$9,969.38
FP Medicine IP	098	BRONCHITIS & ASTHMA AGE 0-17	NONE	NONE	1	$2,124.07	$1,639.20
				TOTAL	**59**	**$311,753**	**$230,374**

Source: M2 Data Query by Brenda Learned (2005)

Direct Care Emergency Department Visits

Enrollment Site Parent	Enrollment Site Parent Name	Encounters	Variable Cost	Full Cost
0032	FT CARSON - EVANS ACH	337	$66,134.74	$81,796.44
0033	USAF ACADEMY - 10TH MED GROUP	5	$947.00	$1,167.96
0048	FT BENNING - MARTIN ACH	1	$180.04	$218.92
0049	FT STEWART - WINN ACH	1	$188.06	$232.41
0052	TRIPLER AMC-FT SHAFTER	1	$188.06	$232.41
0060	FT CAMPBELL - BLANCHFIELD ACH	1	$199.84	$247.14
0075	FT LEONARD WOOD - L. WOOD ACH	1	$197.35	$244.03
0083	KIRTLAND AFB - 377TH MED GRP	1	$188.06	$232.41
0085	CANNON AFB - 27TH MED GRP	1	$190.54	$235.52
0123	FT BELVOIR - DEWITT ACH	1	$179.02	$221.13
0129	FE WARREN AFB - 90TH MED GRP	1	$188.06	$232.41
0252	PETERSON AFB - 21ST MED GRP	31	$6,140.96	$7,609.68
6904	MANAGED CARE CNTRCTR-REGION 04	1	$188.06	$232.41
6905	MANAGED CARE CNTRCTR-REGION 05	2	$376.12	$464.82
6906	MANAGED CARE CNTRCTR-REGION 06	3	$566.18	$697.25
6907	MANAGED CARE CNTRCTR-REGION 07	2	$404.93	$502.80
6908	MANAGED CARE CNTRCTR-REGION 08	13	$2,451.35	$3,015.27
7200	460TH MDS-BUCKLEY AF	1	$161.94	$206.11
NONE	NONE	56	$10,859.05	$13,401.47
	TOTAL	**460**	**$89,929.36**	**$111,190.59**

Purchased Care Institutional

DRG	DRG Description	Admission Type	Provider City	RWP	Admissions	Bed Days	Amount Paid
096	BRONCHITIS & ASTHMA AGE >17 W CC	Emergency	COLORADO SPRINGS	0.78	1	3	$3,020.25
097	BRONCHITIS & ASTHMA AGE >17 W/O CC	Emergency	COLORADO SPRINGS	0.55	1	3	$858.13
098	BRONCHITIS & ASTHMA AGE 0-17	Emergency	COLORADO SPRINGS	0.78	2	4	$2,072.58
475	RESPIRATORY SYSTEM DIAGNOSIS WITH VENTILATOR SUPPORT	Emergency	COLORADO SPRINGS	4.34	1	12	$20,030.44
			TOTAL	**6.45**	**5**	**22**	**$25,981**

Purchased Care Non-Institutional (ER)

Provider Specialty	Provider Location	Place Of Service	Number of Visits	Number of Services	Amount Paid
General Practice	COLORADO SPRINGS	Emergency Room-Hospital	17	17	$1,151.88
General Practice	COLORADO SPRINGS	Emergency Room-Hospital	2	2	$235.99
General Practice	ARIZONA, EXCLUDING YUMA AREA	Emergency Room-Hospital	1	1	$149.90
General Practice	MARYLAND	Emergency Room-Hospital	1	1	$146.97
Pediatrics	TENNESSEE	Emergency Room-Hospital	1	1	$138.38
General Practice	COLORADO	Emergency Room-Hospital	1	1	$94.50
General Practice	OHIO	Emergency Room-Hospital	1	1	$94.42
Miscellaneous	EASTERN TEXAS	Emergency Room-Hospital	1	1	$89.37
Family Practice	IOWA-EXCLUDING QUAD CITIES	Emergency Room-Hospital	1	1	$87.21
Pediatrics	MASSACHUSETTS	Emergency Room-Hospital	1	1	$65.54
General Practice	SOUTHERN CALIFORNIA	Emergency Room-Hospital	1	1	$60.31
General Practice	FT GORDON - EISENHOWER AMC	Emergency Room-Hospital	1	1	$60.18
Miscellaneous	OREGON	Emergency Room-Hospital	1	1	$60.08
General Practice	IOWA-EXCLUDING QUAD CITIES	Emergency Room-Hospital	1	1	$58.65
General Practice	NEW MEXICO	Emergency Room-Hospital	1	1	$57.63
General Practice	EASTERN TEXAS	Emergency Room-Hospital	1	1	$57.24
Internal Medicine	IOWA-EXCLUDING QUAD CITIES	Emergency Room-Hospital	1	1	$55.81
Physician's Assistant	COLORADO SPRINGS	Emergency Room-Hospital	1	1	$50.21
Internal Medicine	WASHINGTON	Emergency Room-Hospital	1	1	$27.18
General Practice	WESTERN MISSOURI	Emergency Room-Hospital	1	1	$26.41

Radiology	COLORADO SPRINGS	Emergency Room-Hospital	1	2	$19.91
Nurse Practitioner	COLORADO SPRINGS	Emergency Room-Hospital	1	1	$10.34
Radiology	EASTERN TEXAS	Emergency Room-Hospital	1	1	$9.27
		TOTAL	**40**	**41**	**$2,807.38**

Purchased Care Non-Institutional (Ambulance Services)

Provider Specialty	Provider Catchment Area Name	Place Of Serv	Number of Visits	Number Services	Amount Paid
Ambulance Service Supplier	COLORADO	Ambulance-Land	0	5	$556.49
Ambulance Service Supplier	COLORADO SPRINGS	Ambulance-Land	0	1	$285.00
Ambulance Service Supplier	TENNESSEE	Ambulance-Land	0	6	$279.81
Ambulance Service Supplier	FT CAMPBELL - BLANCHFIELD ACH	Ambulance-Land	0	3	$125.50
		TOTAL	**0**	**15**	**$1,246.80**