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

Data Accuracy of the Bubble Sheet Ambulatory Data System and the KG-Ambulatory Data System in the Internal Medicine Clinic, Bayne-Jones Army Community Hospital, Fort Polk, Louisiana

Graduate Management Project

CPT Lisa M. MacLaren

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MEMORANDUM THRU LTC Mark Moore, Deputy Commander for Administration, 1585 Third Street, Bayne-Jones Army Community Hospital, Fort Polk, LA 71459-5110

FOR U.S. AMEDD Center and School, Bldg 2841, MCCS-HRA(Rene L. Pryor), 3151 Scott Road, Fort Sam Houston, TX 78234-6135

SUBJECT: Submission of Graduate Management Project for CPT Lisa M. MacLaren

1. The following Graduate Management Project (GMP) is submitted for CPT Lisa M. MacLaren, (044-68-4429), Administrative Resident, Bayne-Jones Army Community Hospital in partial fulfillment of the graduation requirements for the U.S. Army- Baylor University, Graduate Program in Healthcare Administration.

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Abstract

The purpose of this project was to determine the coding accuracy of the Evaluation and Management (E&M), diagnosis, and procedure codes as reported in the Ambulatory Data System (ADS) for the Internal Medicine Clinic at Bayne-Jones Army Community Hospital, Fort Polk, Louisiana. A secondary purpose was to determine the financial impact of inaccurate coding through the use of the Ambulatory Payment Classification (APC) and Ambulatory Patient Group (APG) outpatient prospective payment system (OPPS). Three data sets were examined at different points in time based on type of ADS used and implementation of data quality management efforts. The data quality management efforts included training, template development, customization of diagnosis and procedure code selection lists, and management controls. The management controls consisted of the ADS compliance metric, KG-ADS reports, and ad hoc ADS reports. Analysis of the data revealed that the use of data quality management efforts did increase the accuracy of data in the ADS database. Analysis of the financial data indicated that the hospital was minimally at risk for either fraudulent billing or loss of revenue. However, as the Internal Medicine Clinic only accounts for 6.3% of outpatient workload, coding behaviors similar to those observed practiced in other high volume clinics would result in an increased annual impact. In order for data quality to be important for the staff of the hospital, command support of data quality management efforts is imperative. Command support combined with aggressive training on coding procedures and medical record documentation and the use of management controls will significantly increase the quality of data, thus decreasing the probability of inappropriate resource levels for mission accomplishment.

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List of Abbreviations

AAPC	American Academy of Procedural Coders
ADS	Ambulatory Data System
AMEDD	Army Medical Department
APC	Ambulatory Payment Classification
APG	Ambulatory Patient Group
BBA	Balanced Budget Act
BJACH	Bayne-Jones Army Community Hospital
BPA	Bid Price Adjustment
BS-ADS	Bubble Sheet – Ambulatory Data System
CEIS	Corporate Executive Information System
CHAMPUS	Civilian Health & Medical Program of the Uniformed Services
CHCS	Composite Health Care System
CMAC	CHAMPUS Maximum Allowable Charge
CPC-H	Certified Procedure Coders - Hospital
CPT-4	Current Procedural Technology, 4th edition

DISA	Defense Information Systems Agency
DoD	Department of Defense
DOM	Department of Medicine
DQAT	Data Quality Action Team
DQFAST	Data Quality for AMEDD Success Team
DRG	Diagnosis Related Group
E&M	Evaluation and Management
EBC	Enrollment Based Capitation
EMIC	Emergency Maternity and Infant Care Program
FHFS	Foundation Health Federal Services
FORSCOM	Forces Command
GAO	General Accounting Office
GDP	Gross Domestic Product
GPRMC	Great Plains Regional Medical Command
HCFA	Health Care Financing Administration
HEDIS	Health Plan Employer Data and Information Set
HMO	Health Maintenance Organization
ICD-9-CM	International Classification of Diseases, Clinical Modification, 9th Revision
IMC	Internal Medicine Clinic
JCAHO	Joint Commission on Accreditation of Healthcare Organizations
JRTC	Joint Readiness Training Center
KG-ADS	Named for TMSSC's name space, "K" in CHCS utilized for the "G"overnment transportable front-end system for ADS
LOE	Level of Effort
MCSC	Managed Care Support Contract
MDC	Major Diagnostic Category
MEDCOM	Medical Command
MEPRS	Medical Expense and Performance Reporting System
MHS	Military Health System
MTF	Military Treatment Facility
NCHS	National Center for Health Statistics
NCQA	National Committee for Quality Assurance
OASD-HA	Office of the Assistant Secretary for Defense, Health Affairs
OBRA	Omnibus Budget Reconciliation Act
OIG	Office of the Inspector General
OPPS	Outpatient Prospective Payment System
PASBA	Patient Administration Systems & Biostatistics Activity
PAT	Process Action Team
PCM	Primary Care Manager
POS	Point of Service
PPIP	Putting Prevention into Practice
PPO	Preferred Provider Organization
PPS	Prospective Payment System
RMC	Regional Medical Command
SADR	Standard Ambulatory Data Record

SDCS Source Data Collection System
TMSSC Tri-Service Medical Systems Support Center
TSG The Surgeon General
TSP TRICARE Senior Prime
WHO World Health Organization
WWR Worldwide Workload Report

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and the KG-Ambulatory Data System in the Internal Medicine Clinic,
Bayne-Jones Army Community Hospital, Fort Polk, Louisiana

Introduction

In an effort to control the rising cost of healthcare, the Omnibus Budget Reconciliation Act (OBRA) of 1986 directed the development of a prospective payment system (PPS) for hospital-based outpatient care (Averill & Goldfield, 1993). While a PPS was developed and formally presented to Congress in 1995, other political and regulatory issues prevented the legislation from being presented again until 1997. The Balanced Budget Act (BBA) of 1997 directed that a Medicare outpatient prospective payment system (OPPS) be implemented on January 1, 1999. The contemplated Year 2000 problems prompted the Health Care Financing Administration (HCFA) to request a delay in implementation, and as such, the current implementation date is July 1, 2000 (Goldfield & Kelly, 1999). The use of an OPPS is intended to shift the financial risk of outpatient healthcare services to the healthcare provider creating an incentive for healthcare providers to utilize the most appropriate and cost effective type of healthcare (Smith, Freeland, Heffler, & McKusick, 1998; Ervin, 1999).

In order for the OPPS to be successful, healthcare facilities must ensure that the quality of outpatient encounter data is maximized. A 1999 Office of the Inspector General (OIG) study on Medicare claims revealed that 46.8% of claims contained "insufficient" or "no documentation" errors and 8.53% of claims were incorrectly coded (Scichilone, 1999). Each outpatient encounter must be coded completely and accurately (Meyer, 1998). The need for mechanisms to increase data quality thus minimizing the risks associated with inappropriate coding (fraud and loss of revenue) is obvious. In addition to mitigating risk, increased data quality also results in data that can be used for utilization management, quality assurance, provider profiling, and performance monitoring (Orion, 1999).

The Military Healthcare System

Due to the tendency of the Department of Defense (DoD) Military Health System (MHS) to follow civilian healthcare trends, the imperative for data quality and cost containment also applies to Military Treatment Facilities (MTF). In 1995, the DoD implemented TRICARE, the military health maintenance organization (HMO), in an effort to control the cost of healthcare and to provide a uniform medical benefit to all beneficiaries. To facilitate the implementation of TRICARE, the MTFs were organized into twelve regions. Each region contracts with a health service organization to provide a network of civilian providers to supplement the MTF's available services (Military Medical Health Care Program, 1999).

Subordinate to the DoD is the Office of the Assistant Secretary for Defense, Health Affairs (OASD-HA), which is responsible for the medical departments of the U.

S. Army, Navy, and Air Force. The Army Medical Department (AMEDD) is organized into Regional Medical Commands (RMC), which are assigned based on geographical location. Associated, but not aligned with the RMCs, are the TRICARE regions. A tri-service Lead Agent (LA) is responsible for the TRICARE Managed Care Support Contract (MCSC) for their region. The LA is responsible for managing healthcare services provided by the contractor to include development of a provider network, management of funds, and contract performance (Corey, 1997).

In the MHS, data quality can have significant implications. Data quality directly impacts the success of the MHS, specifically accessible and quality patient care, healthcare policy decisions, budget determination, allocation of resources, and third party reimbursement (Hall & Funk, 2000). A recent audit of outpatient encounter data conducted by a DoD contractor revealed that 68% of records had an accurately coded primary diagnosis, 71% of records had an accurately coded secondary diagnosis, 88% of records had accurately coded procedures, and 34% of records had an accurately coded evaluation and management code (Large, 2000). Similar to the civilian sector, the MHS has also demonstrated problems with data quality and identified the significant impact of poor data quality.

Bayne-Jones Army Community Hospital

Bayne-Jones Army Community Hospital (BJACH) located at Fort Polk, Louisiana is a 52 bed, (expandable to 169 beds) acute care hospital, which supports the Joint Readiness Training Center (JRTC) and military beneficiaries in west central Louisiana and east Texas. BJACH is responsible for providing healthcare services with an annual budget of $33 million to over 23,000 beneficiaries in a forty-mile catchment area (Brunson, 1999; Eiteljorge, 1999).

In fiscal year 1999, the hospital was authorized 728 employees, which included 116 officers, one warrant officer, 157 enlisted soldiers, and 454 civilian employees (Strothers, 1999). BJACH had 2359 dispositions with an average daily census of 15.4 patients and an average length of stay of 2.4 days. Forty percent of the dispositions were live births and newborns (Civilian CHAMPUS Diagnostic Related Groups (DRG): 373, 391, 371, 630, 628). BJACH also had 242,721 outpatient visits of which fifty percent were established patients (patient has been seen within the previous three years in the same clinic) or telephone consults (Current Procedural Technology-Fourth Edition Codes (CPT-4): 99211, 99212, 99213, 99214, and 99371). Of the 242,721 outpatient visits at BJACH, 31.7% were from the Family Practice Clinic, 10.0% from Emergency Services, 8.1% from Behavior Health Services, 6.3% from the Community Health Clinic, 6.3% from the Internal Medicine Clinic (IMC), and 6.3% from the Physical Therapy Clinic (see Figure 1) (CEIS, 1999).

Conditions Which Prompted the Study

While there has been a recent focus on the quality of data in the MHS' information systems, initial data quality efforts can be traced back to 1996. In 1996, the planning for the deployment of a corporate level management information system indicated the need for a formal data quality assurance plan. The corporate level management information system known as the

Corporate Executive Information System (CEIS) collects information from several disparate legacy information systems and integrates the data into one single data repository. The integration of the data provides the user with better information, which is

necessary to manage
healthcare in a dynamic environment such as managed care. In order for the integrated information system to be effective, the quality of data entered into the legacy systems must be of the highest quality, thus the need for a data quality assurance program in the MHS (Corey, 1996).

In September 1998, a subcommittee of the Health Data Administration Program working group established the Data Quality Action Team (DQAT) to focus on improving data quality in the source data collection systems (SDCS). The DQAT developed the MHS data quality plan in support of developing and implementing business processes in the MTF to ensure data quality for informed decision making. The plan focuses on the total data quality management process; a data quality implementation plan; and education, training, and promotion on the importance of data quality (Data Quality Action Team, 1998).

In November 1998, the Patient Administration Systems and Biostatistics Activity (PASBA) formed the Data Quality for AMEDD Success Team (DQFAST) to address data quality for the AMEDD. This team replaced the Enrollment Based Capitation (EBC) Data Quality Process Action Team (PAT) when the PAT discovered that data quality problems were

Figure 1. Bayne-Jones Army Community Hospital Workload, FY 1999
Total Outpatient Visits for Fiscal Year 1999: 242,721 visits
Data Source: CEIS, Trendpath, Utilization and Quality Management
FY99 DC OP Visits by Month (MTF, Dept, XXXMEPRS))

broader than specific EBC data quality issues. DQFAST developed the Army Medical Treatment Facility Commander's Data Quality Guide, which provides an overview of data quality issues, implications of poor data quality, and a series of metrics to assess MTF data quality. The PASBA web page (
HYPERLINK http://pasba.tricare.osd.mil
http://pasba.tricare.osd.mil
) is the primary source for the AMEDD data quality issues and guidance (Houtsma, 1999; Data Quality for AMEDD Success Team, 1998). Recently, PASBA also developed a series of presentations called the Data Quality

Primer outlining the issues, impacts, available metrics, and necessary guidance to increase the quality of data in the MTF (Data Quality for AMEDD Success Team, 1999).

In March 1999, PASBA revamped the Corporate Executive Information System (CEIS) Data Quality Management Guide originally developed in October 1997. The purpose of the guide was to provide the MTF with a self-assessment tool to evaluate data quality. While the metrics contained in the guide are used to assess data quality at the MTF level, they can also be used to measure data quality at the DoD level (Corey, 1997; PASBA, 1999b). DoD requested that each MTF conduct the self-assessment and report the results. The response rate was 92% and revealed an average 84.1% for all the metrics. The primary reasons provided by MTFs for the low data quality were data entry problems, the need for additional training, and the need for management controls (Burzynski, 1999; Data Quality for AMEDD Success Team, 1999).

More recently, the Surgeon General's (TSG) update (Blanck, 1998) also focused

on the need for data quality for successful operations in a managed care environment. General Blanck (1998) also stressed that data quality requires command emphasis and leadership support at all levels. A policy letter dated February 26, 1999 written by the Assistant Secretary of Defense for Health Affairs (ASD-HA), Dr. Sue Bailey, emphasized the importance of data quality; specifically, timely and accurate data, in measuring the performance and effectiveness of the MHS (Bailey, 1999). Other government offices have also focused on data quality due to the recent increased visibility of military healthcare.

A recent General Accounting Office (GAO) report supports the need for increased emphasis on data quality. The purpose of the GAO report was to provide interim results on the DoD Medicare Subvention demonstration project authorized by the BBA of 1997. The project is a three-year demonstration allowing Medicare eligible retirees and their families to enroll in TRICARE Senior Prime (TSP), a DoD Medicare HMO. The purpose of testing TSP is to determine if the DoD Medicare HMO can provide healthcare services to dual beneficiaries and their families without increasing federal costs for either the DoD or Medicare. Before Medicare will reimburse the MTF, the MTF must measure the cost of healthcare they would have provided to beneficiaries aged 65 years or older without TSP. This cost of healthcare is called the "level of effort" (LOE) or baseline. If the LOE is underestimated, Medicare will reimburse more than appropriate (benefit to the MTF), but if the LOE is overestimated, Medicare will reimburse less than appropriate (loss to the MTF). Accurate costing and workload data is essential to correctly calculate the LOE. The GAO report on the demonstration indicated that DoD lacks accurate, complete, and timely data to determine the success or failure of the demonstration for the initial reporting period (GAO, 1999).

The bottom line is that inaccurate data leads to poor decision making at all levels within the MHS. In a managed care environment where the focus is getting maximum value for the healthcare dollar, data quality has never been more critical. All resource allocation decisions must be carefully analyzed to ensure maximum efficiency. Decisions regarding resource sharing, reduction or elimination of services, make versus buy decisions, and outsourcing impact the MCSC, and ultimately, available resources with which to provide healthcare services. Data quality directly impacts the ability to provide efficient, accessible, and quality healthcare, which also impacts the credibility of the MHS and the AMEDD.

Statement of the Management Problem

The Medical Command (MEDCOM), the GPRMC, Health Affairs, and the GAO are scrutinizing MTF data more frequently and intensely (Data Quality Primer, 1999). The MTF higher headquarters has access to and is analyzing MTF data and making decisions on how military healthcare will be provided to include the quantity and type of resources. Healthcare data must be accurate to ensure that the most appropriate mix of resources is provided to the facility in order to provide quality, efficient, and accessible healthcare services.

The questions this study will address are:

1. Will implementation of KG-ADS result in more accurate outpatient encounter data?
2. Will the implementation of data quality management efforts increase the accuracy of provider coding?

Literature Review

The information age, led by the computer revolution, has allowed the collection and storage of data followed by the transformation of data into information, which evolves into knowledge, and at a higher level, wisdom. The value of high quality data and information is a concept that many organizations understand, but commonly fail to exploit. The quality of data and information will determine the success or failure of the organization. Poor data quality will hurt an organization through lost revenue or lost opportunity, whereas high data quality can create competitive opportunities and advantages. Data quality is a fundamental concern of the organization and the organization must treat their data and information as a valuable asset and product of the organization (Burzynski, 1999; Hoven, 1999; Huang, Lee, & Wang, 1999; Wang, Lee, Pipino, & Strong, 1998).

Data quality has many characteristics. The most common characteristics are accuracy, completeness, consistency, and timeliness (Huang, Lee, & Wang, 1999). Other characteristics include uniqueness, validity, and comparability (Data Quality Action Team, 1998; DoD Defense Information Systems Agency, 1999). Even though characteristics may remain constant, each

characteristic may have a slightly different definition depending on the context in which they are used.

Data accuracy refers to data that are correct in that they represent the truth. For example, "M" is coded for male and the patient's gender associated with the record is in fact male. Data completeness is defined as the rate that required data is present (not incomplete) or that the appropriate amount of data is provided at the right level of need. To illustrate this point, a vice-president prefers summarized data whereas an auditor needs more comprehensive data from which to conduct analyses. Data consistency is the rate at which the value of the data is the same for all applications or that the data "makes sense". For example, the patient's gender is not "M" in one information system and "MALE" in another. An example of data "making sense" is male patients not having babies or receiving hysterectomies. Data timeliness is determined by the use of the data. Timeliness is considered to be acceptable if the individual who needs the data to make decisions is provided the data in enough time to use the data to make informed and timely decisions (AHIMA, 1998; Cassidy, 1998; Clikeman, 1999; DoD Defense Information Systems Agency, 1999; Data Quality Action Team, 1998; Fletcher, 1998; Miller, 1996).

Data uniqueness is defined as the lack of duplicate records in the system, for example, there should be only one record for each patient encounter in the database. Data validity is data that are collected within the appropriate constraints. For example, gender coded "P" is invalid since the acceptable values are "M" or "F." Data comparability is defined as the ability to benchmark performance with other organizations. The data must be defined and collected in such a manner as to allow appropriate comparisons (Data Quality Action Team, 1998; DoD Defense Information Systems Agency, 1999; Miller, 1996). Data accuracy, the most commonly used data quality characteristic is the scope of this study.

There are three main factors that affect the ability to achieve high quality data: culture, process, and people. The culture of the organization significantly impacts data quality. Leadership and command emphasis is critical to the success of the organization since resource decisions are made based on organizational data. If the hospital

commander does not think that data quality is important, then neither will subordinates. The managed care environment within which healthcare services are now delivered also mandates high quality data. All commanders need information that is accessible, accurate, complete, and timely in order for the organization to be successful (Burzynski, 1999; Corey, 1997; Data Quality for AMEDD Success Team, 1999).

Process factors include information system processes and policy and procedures. Information system processes include the hardware infrastructure and the software programs used to collect and report data. The system must be carefully designed and modified in concert with the changing needs of the organization. Furthermore, local data collection policies and procedures must be up-to-date, specific, and comprehensive to ensure data collection standardization and accurate data collection at the source. Finally, data quality improvement goals and objectives should be included in the organization's strategic plan (Corey, 1997; Data Quality for AMEDD Success Team, 1999; Mathieu & Khalil, 1998).

People are the most important factor affecting data quality. The individuals in the organization who enter data must be adequately trained and motivated to enter data correctly. They must understand why the data is important and what decisions are affected by the data they input. They must understand the impact of good data quality and bad data quality. This increased understanding will result in people who understand their importance and role in affecting the success or failure of the organization. The actions of the people are also directly related to the culture and processes within the organization. The theory that "what gets inspected is what gets done" is directly related to the data quality policies and procedures and the degree to which the command enforces those policies and procedures (Burzynski, 1999; Corey, 1997; Data Quality for AMEDD Success Team, 1999).

As mentioned earlier, data quality can significantly impact an organization. Data quality in a managed care environment is essential to ensure that the most accurate picture of provided healthcare services is depicted. The data must be accurate for inpatient as well as outpatient healthcare services. For an outpatient encounter, the most important data are the diagnostic and procedure codes to include the evaluation and management (E&M) codes (Spoeri, 1996). These are also the data elements that will be critical to the success of the OPPS.

With the shift of healthcare from inpatient services to outpatient services, the capture and interpretation of data associated with the outpatient encounter becomes critical to an organization's ability to provide cost effective and efficient healthcare. In 1991, Public Law 101-189 mandated that the DoD implement a process to capture disease and procedure data associated with outpatient encounters. The Office of the Assistant Secretary of Defense, Health Affairs (OASD-HA) responded with the development of an automated information system known as the Ambulatory Data System (ADS) (PASBA, 1999a).

ADS was designed to effortlessly capture data associated with an outpatient encounter through the use of a scannable form. Nightly, the ADS data is downloaded to the Standard Ambulatory Data Record (SADR). The SADR (ADS data) is accessible through the use of Business Objects, which is an ad hoc report writing software. ADS data can be used by the medical treatment facility (MTF) for provider feedback (practice patterns, utilization patterns, acuity of care, and graduate medical education),

epidemiological studies, clinical management, third party collection, outcome analysis, and benchmarking with other MTFs and civilian healthcare facilities (CHCS II, 1999; PASBA, 1999a; White, 1998).

The source of data for ADS is CHCS through the appointment scheduling module and a scanned encounter form or "bubble sheet" (BS-ADS). The most current source of data collection is an electronic version of the "bubble sheet" which is the KG-ADS module within CHCS (PASBA, 1999a). The primary outpatient encounter data is the E&M code, the diagnosis (International Classification of Diseases, Clinical Modification, Ninth Revision: ICD-9-CM) code, and the procedure (Current Procedural Technology, 4th Edition: CPT-4) code. The healthcare provider enters the data into the ADS database via the CHCS KG-ADS module. See Appendix A for an example of the BS-ADS form used in the IMC and Appendix B for the KG-ADS data entry screen.

The E&M and procedure codes are determined using the CPT-4 codes. CPT codes were first developed and published by the American Medical Association (AMA) in 1966. The fourth, and most current edition was published in 1977. The purpose of CPT-4 coding is to provide a uniform system that accurately describes the medical, surgical, and diagnostic services performed during a patient encounter. CPT-4 codes are used for administrative purposes such as claims processing and benchmarking and for clinical purposes such as patient management, research, and medical education. In 1983, the Health Care Financing Administration (HCFA) mandated the use of CPT codes to report care under Medicare Part B. As part of the 1986 Omnibus Budget Reconciliation Act (OBRA), HCFA also mandated the use of CPT codes to report hospital surgical procedures (American Medical Association, 1999).

The E&M code is a CPT-4 code that describes the level of medical service provided by the physician. The level of service or amount of physician work includes variations in the amount of skill, effort, time, responsibility, and medical decision making required during the outpatient encounter. The CPT-4 procedure codes are used to identify any procedures such as blood draw or intravenous therapy that are performed during an outpatient encounter.

The diagnosis is coded using the ICD-9-CM codes. The International Classification of Diseases (ICD) code is used to code and classify mortality data from death certificates. The ICD-CM codes are used to code and classify morbidity data from inpatient and outpatient services. The ICD-CM codes evolved from the Bertillon Classification or International List of Causes of Death developed in 1893. The National Center for Health Statistics (NCHS) is the World Health Organization's (WHO) Collaborating Center for the classification of diseases and is responsible for the coordination of all disease classification activities to include use, interpretation, and revision (NCHS, 1999).

The KG-ADS module has several advantages over the BS-ADS system. Since KG-ADS relies on the keyboard for data entry, there is no requirement for the scannable forms, scanners to scan the completed forms, workstations to process the forms, or laser printers to print the scannable forms with the patient demographic data. However, the scannable form does provide a recoverable historical record of the outpatient encounter coding in the event of a database failure. Both the KG-ADS and the BS-ADS system have selection lists for the different code types. With BS-ADS, the selection list was limited to 19 E&M codes, 38 procedure codes, and 58 diagnosis codes with the ability to add 3

additional procedure codes and 3 additional diagnosis codes. With KG-ADS, the selection list can contain up to 999 codes for each type. Furthermore, KG-ADS allows the healthcare provider to search for diagnosis codes not on the selection list or use the patient specific Master Problem List as the selection list for the diagnosis codes. Finally, both systems are disadvantaged by the fact that the physician is responsible for the coding of the
outpatient encounter. This requires ongoing training and education to ensure that coding is performed accurately.

As mentioned earlier, the E&M, ICD-9-CM diagnosis, and CPT-4 procedure codes are essential to the success of the OPPS. For DoD, ADS will be the data source for the determination of the Ambulatory Payment Classification (APC), which is the basis of the OPPS. The majority of the literature (Bilirakis, 1999; Duncan, 1999; Freer, 1999; Meyer, 1998; Scichilone, 1999) states that HCFA is preparing to implement the APC system soon after January 1, 2000; most likely July 1, 2000. At this time, DoD has not determined whether the APC or Ambulatory Patient Groups (APG) will be used as part of the MTF funding determination or for the Medicare Subvention Demonstration (Mandell, 1999).

The APC was adapted by HCFA from the APG developed by 3M-Health Information Systems in the early 1990s. Both the APC and APG are based on the ICD-9-CM diagnosis codes and the CPT-4 procedure codes. Both the APC and the APG are designed to indicate the amount and type of different resources (supplies, equipment, type of room, time) used in an outpatient encounter (Freer, 1999; Meyer, 1998). The implementation of an OPPS (either the APC or the APG) is intended to decrease the growth of outpatient spending, result in increased efficiency of outpatient departments, eliminate unnecessary services, increase revenue predictability, and lower patient co-payments. Basically, the concept of an OPPS system is the same as that of the inpatient Diagnosis Related Group (DRG) inpatient PPS. The OPPS sets reimbursement before services are provided, thus forcing a risk share between the provider and the payer. If costs exceed reimbursement, the provider will experience a loss, whereas if the costs are lower than the reimbursement, a profit situation exists (Averill & Goldfield, 1993; Duncan, 1999; Duncan &

Servais, 1996; Meyer, 1998). While the APC/APG system is very similar in theory to the DRG system, there are several differences.

The basic unit of payment for the OPPS is the outpatient visit while the DRG uses the hospital admission. An outpatient visit is defined as contact between a patient and a healthcare provider and includes performance of a procedure, medical evaluation, or an ancillary service. Several APCs or APGs can be assigned to one outpatient visit, where only one DRG describes an inpatient stay. The initial classification variable for the APC or APG is the procedure performed (as indicated by the CPT-4 code) whereas with the DRG, the principal diagnosis (as indicated by the ICD-9-CM code) is used. Furthermore, the OPPS will be implemented without a phase-in system unlike the DRG system, which had a lengthy phase-in period (Averill & Goldfield, 1993; Duncan & Servais, 1996; Freer, 1999; Orion, 1999).

The APC or APG system classifies patients into one of three major categories: significant procedure, medical, or ancillary service. Only patients who undergo

significant procedures are assigned to the significant procedure category. Significant procedure categories are assigned based on the CPT-4 procedure code. Patients who undergo medical evaluation without any significant procedures are assigned to a medical category (the majority of patients in the IMC will be assigned to a medical APC). This is where the major difference between APCs and APGs is evident. With APCs, the assignment of the medical visit APC is determined first by the level of service as indicated by the E&M code and secondly by the ICD-9-CM diagnosis code. There are 121 possible APCs categorized into twenty different major diagnostic categories (MDC). With APGs, the ICD-9-CM diagnosis code drives the medical visit APG. There are 83 possible APGs. Because of the assignment methodology, the APC medical visit categories are less clinically distinct than the APG medical visit categories (Goldfield & Kelly, 1999). Finally, patients who have ancillary tests (laboratory or radiology) or ancillary procedures (immunizations) performed and no significant procedures or medical evaluation are assigned to an ancillary service category (Averill & Goldfield, 1993; Duncan & Servais, 1996; Freer, 1999; Orion, 1999). A list of APCs can be found in the September 1998 Federal Register.

Since several APCs or APGs can be assigned to one outpatient visit, the prevention of upcoding must be addressed. The first step in the prevention of upcoding is not basing the reimbursement on the summed cost of all assigned APCs or APGs to determine the reimbursement rate. Instead, the OPPS uses three methods of grouping the APCs or APGs into a single payment unit. The first method, significant procedure consolidation, is used for a patient who has had several significant procedures. The significant procedure consolidation consists of combining several related significant procedure APCs or APGs into a single APC or APG and a single reimbursement rate. A list of consolidated significant procedures was developed based on clinical judgement. A consolidated significant procedure consists of a significant procedure combined with other significant procedures commonly performed as a series (Averill & Goldfield, 1993; Duncan & Servais, 1996; Orion, 1999).

The second method, ancillary packaging, consists of combining certain ancillary services as part of a significant procedure or medical visit. This does not mean that the ancillary service is performed without charge, but that the reimbursement rate for a significant procedure or medical visit includes the cost of the ancillary service. The third method, multiple significant procedure and ancillary discounting, is used when multiple unrelated significant procedures are performed or when identical ancillary services are performed multiple times. Discounting indicates that a lesser reimbursement rate is indicated since the incremental cost of performing a second procedure or ancillary service during the same outpatient visit is less than performing the procedure one time. In other words, the cost of performing the two procedures or ancillary services at the same time is less than performing the two procedures or ancillary services on two separate occasions. Discounting is a disincentive to repeat the same procedure or ancillary service unless absolutely indicated thus maximizing the use of available resources and containing costs (Averill & Goldfield, 1993; Duncan & Servais, 1996; Orion, 1999).

Purpose

The purpose of this project is to determine the coding accuracy of the E&M, diagnosis, and procedure codes as reported in the ADS database and to determine the financial impact of inaccurate coding through the use of the APC and APG OPPS.

Hypotheses.

Null Hypothesis: The data accuracy of the ADS record does not improve or deteriorate with the implementation of the KG-ADS system or the implementation of data quality management efforts.

Alternate Hypothesis 1: The data accuracy of the ADS record improves with the implementation of the KG-ADS system.

Alternate Hypothesis 2: The data accuracy of the ADS record improves with the implementation of data quality management efforts.

Methods and Procedures

The Internal Medicine Clinic (IMC) was chosen for this study due to moderate patient volume, small staff size, and longer visit duration as compared to other clinics and services in BJACH. A clinic of this size facilitates study of the effects of the implementation of an automated information system and to develop solutions that can be applied to larger clinics within the facility.

The IMC is organized within the Department of Medicine (DOM) along with the Dermatology Clinic, Pediatric Clinic, Cardiopulmonary Clinic, and the Immunization Clinic (see Figure 2). The IMC serves as both a primary care clinic and a referral clinic. The physicians in the IMC serve as primary care managers for over 1,000 empanelled patients with chronic or complex medical conditions. They also serve as specialists for patients who are referred from the emergency room and other clinics within the hospital. The assigned internists provide comprehensive diagnostic and treatment services for all of the major organ systems.

Figure 2. Department of Medicine Organization

Data Source: BJACH Table of Distribution and Allowances, FY1999

The IMC is authorized nine personnel: three internists (61F), three practical nurses (GS-05), one nursing assistant (GS-04), and two medical clerks (GS-04). A nurse practitioner (66H8E) who is a Forces Command (FORSCOM) asset assigned to the 115th Field Hospital also serves as a healthcare provider in the IMC (see Figure 3). The floor plan of the IMC consists of one administrative office for each physician, seven patient exam rooms, a nurse's station, and a centrally located front desk (See Figure 4).

Figure 3. Internal Medicine Clinic Organization

Data Source: BJACH Table of Distribution and Allowances, FY1999

The IMC clinic profile as defined in the Composite Health Care System (CHCS) consists of several appointment types for the face-to-face physician-patient encounters, which include NEW (New patients), ROU (Routine patients), SDC (Same Day Clinic), FOL (Follow-Up), ERCOM (Emergency Room Consult), DDS (Doctor Designated Slot), and CON (Consult). Appointment types for "Other" services include TCON (Telephone Consults), PRX (Prescription Refill), BPC (Blood Pressure Check), ECH (Echocardiogram), EKG (Electrocardiogram), FLS (Flex Sigmoidoscopy), GXT (Graded Exercise Test), HOL (Holter Monitor), PFT (Pulmonary Function Test), and GRP (Group Teaching).

Figure 4. Layout of the Internal Medicine Clinic

The IMC workload consists of an average of 1,168 visits per month (visits include all of the appointment types). Face-to-face patient visits average 406 per month or 20 patients per day based on an average 21 working days per month (See Figure 5). These appointment types vary
from 25 minutes to 60 minutes per patient.

Figure 5. Internal Medicine Clinic Workload, FY 1999

Data Source: CHCS Clinic Workload Report
(Patient Visits = CON, DDS, ERCOM, FOL, NEW, ROU, SDC)

This study was conducted in three phases. Each phase consisted of a retrospective analysis of data from the ADS database. The first phase consisted of an analysis of data collected in September 1999 during a period when the BS-ADS system was in place. The second phase consisted of data collected in October 1999 during the initial period of KG-ADS implementation (KG-ADS was implemented in the IMC on October 1, 1999), prior to any data quality management efforts. The third phase consisted of data collected in February 2000, after the data quality management efforts were implemented.

The data quality management efforts consisted of focused provider training on the use of KG-ADS and specific coding issues unique to the IMC, template development, customization of selection lists for the IMC procedure and diagnosis codes within the KG-ADS CHCS module, and management controls. The management controls consist of the ADS compliance metric, CHCS module KG-ADS reports, and ad hoc reports from the ADS database. Outpatient medical record audits are the best management control to determine the accuracy of the data in the ADS database. The medical record audit is the focus of this study.

The focused provider training consisted of training for the physicians and nursing staff of the IMC on the use of KG-ADS. Training focused on the completion of an ADS record (see Appendix B for the KG-ADS data entry screen), use of the “Master Diagnosis List,” diagnosis and procedure code search function, and use of the “Email to Coder” function. When the provider completes the ADS record, a prompt allows the provider to add the selected diagnoses to the patient “Master Diagnosis List.” Once this is completed for a patient, time searching for the correct diagnosis codes during subsequent visits of the patient is minimized since the physician can select the “Patient Master Diagnosis List” choice from the “Diagnosis Selection List” menu. Additionally, if the provider is uncertain as to how an outpatient encounter should be coded, KG-ADS offers the ability to “Email to Coder” for the coders to complete the record accurately. The ADS systems manager and her staff, who are also certified coders, conducted the group training session and provided individual training sessions at the provider’s request.

This provided the IMC staff an opportunity to ask ICD-9-CM and CPT-4 coding

questions specific to the clinic visits and procedures performed in the IMC.
The provider training also emphasized that documentation in the outpatient medical record is critical to the capture of outpatient encounter information. The standing rule is "If it is not documented, then it did not happen." Providers must comprehensively document the outpatient encounter such that the documentation in the outpatient medical record supports the E&M, diagnosis, and procedure codes entered into the ADS database. Lack of or inadequate documentation to support the data in the ADS database may be considered fraud or become hindrance in the event of a malpractice suit.
Development of a template or "cheat sheet" similar to the ADS bubble sheet that defines the coding requirements for the most common CHCS visit types for the clinic will also facilitate the completion of the ADS records. The template should include the CHCS appointment type, visit description, E&M code possibilities (ensure that NEW patients are coded with NEW patient E&M codes), commonly used diagnosis codes for the appointment type, and commonly used procedure codes for the appointment type. The template facilitates accurate coding of frequently occurring appointment types within the clinic. See Appendix C for the coding template used in the IMC.
The most important data quality management effort is the development of customized selection lists for the diagnosis code and procedure code menus within KG-ADS. The selection lists must be developed with significant user (physicians and nurses) input. Suggestions for developing the selection lists include organizing the codes by major organ system or by different types of patients such as diabetic, cardiac, pediatric, or OB/GYN patients. The IMC staff was provided with the selection list currently available on KG-ADS along with a list of the most common diagnosis and procedure codes being entered in the ADS database. The list of diagnosis and procedure codes was used realizing that the coding accuracy may be limited. Certified coders assisted the physicians in the development of their lists by providing coding guidance and continuous coding training. The physicians were also able to add diagnosis and procedure codes without knowing the specific code. Most important is that the selection lists can be easily modified at any time. This feature facilitated the physicians developing the selection lists. Knowing that the list did not have to be perfect at the time of implementation resulted in timely feedback. See Appendix D for an example of the customized selection menus for the IMC.

In addition to the data quality management efforts, several management controls were implemented for use on a continuous basis. The management controls consist of the ADS compliance metric, CHCS module KG-ADS reports, and ad hoc reports from the ADS database. The first indicator of ADS data quality is the completeness of the ADS records. Before one can measure the accuracy of the ADS data, the ADS data must be entered into the system. The ADS compliance metric measures how well a clinic has integrated the use of KG-ADS into daily processes. This metric is calculated at the third level MEPRS code to pinpoint the clinics that are having difficulty completing KG-ADS. The ADS compliance metric is calculated by dividing the number of Worldwide Workload Report (WWR) visits for the month into the number of Standard Ambulatory Data Record (SADR) visits for the month multiplied by 100. The standard for "green" is 95-100% compliance, amber is 90-94% compliance, and red is less than 90%. Continuous monitoring of this metric is designed to result in increased compliance rates (ADS After Action Report, 1998; PASBA, 1999c).

In the past, the MEPRS data was used instead of the WWR data. This was recently changed due to the timeliness of the WWR data. The MEPRS data is not available until 60 days after the last day of the month, whereas the WWR data is available ten days after the last day of the month. This provides the MTF compliance rates early enough to detect trouble spots and make corrections before valuable encounter data is lost.

Furthermore, using the WWR workload count can result in compliance greater than 100% due to the fact that the WWR workload only includes CHCS "count" visits. Since KG-ADS is completed on both "count" and "non-count" visits, the SADR workload can be greater than the WWR workload. A greater than 100% compliance may not truly indicate 100% compliance for the clinic. PASBA is redesigning the metric to adjust the SADR so that those clinics with a significant number of "non-count" visits will not have inflated compliance rates.

The next management control is to monitor the canned reports generated by ADS through the CHCS module. Three reports from the KG-ADS CHCS module are available to pinpoint specific clinics and/or providers of concern for compliance and to ensure that data entered into the system is being transmitted to the SADR. Under the Ambulatory Data Reports menu option from the KG-ADS menu in CHCS, two reports can be selected. They are Appointments with No ADS Records by Clinic and ADS Records with Unresolved Coding Issues (KG-ADS Pending Records Report). The first report provides management with a list, by provider, of the CHCS appointments without a completed KG-ADS record. This report focuses on compliance only (see Appendix E). The second report provides the ADS systems manager with a list of the records for which the provider requested assistance for coding (see Appendix F). Once the provider uses the "Email to Coder" function, the ADS coder is responsible for ensuring that the record is completed. Records found on this report will be reported by the system as incomplete, thus decreasing compliance (KG-ADS User's Guide, 1999).

Under the Ambulatory Data Collection Manager Menu, the ADS Interface Error Menu can be selected which provides access to the ADS Interface Error Report (see Appendix G). This report provides the ADS systems manager with a list of the records that did not transmit successfully to the SADR. On the report, records coded Error indicate that the record did not transmit to the ADS database, Warning indicates that the record was transmitted, but may have demographic errors; or Unresolvable indicates that the record is in a holding status until the error is resolved. Records in the Error status attempt to re-transmit nightly. This report must be run by the ADS system manager on a regular basis (at least weekly) to ensure that the KG-ADS records are transmitted successfully to the SADR (KG-ADS User's Guide, 1999).

A third management control is ad hoc reporting through the use of Business Objects. The ADS system manager can provide information on the coding practices of the providers to evaluate the accuracy of coding by developing an ad hoc report. The ad hoc report can be designed to determine if E&M codes are being used appropriately (appointment type NEW is associated with E&Ms for new patients) and to determine if proper diagnosis codes (verify that a single code is not used for all records) are used. The ad hoc report can also be used to determine the effectiveness of the template by looking at specific appointment types and the E&M, diagnosis, and procedure codes that are being coded for

that type of visit. For example, all EKG interpretations should have an E&M of 99212 and a procedure code of 93010, while the diagnosis code may vary (see Appendix C). To determine the specific accuracy of the coding, a periodic medical record audit must be conducted. The audit would consist of certified coders coding the medical record and comparing the results with the data in the SADR. The ADS compliance rate (data completeness) is the first hurdle to overcome in the quest for data quality; however, data accuracy is more important. Data completeness is necessary for, but does not guarantee data accuracy. Completing the ADS record and completing the ADS record with the correct data are two separate issues.

Data Collection

The data for this study was collected retrospectively from the outpatient medical record and the ADS database. The period used for all data sets was the last full week (five full working days) of the specified month. The data for the first phase was from the month of September 1999; the second phase data was from the month of October 1999; and the third phase data was from the month of February 2000. Based on a mean of 406 patient visits per month, the projected sample size for each phase was 98. (These figures are based on FY99 data as presented in Figure 5.) Patient visits without a corresponding completed ADS record were not included in the study.

For each of the data sets used in the study, the ADS data (E&M, diagnosis, and procedure code) were pulled for all of the patients seen for a face-to-face appointment during the data period. The data were recorded on the Data Collection Sheet and each patient was assigned an administrative number to maintain patient confidentiality (see Appendix H). The outpatient medical record for each patient was pulled and coded by two certified coders assigned to the permanent staff of BJACH. The coding results were recorded on the Coders Audit Worksheet (see Appendix I). The coders did not have access to the codes reported in the ADS database.

The codes determined by the coders were transferred to the Data Collection Sheet for comparison and further analysis.

Once the coding of all three data sets was complete, the codes from both the ADS database and the outpatient medical record were entered into the APC and APG Grouper located at PASBA. The Grouper is an algorithm based software package developed by 3M that determines the APC and APG from the E&M, diagnosis, and procedure codes. The Grouper also determines the reimbursement level for each APC and APG. The results from the Grouper were also recorded on the Data Collection Sheet.

Once all the data was recorded on the Data Collection Sheet, analysis of the data began with determining the most common E&M, diagnosis, and procedure codes in the ADS database for the months of October 1999 through February 2000. This was conducted to get a general overview of the data accuracy for all the patient appointment types in the IMC. This data set was also used to trend the ADS compliance rate for the IMC. Further analysis consisted of comparing the E&M, diagnosis, and procedure codes to determine the percentage of over-coding, under-coding, and accuracy. Analysis of the APCs and APGs included comparing the frequency of over-coding and under-coding, use of v70.0 (Routine general medical examination) as the primary diagnosis, and percentage of records that contained the correct ICD-9-CM codes, but in the incorrect order. Finally, the reimbursement levels for the APCs and APGs were compared between the ADS data and the outpatient medical record.

Limitations

The primary limitation in this study was the initial physician resistance to the use of KG-ADS. The primary reason for the resistance is the lack of training and knowledge to accurately code the E&M, diagnosis, and procedure codes. However, the inability to code is not unique to the KG-ADS module since basic coding knowledge was also required with BS-ADS. Another limitation was that the selection lists in the KG-ADS CHCS module were overwhelming and difficult to navigate. This limitation was greatly reduced through the implementation of the customized selection lists. There was only limited resistance to the automated KG-ADS format since the majority of physicians were able to quickly grasp the technical mechanics of entering data since they were already accustomed to using CHCS. Most importantly, continued command emphasis on physicians' performance of KG-ADS data entry is critical to the success of this study as well as the success of KG-ADS.

Assumptions

The major assumption in the study is that the outpatient medical record contains the most accurate picture of the patient encounter. If the provider did not document the outpatient medical record accurately, all subsequent data will contain the same inaccuracy. The training efforts stressed the importance of documenting the type of patient, (new, established, or consult), documentation of all diagnoses assessed and/or treated, and procedures that were performed in the clinic. Another assumption is the technical competence and ability of the coders to accurately code the E&M, diagnosis, and procedures from the documentation in the outpatient medical record.

Ethical Considerations

Ethical considerations in research are extremely important to ensure that the benefits of the research are not lost due to unethical or inappropriate methods. The research team had several ethical responsibilities mainly to ensure that the patient data was kept confidential. Each team member should expected ethical compliance from the other members to ensure that the data used in the study (coding of outpatient records) was accurate and represents a true depiction of the patient's status. Although the outpatient medical record is the property of the MTF, the data contained within the outpatient medical record and the corresponding information systems (ADS) must be kept confidential by all research team members. Each team member did not discuss any of the patient data (names, social security number, diagnoses, and treatments) used in the study and each member ensured that all data was secured when not in use and all data was destroyed upon completion of the study (Cooper & Schindler, 1998).

Results

The first data set consisted of 95 CHCS face-to-face clinic visits during the period of September 20 –24 1999. This data set represents the maturest data using the BS-ADS method of data collection. Of the 95 visits, 78 bubble-sheets were successfully scanned and transmitted to the SADR resulting in an 82.11% compliance rate for the data set. Of the 78 records in the SADR, 66 outpatient medical records were coded and included in the study (n=66). The twelve records not included in the study consisted of two records without a Standard Form 600 for the outpatient encounter, nine records were not available for coding, and one record was deleted from the study due to an invalid ICD-9-CM code (see Figure 6 for the Data Set Description).

Figure 6. Data Set Description

The second data set consisted of 134 CHCS face-to-face clinic visits during the period of October 25-29, 1999. This data set represents the initial data using the KG-ADS method of data collection. Of the 134 visits, 104 records were successfully transmitted to the SADR resulting in a 77.61% compliance rate for the data set. Of the 104 records in the SADR, 96 outpatient medical records were coded and included in the study (n=96). The eight records not included in the study consisted of five records without a Standard Form 600 and three records not available for coding.

The third data set consisted of 65 face-to-face clinic visits during the period of February
7-11, 2000. This data set was taken after the successful implementation of the data quality management efforts and management controls. Of the 65 visits, 60 records were successfully transmitted to the SADR resulting in a 92.31% compliance rate for the data set. Of the 60 records in the SADR, 47 outpatient medical records were coded and included in the study (n=47). The thirteen records not included in the study consisted of one record without a Standard Form 600, seven records were not available for coding, and five records were deleted due to duplicate workload counted in CHCS and the SADR. During this period, one of the four Internists was on convalescent leave, which resulted in below average clinic visits. See Table 1 and Figure 7 for a summary of the IMC Workload from July 1999 – February 2000.

An analysis of the most common E&M, diagnosis, and procedure codes (see Table 2) compared against the IMC workload provides a general overview of the coding accuracy. The most common E&M was 99371 (Telephone Consult, simple) from July 1999 – November 1999 and 99212 (Established patient, problem focused) from December 1999- February 2000. The second most common E&M codes were also 99371, 99212, and 99211 (Established patient, minimal: code is reserved for non-privileged providers). The most common diagnosis code was v70.0 (General medical examination) from July 1999 – October 1999 and v68.1 (Issue of repeat prescriptions) from November 1999 – February 2000. The second most common diagnosis was v68.1, v58.61 (Long-term use of anticoagulants), and 401.9 (Hypertension, unspecified). The most common procedure code was 93010 (EKG interpretation) for six of the eight months reviewed. For the remaining two months (September and October 1999), the most common procedure code was 93770 (Measure venous pressure).

Figure 7. Internal Medicine Clinic Workload and Compliance
Data Source: CHCS Clinic Workload Report, ADS Ad hoc report

Table 2. Most Common Codes

EMBED Excel.Sheet.8
Data Source: ADS Database, Ad hoc report

The data from the outpatient medical record audit was analyzed several different ways. The accuracy of the E&M, diagnosis, and procedure codes were initially analyzed separately. The E&M code was coded accurately 59.09% in the September data set, 41.67% in the October data set, and 25.53% in the February data set. The percentage of records over-coded based on the E&M was 25.76%, 34.38%, and 8.51% for the three data sets respectively. The percentage of records under-coded based on the E&M was

15.15%, 23.96%, and 65.96% respectively (see Figure 8). The basis used to determine over or under-coding was the CHAMPUS Maximum Allowable Charge (CMAC) for each E&M. The CMAC rates were obtained from the DoD MHS TRICARE website, HYPERLINK http://www.tricare.osd.mil
http://www.tricare.osd.mil
.

The accuracy of the ICD-9-CM codes was analyzed based on the percentage of records that were coded the same for the primary ICD-9-CM. For the September data set, 37.88% of the

Figure 8. E&M Coding Results

records had identical primary ICD-9-CM codes, October had 18.75%, and February had 46.81%. Also analyzed was the percentage of records that had v70.0 coded as the primary and only diagnosis. This code was identified by an ad hoc report as a potentially "abused" code meaning that the provider used this code for all outpatient encounters for the sole purpose of maintaining compliance. In the September data set, 30.30% of the records had v70.0 as the primary and only diagnosis code, the October data set had 22.92%, and the February data set had 0.00% (see Figure 9).

Figure 9. ICD-9-CM Coding Results

The CPT-4 procedure code accuracy was also analyzed several different ways. The data sets had an average of 17.16% outpatient encounters (average 11 per data set) with procedures coded in either ADS or the outpatient medical record. In the September data set, 18.18% of the procedures were coded accurately; 18.18% of the procedures were coded inaccurately; 18.18% of the procedures were documented in the medical record, but not coded on the SADR; and 45.45% of the records had procedures coded in ADS, but not documented in the medical record. In the October data set 30.77% were coded accurately; 23.08% inaccurately; 23.08% documented, but not coded in the SADR; and 23.08% were coded, but not documented. Respectively for the February data set, 40.00% coded accurately; 30.00% coded inaccurately; 10.00% documented, but not coded in the SADR; and 20.00% coded, but not documented.

Also, analyzed was the percentage of records that included CPT-4 procedure code 93770 (Measure venous pressure). This procedure code was also identified by an ad hoc report as inappropriate. The standard blood pressure check during a medical visit records the arterial pressure for which there is not a CPT-4 procedure code. The blood pressure check is included as part of the E&M code for reimbursement purposes. In the September data set, 93770 was coded in 34.85% of the ADS records, 19.79% for the October data set, and 0.00% for the February data set. See Figure 10 for the CPT-4 Coding Results.

Analysis of the APC and APG data was identical. The basis used to determine over or under-coding was the reimbursement rate calculated with the APC or APG Grouper. The APC results are presented first. In the September data set, 33.33% were over-coded, 27.27% under-coded, and 39.39% resulted in the same reimbursement rate. Additionally, 18.18% of the records were over-coded based on the inappropriate use of v70.0 as a primary diagnosis and 8.33% were under-coded. See Figure 11 for the APC Coding Results.

Figure 10. CPT-4 Coding Results

In the October data set, 57.29% were over-coded, 22.92% were under-coded, and 19.79% resulted in the same reimbursement. 14.58% of the records were over-coded based on the inappropriate use of v70.0 and 8.33% of the records were under-coded. In the February data set, 19.15% were over-coded, 63.83% were under-coded, and 17.02% had the same reimbursement. 0.00% of the records in the February data set used v70.0 as a primary ICD-9-CM inappropriately.

Figure 11. APC Coding Results

The APGs were analyzed in the same manner as the APCs. In the September data set, 36.36% of the records were over-coded, 30.30% of the records were under-coded, and 33.33% resulted in the same reimbursement. 15.15% of the records were over-coded based on the inappropriate use of v70.0 and 18.18% of the records were under-coded. 39.58% of the October data set records were over-coded, 37.50% were under-coded, and 21.88% resulted in the same reimbursement level. 14.58% of the records were over-coded based on the inappropriate use of v70.0 and 8.33% of the records were under-coded. In the February data set, 19.15% of the records were over-coded, 63.83% were under-coded, and 17.02% resulted in the same reimbursement level. 0.00% of the records in the February data set used v70.0 as a primary ICD-9-CM inappropriately (see Figure 12).

Figure 12. APG Coding Results

For both the APC and the APG results, the percentage of records with accurate coding of the primary ICD-9-CM and the percentage of records with the correct ICD-9-CM, but in the wrong order was the same in each data set. For the September data set, 37.88% of the records had accurate primary ICD-9-CM coding and 9.09% of the records had the correct ICD-9-CM coded, but in the wrong order. For the October data set, 18.75% had accurate coding for the primary ICD-9-CM code and 19.79% of the records had the correct ICD-9-CM coded, but in the wrong order. For the February data set, 46.81% of the records had accurate primary ICD-9-CM coding and the correct ICD-9-CM was coded, but in the wrong order in 14.89% of the records.

The ADS and medical record APC and APG reimbursement rates were compared to determine the dollar amount associated with over and under-coding and the net reimbursement for each data set. Additionally, the financial impact of the ICD-9-CM order and inappropriate use of v70.0 as the primary diagnosis was analyzed. For the APC reimbursement results, the September data set over-coding resulted in $869.88 reimbursement and under-coding resulted in ($280.92) reimbursement with a net of $588.96. The October data set over-coding resulted in $1,135.63 reimbursement and under-coding resulted in ($382.24) with a net of $751.39. The February data set was $150.42 in over-coding reimbursement and ($756.23) in under-coding with a net of ($605.81). See Figure 13 for the APC Reimbursement Summary.

Figure 13. APC Reimbursement Summary

Closer analysis revealed that five procedures over-coded and two procedures under-coded from the three data sets combined accounted for $748.74. After deducting this amount from the net for each data set, the adjusted net was $51.10, $543.43, and

($599.73) for the September, October, and February data set respectively. The impact of coding the correct ICD-9-CM, but incorrectly selecting the primary diagnosis was $29.22 net for the September data set, $149.91 for the October data set, and $63.87 for the February data set. The impact of the inappropriate use of v70.0 as a primary diagnosis was $71.13 net for the September data set, $97.23 for the October data set, and $0.00 for the February data set.

For the APG reimbursement results, the September data set over-coding resulted in $968.26 reimbursement and under-coding resulted in ($552.54) reimbursement with a net of $415.72. The October data set over-coding resulted in $982.12 reimbursement and under-coding resulted in ($1,347.16) with a net of ($365.04). The February data set was $914.57 in over-coding reimbursement and ($493.44) in under-coding with a net of $421.13. See Figure 14 for the APG Reimbursement Summary.

Closer analysis of the APG data also revealed that inaccurate coding of the procedures made a significant difference in reimbursement. For all three data sets, six procedures were over-coded and one procedure was under-coded accounting for ($1,208.71). After deducting this amount from the net for each data set, the adjusted net was ($179.50), ($258.02), and ($299.38) for the September, October, and February data sets respectively. The impact of coding the correct ICD-9-CM, but incorrectly selecting the primary diagnosis was ($81.66) net for the September data set, $64.29 for the October data set, and $62.76 for the February data set. The impact of inappropriate use of v70.0 as a primary diagnosis was $(263.87) net for the September data set, ($170.71) for the October data set, and $0.00 for the February data set.

Figure 14. APG Reimbursement Summary

Calculation of the total reimbursement of each data set was conducted for both APCs and APGs to determine the impact of third party billing (assuming all encounters were billable and that the outpatient medical record is the truest depiction of the outpatient encounter) from the ADS data. Comparison of the ADS data with the outpatient medical record revealed that billing directly from the ADS data would result in APC over-billing of $422.35 for the September data set, over-billing of $725.43 for the October data set, and under-billing of ($585.78) for the February data set. Total APC reimbursement for the ADS data was an average $5,146.53 and $4,959.20 for the outpatient medical record with a net over-billing of $187.33. See Table 3 for the APC-APG Reimbursement Summary.

Table 3. APC-APG Reimbursement

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Data Source: Monthly and annual figures computed based on individual record reimbursement as determined by the 3M Information Systems APG/APC Grouper

For APGs, the September data set revealed that the SADR would result in $350.96 over-billing; October, ($420.24) under-billing; and February, $389.07 over-billing. Total reimbursement for the SADR was an average $4,831.37 and $4,724.77 for the outpatient medical record with a net over-billing of $106.60. Further analysis

between the APC and the APG revealed that the APC would reimburse $315.17 (net) more than the APG for the ADS data and $234.43 (net) more for the outpatient medical record.

Discussion

The study demonstrated that the implementation of KG-ADS and the use of data quality management efforts do increase the accuracy of provider coding. The first step towards accuracy of coding is ADS compliance. The BS-ADS compliance rates for IMC averaged 96.54% indicating that the physicians were properly filling out the scannable forms and they were being scanned. The decrease in August and September 1999 can be attributed to the phase in period of KG-ADS. KG-ADS was implemented for all clinics in the hospital over a two- month period with all clinics on-line on October 1, 1999. Even though both systems were in place concurrently and training sessions were being conducted, a high level of provider resistance was seen in most clinics and acted as a barrier to the completion of either BS-ADS or KG-ADS.

In October 1999, the compliance rate of 110.28% seems to indicate that the providers were "back on track" and completing the KG-ADS. However; in October, 22.92% of the records were inappropriately coded with v70.0 as the primary diagnosis and only 18.75% of the records had accurately coded primary diagnosis codes. This demonstrates that compliance or completeness does not guarantee accuracy. In November, the compliance rate decreased again, which is possibly explained by provider resistance to completing the KG-ADS and rumors that the support staff would be responsible for completing KG-ADS. The first KG-ADS Appointed Patients Without ADS Record reports were generated in early December 1999 forcing providers to take action and complete the KG-ADS. Continuous monitoring of this report by the administrative assistant and service chief resulted in an average 109.11% compliance rate for the last three months of the study. The compliance rate for each data set followed the same pattern as the compliance rate for all appointment types.

A review of the most common E&M codes demonstrates that the most frequently used E&M codes match the most frequent appointment type in the clinic. According to the template developed for the IMC, EKGs; PFTs; BPCs; and PRXs can only be coded with E&M 99212. These appointment types represent 34% of all appointments in the IMC. Furthermore, TCONs represent 32% of all appointments and can only be coded with 99371, 99372, or 99373. In the most mature data sets, E&M code 99212 and 99371 were the most frequently used E&M codes, which are the correct codes for the highest volume appointment types in the IMC.

Increased coding accuracy is also demonstrated by the primary ICD-9-CM code. The most common diagnosis code should represent the high volume visits in the clinic. The early data revealed v70.0 as the most common diagnosis. The study data revealed that v70.0 was inappropriately coded as the primary diagnosis in an average of 26.61% of the records in the first two data sets, which explains v70.0 as the most common primary diagnosis for July 1999 through October 1999. Fourteen percent of all IMC visits are for prescription refills, which accounts for v68.1 as the secondary diagnosis for July 1999 through September 1999 and primary diagnosis for November 1999 through February

1999. The second most common diagnosis for the mature data is v58.61, which is explained by the Coumadin clinic (70 patients) managed by the IMC. Each patient in the clinic requires follow-up from one to four times each month. Proper coding of patients requiring coumadin therapy was part of the continuous training provided to the IMC staff. Success of the training is indicated by v58.61 emerging as the second most common diagnosis in the mature data.

The procedure coding reveals an interesting trend. As EKG interpretations account for 11% of the total workload, the procedure code 93010 is accurate. However, the code, 93770 is the most common for September and October 1999. This is the transition period from BS-ADS to KG-ADS. The search feature within KG-ADS resulted in the IMC staff looking up the procedure code for blood pressure checks since each patient that presents to the IMC receives a screening blood pressure check. With the goal of complete and accurate coding in mind, the only blood pressure code found, 93770 (Measure venous pressure) was used inaccurately in an average 27.32% of records in the first two data sets. Identification of this trend with an ad hoc report and training of the IMC staff resulted in this code no longer being used.

Training on the use of the E&M code was highlighted during all training conducted in the IMC. Coding of the E&M is difficult and is very subjective. The E&M describes the level of medical service provided by the provider and takes into account variations in the amount of skill, effort, time, responsibility, and medical decision making required during the outpatient encounter. In spite of the training, the percentage of accurate E&M coding decreased and the percentage of E&M under-coding increased. This phenomenon can be explained by the fact that the training sensitized the providers to the risks of over-coding resulting in “cautious” coding and erring on the conservative side to avoid possible penalty of fraud.

The percentage of accurate coding of the primary ICD-9-CM decreased in October and climbed to 46.81% in February. This can be explained by the push to complete the KG-ADS and subsequent inappropriate use of v70.0 as a primary diagnosis. CPT-4 procedure coding is also improving as demonstrated by the increasing percentage of correctly coded procedures. However, the percentage of incorrectly coded procedures is also increasing. This is directly related to a decrease in the percentage of records that have uncoded, but documented procedures. The percentage of records that have coded, but undocumented procedures is also decreasing. The IMC providers have responded to the training on the importance of “code what you document, and document what you code” concept. Additional training may be warranted on the proper coding of the procedures. The first step of getting the procedure data into the system has been taken; the second step of getting the correct procedure data into the system needs improvement.

Analysis of the APC and APG data will focus on the E&M and ICD-9-CM codes since the majority of the visits in the IMC clinic fall into the medical visit category in that significant procedures are not performed in IMC. Since the medical visit APC is based first, on the level of service as indicated by the E&M code and second, by the ICD-9-CM code, patterns of APC accuracy should be similar to patterns of E&M accuracy and ICD-9-CM accuracy (see Figure 15). The decreasing trend of correct E&M codes is consistent with the decreasing trend of records that “break-even” or result in the same reimbursement. The percentage of records over-coded and accurately coded based on the E&M criteria and the APC reimbursement are similar. E&M and APC over-coding

increased in the second data set, but decreased for the third data set. Under-coding followed a reverse trend by decreasing in the second data set and increasing for the third data set for the APC, but increased with each data set for the E&M code. The decreasing trend for accurate E&M coding and "break-even" is also consistent with the increase in under-coded records. Again, this may indicate a need for additional E&M training.

The medical visit APG is based on the ICD-9-CM code, thus, patterns of APG accuracy should be similar to patterns of ICD-9-CM accuracy (see Figure 16). The trend of correct ICD-9-CM codes is consistent with the trend of records that "break-even" or result in the same reimbursement. The trend decreased with the second data set (less accurate) and increased in the third data set (more accurate). This trend is consistent with the learning curve associated with the ability to search on KG-ADS for a diagnosis code if the code is not on the selection list. The search option provides the provider with an overwhelming number of options. Because of this, if the provider does not find the code in the first few attempts, usually any code will be chosen thus reducing the accuracy. With the development of the customized selection lists and use of the "Master Problem List", the search for the correct diagnosis code is reduced and the provider is more likely to choose a more accurate code.

Figure 15. APC and E&M Comparison

Figure 16. APG and ICD-9-CM Comparison

The APC reimbursement trends are identical to the trends of APC and E&M accuracy. The over-coding in the second data set leads to over-billing and the under-coding in the third data set leads to under-billing. The annual impact of over-coding is fraudulent billing of $32,168 and the annual impact of under-coding is ($29,079) loss of revenue. The net annual APC impact is $3,089 over-billed. The annual impact of inaccurately selecting the primary diagnosis code is an over-billing of $3,888 and the annual impact of inappropriately using v70.0 as the primary diagnosis is an over-billing $4,041. While these figures are small in relation to the overall budget of the hospital, the IMC only represents 6.3% of the outpatient workload in the MTF. If similar coding behaviors were found in the high volume clinics such as Family Practice (31.7% of the outpatient workload), the annual impact would be much greater.

Similar to APCs, the APG reimbursement trends are identical to the trends of ICD-9-CM coding accuracy. The increase in over and under-coding in the second data set leads to decreased ICD-9-CM coding accuracy and subsequently, under-billing. The annual impact is a loss of ($17,522). Conversely, the decrease in over and under-coding in the first and third data set leads to increased ICD-9-CM accuracy, but also over-billing with an annual impact of $20,084. The net annual APG impact is $2,562 over-billed. The annual impact of inaccurately selecting the primary diagnosis code is an over-billing of $726 and the annual impact of inappropriately using v70.0 as the primary diagnosis is an annual loss ($10,430). With the use of the APG, the inaccurate coding of the ICD-9-CM has a larger impact on reimbursement than the inaccurate coding of the E&M code.

The total APC-APG reimbursement analysis revealed that the ideal reimbursement data is the medical record data (most accurate) and the use of the APC for reimbursement. This is important to note since DoD will most likely use APCs over APGs due to the fact that HCFA is implementing APCs. The reimbursement of APCs will become critical if they become the basis of the Medicare Subvention demonstration

or when Medicare Subvention becomes the standard at all MTFs. Since APCs are categorized based primarily on the E&M and the ICD-9-CM, provider training must and data quality efforts must be directed toward improving E&M and ICD-9-CM coding accuracy. Furthermore, the impact of improperly coded procedures on reimbursement cannot be overlooked.

Conclusions and Recommendations

First and foremost, command support of data quality management efforts is essential to the successful implementation and use of KG-ADS. Secondly, the implementation of KG-ADS must be conducted incrementally within the MTF. The recommendation is to start with smaller clinics with a small number of possible diagnoses and procedures and work up to the larger clinics. Success in the smaller clinics will increase "buy-in" from providers in the larger clinics. Physician "buy-in" is critical to the successful implementation of KG-ADS within the MTF. PASBA has also created a KG-ADS Clinic Activation Checklist (see Appendix K) that provides a step-by-step process to ensure successful implementation.

Training is an extremely important aspect in KG-ADS implementation. The providers must not only know how to engage the information system; they must know how to completely and accurately code the outpatient encounter. Training should be conducted at the clinic or service level to allow maximum interaction and explanation of service unique situations. Training must be continuous and provided at the individual level if necessary. Training should also focus on the accurate coding of E&M and ICD-9-CM codes to include proper ordering of the ICD-9-CM codes. System characteristics such as the "Email to Coder" and "Master Diagnosis List" must be emphasized and their use encouraged. The use of the diagnosis and procedure search feature is not recommended. Use of this feature results in a decrease in the accuracy of coding.

Training efforts should also focus on the documentation in the outpatient medical record of the outpatient encounter. Documentation must be complete, accurate, and represent the interaction between the physician and the patient. Furthermore, the information documented in the outpatient medical record must also be coded in KG-ADS and vice versa, what is coded in KG-ADS must also be documented in the medical record. Fraud occurs when the ADS data is not supported by proper documentation; however, a loss of revenue occurs when the provider does not document or code the services provided in ADS.

All efforts must be made to facilitate the coding process for the physicians. Development of a template or "cheat sheet" of the most common types of encounters will increase accuracy of coding. Also, customization of the diagnosis and procedure selection lists as determined by the providers will also facilitate input of accurate codes. The ADS systems manager and coding specialists must be ready to provide responsive and continuous coding training and support.

The ADS Compliance metric must be monitored on a monthly basis by clinic or service (third level MEPRS) and by provider, if necessary. Ensure that the providers are aware of the cutoff date and allow them the maximum time to complete their records. Ideally, the providers will complete the KG-ADS on a daily basis; however, the WWR is not available until the tenth day of the next month. Individual provider compliance reports (Appointments with No ADS Records by Clinic) can be provided at any time. Local

commanders may even consider linking provider level compliance with the granting of leave, TDY, or, if necessary, privileging. Third party reimbursement to the clinic or service level of the revenue earned through the accurate coding practices of the physicians may also provide an incentive to improve individual coding for the collective good of the clinic and the patients.

Finally, periodic outpatient medical record audits will provide the clearest picture of the coding accuracy in the MTF. The data in the ADS database must be compared to the coding results from a certified coder. This will facilitate identification of "trouble areas" that may require additional training or a review of the process. In conjunction with the audits, the ADS

system manager can continuously create ad hoc reports to identify trends such as overuse of a single ICD-9-CM code or overuse of a high or low level E&M code.

The key to successful implementation of KG-ADS is two tiered. The first tier is compliance and the second tier is accuracy. Coding accuracy is the key to maximize reimbursement, while avoiding fraud. While cautious coding is better than aggressive coding, under-coding may result in decreased reimbursement resulting in decreased resources with which to provide services. On the other hand, aggressive coding leads to over-coding resulting in increased reimbursement and revenue, but the risk of fraud is also increased, which carries a stiff penalty. A third order effect of over-coding is the loss of revenue resulting from the bad press associated with fraud and litigation.

Recommendations for further study include analysis of the increase of third party revenue and provider output by adding a coder to the clinic. Determination of whether additional money earned through third party reimbursement will pay for the coder's salary may be worth investigating. Also, follow-up studies on the data quality one year after the implementation of the data quality management efforts to determine the level of improvement of coding with time and continuous training. Also, study of the higher volume clinics is also warranted to gain a better understanding of the impact of data quality on the facility.

Data quality is essential to the efficient operation of any type of organization. Data quality management efforts must be directed at the source of data entry to prevent data collection mistakes from snowballing as the data is processed through an information system. Accurate data directly impacts resources to include human resources and financial resources, which directly impact the ability of an organization to accomplish their mission. Data quality is

everyone's responsibility and poor data quality impacts each stakeholder in the organization. Data quality management efforts are easily implemented while the payoff can be significant.

Appendix A – Internal Medicine Clinic Bubble Sheet

(Image not included due to space constraints)

Appendix B – Internal Medicine Clinic KG-ADS Data Entry Screen

Appendix C – Internal Medicine Clinic Coding Template

EMBED Excel.Sheet.8
Appendix D – Customized Internal Medicine Clinic KG-ADS Data Entry Screen (Page 1)

Appendix D – Customized Internal Medicine Clinic KG-ADS Data Entry Screen (Page 2)

Appendix D – Customized Internal Medicine Clinic KG-ADS Data Entry Screen (Page 3)

Appendix E – KG-ADS Report: Appointments with no ADS Records by Clinic

Appendix F – KG-ADS Report: ADS Records with Unresolved Coding Issues

Appendix G – KG-ADS Report: ADS Interface Error Report (Page 1)

Appendix G – KG-ADS Report: ADS Interface Error Report (Page 2)

Appendix H – ADS Record Audit: Data Collection Sheet

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Appendix I – Coders Audit Worksheet

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Appendix J – Description of Information Systems

Ambulatory Data System (ADS) – The purpose of ADS is to capture outpatient encounter data such as the E&M, ICD-9-CM diagnosis, and CPT-4 procedure code. The demographic data is migrated from the SDCS CHCS. The provider (caregiver) enters the outpatient encounter data through a scannable bubble-sheet or from the CHCS module, KG-ADS. The data captured in ADS is transmitted nightly to the Standard Ambulatory Data Record (SADR) (PASBA, 1999a; TMSSC, 1999).

Composite Health Care System (CHCS) – CHCS is an automated medical information system designed to support MTFs in providing comprehensive, high quality healthcare. CHCS functions include: Patient registration, admission, disposition, and transfer; Inpatient activity documentation; Outpatient administration data; Appointment scheduling; Laboratory services; Drug/laboratory test interaction; Quality assurance; Radiology services; Clinical dietetic administration; Pharmacy services; Results reporting and order entry; Ad Hoc reporting; and numerous administrative functions to assist healthcare administrators maximize the delivery of healthcare services (CHCS Homepage, 1999).

WorldWide Workload Report (WWR) – The WWR is a system designed to collect, summarize, and report inpatient, outpatient, and ancillary workload in accordance with (IAW) the requirements of DoDI 6015.23. The SDCS for the WWR is CHCS. The WWR is created in CHCS on the fifth working day of the month after the reporting

month and transmitted to PASBA no later than (NLT) the tenth working day of the month. PASBA then transmits a year-to-date report to Fort Detrick, Maryland on a monthly basis (WWR User's Manual, 1998).

Medical Expense and Performance Reporting System (MEPRS) - MEPRS is an information system that reports expenses, manpower, and workload performed by the MTF. Many resource (manpower and monetary) decisions at the RMC level and higher are based on the data contained in MEPRS. The quality of data in MEPRS is directly related to the quality of data in CHCS. CHCS is the source of workload data used in MEPRS (MEPRS Homepage, 1999).

Standard Ambulatory Data Record (SADR) – The output of the ADS is the SADR. The SADR workload data is used to determine the SADR Timeliness Metric, which measures the ADS compliance rate. The SADR is also used to determine patient populations for Putting Prevention Into Practice (PPIP), case management, disease management, and to evaluate MTF and provider performance (PASBA, 1999a; PASBA, 1999c).

Appendix K – KG-ADS Clinic Activation Checklist

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Table 1. Internal Medicine Clinic Workload

EMBED Excel.Sheet.8

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Data Accuracy

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