Logistics Management Institute

Control of Pharmaceutical Products in the Department of Veterans Affairs

VA402MR1

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Executive Summary

The Department of Veterans Affairs (VA) operates the largest healthcare system in the United States. That system includes 224 pharmacies that dispense over $900 million worth of pharmaceutical items annually. The VA needs material controls to ensure that pharmaceutical products are used appropriately. Those controls should be economical to maintain, and consistent with the best practices elsewhere.

A review of regulatory requirements and best practices at other similar facilities allows several conclusions about the VA's pharmacy controls.

The VA's practices are already as comprehensive as in most other healthcare systems. Those practices include very strict controls over controlled substances, limited access, and use of alarm systems and security devices. Those practices do not include maintenance of perpetual inventories for noncontrolled substances or explicit measurement of control.

The VA has an excellent opportunity to enhance its pharmacy control and also improve productivity. It is already recording all issue transactions in the automated system, and it is automating the recording of receipts from prime vendors. All the necessary information will be available in the system to track balances without any additional data entry by pharmacy staff. The VA is developing a perpetual inventory capability, thereby enabling the automated system to produce recommended prime vendor orders. Taking advantage of that opportunity would free up some manpower currently allocated to the daily ordering function.

The financial accounting system imposes little control over pharmaceutical items. The VA expenses pharmacy items upon purchase from a prime vendor. If those items were treated as assets, as in most nongovernment organizations, they would not be expensed until they left the VA medical center. Financial control would be retained during their ownership by the VA and thus provide a greater level of material control, because assets would be closely guarded to protect the integrity of the financial records.

The VA needs a standard internal measure of control for pharmacy material. Without a performance measure, the VA cannot monitor and improve its control.

Once internal control standards are established and monitored, the VA needs to focus on specific elements of control to meet those standards. The most promising ones not already in use include frequent review of sales and receipts data to detect diversion, and restrictions on the range, depth, and locations of stocked items.

We specifically recommend the following actions:

- The Information Services Center Birmingham should continue its systems improvement efforts to incorporate perpetual inventory accounting and automated receiving into the Decentralized Hospital Computer Program.

- Each VA pharmacy should keep perpetual inventory balances for all items.

- The Birmingham center should further develop the hospital software to compute recommended prime vendor orders.

- Each medical center should measure and report pharmaceutical inventory turns to the Director, Pharmacy Service.

- Each pharmacy should audit 10 items daily and report the results of those audits monthly to the Director, Pharmacy Service, using internal control indices of inventory accuracy.

- Each pharmacy should incorporate other industry "best practices." Those include treating drug stocks as financial assets, minimizing the amount of material to control by using formularies and active inventory management, and frequently comparing receipts and usage data to detect diversion. In addition, the VA should continue its other security practices already in place.

- The Director, Pharmacy Service, should establish acceptable VA standards for inventory turns and the internal control indices used for auditing. Those standards should initially be based on the median values of the measures reported by each pharmacy director.

- Each pharmacy should perform additional practices to safeguard pharmacy stocks as deemed necessary by the pharmacy director to raise its control indices to the defined standards. Those practices include counting additional items to discover errors quickly, screening new employees, performing loss prevention awareness activities, using scanning equipment to minimize errors, and using automated storage devices to ensure that transactions are recorded when stocks are issued.

We believe that by these actions the VA can measure its degree of pharmacy material control, improve that control over time, and become more productive. In doing so, it will become the material control model for other pharmacy organizations to follow.

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CHAPTER 1

Introduction

The Department of Veterans Affairs (VA) operates the largest healthcare delivery system in the United States. That system includes 171 medical centers; more than 350 outpatient, community, and outreach clinics; 126 nursing home care units; and 35 domiciliaries. The VA facilities provide a broad spectrum of medical, surgical, and rehabilitative care. Altogether, almost one-third of the nation's population — approximately 70 million veterans, dependents, and survivors of deceased veterans — are potentially eligible for VA benefits and services. An average of 40,000 beds are occupied at VA medical centers and another 66,000 patients are seen daily on an outpatient basis.

The VA healthcare system includes 224 pharmacies that dispense over $900 million worth of drugs each year, approximately 6 percent of the VA's total medical budget. As pharmaceutical prices rise, so does the Department's interest in preventing theft, loss, damage and misuse. The Director, Pharmacy Service, in the VA's Veterans Health Administration wants to establish a model program to strengthen control of pharmaceuticals and has taken a number of steps in that direction, especially for Drug Enforcement Administration (DEA)-controlled substances. For the medical centers' inventories of noncontrolled substances, standard control methods and procedures have not yet been established, although new automated systems are being developed that will support greater control. The VA needs a control system that not only provides a high level of confidence that pharmaceutical products are being appropriately used, but also is based on the best pharmaceutical practices and is economical to maintain.

The remainder of this report is organized into four chapters and two appendices. Chapter 2 describes the environment under which the VA operates and discusses applicable government standards, accounting practices, and possible ways to safeguard drug stocks. Chapter 3 describes current VA pharmacy practices, and Chapter 4 presents the best practices we found from visiting other pharmacy organizations. Finally, Chapter 5 presents our conclusions and recommendations on pharmacy material control. Appendix A includes data from our benchmarking study (discussed in Chapter 4), and Appendix B contains a framework for inventory auditing of pharmacy stocks and subsequent performance reporting (discussed in Chapter 5).

CHAPTER 2

The Pharmacy Environment

We divide our discussion of the environment under which VA operates its pharmacies into three broad categories: the regulatory baseline, accounting for inventory, and possible ways to safeguard pharmacy stocks. Each is discussed below.

THE REGULATORY BASELINE

Our tasking called for us to develop a regulatory baseline that represents the required level of control for pharmacy stocks as defined by various Federal regulatory bodies. Although the laws are filled with references to drugs or pharmaceuticals, most of those references do not pertain to material control within the pharmacy. There are three Federal regulations that apply to controlling pharmaceuticals in the VA medical centers:[1] the Controlled Substances Act[2]; the Federal Food, Drug, and Cosmetic Act[3]; and the Federal Managers' Financial Integrity Act of 1982 (FMFIA).[4]

The Controlled Substances Act is intended to prevent the improper use of drugs with useful medical purposes but potential for abuse. It specifically defines controlled substances as those that have been added to one of five control "schedules" by the Attorney General. The criterion for adding drugs to the five schedules is that they have potential for abuse. Schedule 1 drugs have high potential for abuse and have no currently accepted medical use in the United States. Drugs on Schedules 2 through 5 have currently accepted medical uses, with Schedule 2 having the highest potential for abuse and Schedule 5 the lowest. As of April 1994, there were 153 classes of drugs categorized as controlled substances on Schedules 2 through 5. Most pharmacies hold many more noncontrolled substances than controlled ones, with the VA being no exception.

Controlled substances must be very carefully tracked. The DEA, which administers the Controlled Substances Act, requires a 100 percent accurate record of receipts and issues. All dispensers of controlled substances must be registered

[1] Other Federal regulations specifically relate to the transport, import, and export of drugs but not to their material management and dispensing them.

[2] Controlled Substances Act, 21 United States Code (U.S.C.) 801 – 904.

[3] Federal Food, Drug, and Cosmetic Act, 21 U.S.C. 353.

[4] Public Law 97-255.

with the Attorney General's office and are subject to inspection by the DEA. The DEA can look for a variety of required items listed in the Code of Federal Regulations[5] (e.g., vaults), but from the standpoint of material recordkeeping, they ascertain that the dispenser is recording all transactions (receipts and issues) accurately. Technically, there is no allowance for losses whatsoever. The penalty for noncompliance is a fine of at least $25,000 and possibly imprisonment (if there was fraudulent intent).

The Federal Food, Drug, and Cosmetic Act governs prescription drugs. It requires approval for distribution of all drugs by the Secretary of Health and Human Services, through the Food and Drug Administration (FDA). Drugs approved for distribution must be dispensed (by a pharmacist) upon the prescription of a licensed practitioner. Each state has laws that govern the licensing of pharmacists and physicians. The Secretary of Health and Human Services can also give drugs over-the-counter status by exempting them from the prescription requirement. The act states no specific control standards, but the intent is to control most drugs by allowing only qualified individuals to prescribe and dispense them. The prescription drug laws are enforced by state and Federal law enforcement officials, and the penalties for violating them cover a wide range of fines and imprisonment. Non-VA practitioners we spoke with indicated that stateboards of pharmacy periodically inspect their pharmacies to ensure that these and other local regulations are satisfied.

The FMFIA makes Federal agencies responsible for establishing internal controls that provide "reasonable assurances" that property and assets are "safeguarded against waste, loss, unauthorized use, and misappropriation." The FMFIA applies not only to drugs (controlled, noncontrolled, and over the counter) but to all material and property that the VA owns, including the medical supplies, furniture, and equipment in the medical centers. We found other Federal publications that define the implementation details of the FMFIA, but none addresses specific control standards applying to drug stocks.

Theoretically, one would think that noncontrolled substances have little likelihood of diversion and therefore require no special controls to prevent it. Realistically, that is not the case. Several individuals we interviewed, including both pharmacists and law enforcement officials, indicated that there are some drugs not classified as controlled substances that have significant potential for abuse. They also said that there are noncontrolled drugs with high value when diverted from legal distribution channels. In both cases, certain noncontrolled substances are candidates for diversion because they are *not* subject to the tight controls of the Controlled Substances Act but have value when distributed illegally.

In summary, there are three levels of control currently dictated by Federal regulation: complete and accurate record control for controlled drugs, dispensing control for controlled and noncontrolled prescription drugs, and general safeguarding of property for all drugs. Only the controlled substances have

[5]Drug Enforcement Administration, Department of Justice, 21 Code of Federal Regulations (CFR) 1301 – 1316.

specific control standard requirements. All controlled substances and some non-controlled substances have potential for diversion.

ACCOUNTING FOR INVENTORY

There are no official accounting standards in the Federal government. The Federal Accounting Standards Advisory Board (FASAB) was established in 1990 to recommend standard accounting principles for the Federal government. The Board has published its recommended standards but, to date, they have not been adopted.

Its standards[6] define two specific types of property of interest in this study: "inventory" and "operating materials and supplies." Inventory is defined as "tangible personal property that is (1) held for sale, (2) in the process of production for sale, or (3) to be used in the provision of services for a fee." Operating materials and supplies are defined as tangible personal property to be consumed in normal operations. Under these strict definitions, pharmacy stocks should be classified as operating materials and supplies rather than inventory, since the VA does not sell its services to veterans.

The FASAB standards require the "consumption" method of accounting for operating materials and supplies. Essentially, the operating materials are recorded as assets when they are purchased and are then expensed when they are issued to an end user or consumed in normal operations. The same is true of inventory items (there are, however, other differences). Operating supplies that are not of significant value may be expensed upon purchase. The VA currently does not treat any of its drug stocks as assets, even though the value of those stocks is considerable — an estimated $56 million.

In contrast, the private sector view of accounting for inventory is well defined. Generally accepted accounting principles[7] classify material of value as inventory; that material is held as an asset on the balance sheet and then expensed when issued.[8] In essence, this treatment is the same as that proposed by FASAB. The National Performance Review has recommended that the issuance of Federal

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[6] Federal Accounting Standards Advisory Board, *Statement of Recommended Accounting Standards No. 3*, Executive Office of the President, Office of Management and Budget, July 1993.

[7] *Intermediate Accounting*, by Kieso and Weygandt (John Wiley and Sons, 1989; p. 15), defines "generally accepted accounting principles" as those that have "substantial authoritative support." It further states that accounting principles published by the American Institute of Certified Public Accountants (including the Committee on Accounting Procedure, the Accounting Principles Board, and the Financial Accounting Standards Board) are considered generally accepted.

[8] Kieso and Weygandt, p. 344, states that generally accepted accounting principles define inventories as "asset items held for sale in the ordinary course of business or goods that will be used or consumed in the production of goods to be sold." Items of value are considered assets.

financial accounting standards be accelerated.[9] If FASAB standards are eventually accepted, then the VA will be forced to treat its drug stocks as assets. That treatment, in turn, will provide pharmacy managers with greater visibility of the material they must control, and it will subject them to the scrutiny of those responsible for providing accurate financial reporting information about the medical centers.

Possible Ways to Safeguard Stocks

We have identified a number of possible methods to safeguard stocks held in the VA pharmacies, some of which are already in practice in many cases. The ones that offer the most potential are the following:

- *Reduce or eliminate stocks and locations.* The less stock there is to control, the greater the level of control. The range of items stocked can be reduced through the use of formularies, and the depth of stocks can be reduced through the introduction of an active inventory management and ordering system (automated or manual). Reducing or eliminating satellite locations also serves to reduce overall stocks needed to support an operation.

- *Limit access.* Giving fewer people access to pharmacy stocks means fewer mistakes and less likelihood of diversion. This technique is common to many pharmacies, including those at the VA medical centers.

- *Record all transactions.* Accurate recordkeeping of issues and receipts serves two purposes. First, it provides a record that can be reviewed in instances where losses are detected. Second, it can actually serve to deter someone from making mistakes or diverting stocks. In the pharmacy business, this is common only for controlled substances.

- *Screen new employees who will be handling stocks.* Screening activities can include past employment verification, multiple interviews, personal reference checks, criminal conviction checks, credit checks, driving history checks, education verification, and drug screening.

- *Compare issues with receipts to detect diversion.* Experienced pharmacists can review this information to spot either excess usage of a particular drug or large imbalances between receipts and issues. The use of a perpetual system inventory balance that is occasionally checked can aid the pharmacists performing this review. The idea behind this review is to spot diversion soon after it takes place. The sooner it is detected, the less stock will be diverted.

- *Perform cycle counts and inventory verification.* Periodically checking computer inventory balances against actual balances allows pharmacy managers to detect problems early. Early detection, in turn, will help them uncover and

[9] *Report of the National Performance Review, Creating a Government that Works Better and Costs Less*, U.S. Government Printing Office, September 1993, p. 162.

correct procedural or other problems that could result in future losses. The more frequent the counting, the more accurate the system inventory balances become, and the higher the ultimate degree of control achieved.

- *Use loss-prevention security systems.* Prevention systems in use today include the following: observation mirrors, live closed-circuit television, locking devices, secured storage, electronic tags, plainclothes detectives, uniformed guards, and simulated closed-circuit television.

- *Use scanning equipment to improve accuracy.* The use of scanners can reduce or eliminate human errors from the receiving and dispensing processes.

- *Use automated issuing equipment to ensure accurate transaction recording.* Advanced point-of-use medication systems such as the ones produced by Pyxis can make it easier for nurses, practitioners, and even pharmacists to obtain medications while still ensuring that transactions are recorded. Essentially, the transactions recording process is semiautomated and takes place while the users obtain their pharmacy items. In many ways these devices are like vending machines or automated teller machines found at banks.

Other practices we identified include the following:

- *Separate ordering and receiving duties.* The chance of diversion is lessened by having separate individuals order and receive stocks. One individual alone cannot order stocks and then divert them before they are received into the automated system if these duties are separated. This practice is common in VA pharmacies.

- *Monitor the accounting system for errors, incorrect use, or unauthorized use.* Checks can be added to the automated system to detect inconsistencies in recordkeeping. An example might be an open order with no receipt, or a transaction recorded twice.

- *Pursue loss-prevention-awareness programs.* These programs can include discussions with new employees, periodic review for all employees, bulletin board posters, training videotapes or audiotapes, honesty incentives, anonymous telephone hot lines, newsletters, and paycheck stuffers.

- *Check employees exiting areas containing stocks.* This requires instituting security checks of employees exiting pharmacy areas to ensure that drug stocks do not leave the pharmacy without proper authorization.

- *Control trash removal.* It is possible that stocks could be removed from the pharmacy without notice by placing (or accidentally dropping) them in the trash. By instituting some mechanism to examine the trash upon its removal, this possible avenue of loss or diversion is closed.

In Chapter 3 we examine the methods the VA uses, and in Chapter 4 we contrast its approach to what we found other organizations were doing to control and safeguard their pharmacy stocks.

CHAPTER 3

VA Material Control Practices

Although each VA pharmacy operates somewhat differently, they all have similar material control practices. In this chapter we summarize the material control practices at the pharmacies in terms of performance measurement, focus, operations and processes, and control mechanisms. We also discuss the Decentralized Hospital Computer Program (DHCP), the automated system common to all VA pharmacies. That system interfaces with the medical center's financial system known as the Integrated Funds Distribution Control Point Activity Accounting and Procurement (IFCAP) system.

PERFORMANCE MEASUREMENT

In order to understand the relationship between the level of control and the cost of that control, it is important for us to be able to measure control. Unfortunately, control is not explicitly measured at VA pharmacies (nor is it measured in most other pharmacy organizations). At the VA, with the exception of controlled substances, there are no perpetual inventories and therefore no measurements of system accuracy or inaccuracy. In fact, it is difficult to really know how much inventory exists at each pharmacy. Inventories are not taken (for noncontrolled substances), and losses or gains over time are not routinely tracked. Although pharmacy directors are very much aware of control issues and have taken steps to prevent losses and diversion, they have not taken steps to measure control levels. For controlled substances, the issue is somewhat less important because, while there is no explicit control measure, the control requirement calls for accurate recordkeeping, and that requirement is met and verified through frequent inventories of the scheduled drugs.

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The pharmacies focus their material control efforts on preventing and detecting diversion, not on protecting financial assets from loss. Primarily, VA pharmacy directors want to ensure that drug stocks do not fall into the wrong hands. Although each pharmacy director has a limited budget for pharmaceutical spending each year, we believe that dollar losses of drugs are of secondary concern to them in controlling material. The pharmacies do not take periodic inventories of their stock to determine its value, and most pharmacy directors are not aware of the dollars invested in their pharmacy's drug stocks .

While the VA pharmacies put no formal emphasis on inventory management, medical center drug stocks have decreased significantly as confidence in the prime vendor program has grown. Prior to the program, VA pharmacies ordered much less frequently (as a consequence of the supply support system then in place), and experienced long lead times (weeks) for some items. Under the prime vendor program, orders are placed daily and received, for the most part, the following day. As the prime vendor contractors prove their reliability, the pharmacies are storing less buffer stock and ordering more frequently. The net result is far less inventory (and more usable space) in the pharmacies. Less inventory, in turn, means that the amount of material the pharmacies must control is much lower. A typical amount of stock on the shelf currently is two weeks of supply. Prior to using prime vendors as suppliers, this number was closer to two months.

Operations and Processes

Almost all of the stocks found in VA pharmacies are supplied by a local prime vendor. The pharmacy places daily orders from its vendor, usually using a terminal connected directly to that vendor's automated system. Items are received the following day and placed into stock. Pharmacy staff supply financial information to the medical center's IFCAP system to allow the prime vendor to be paid, but they generally do not enter specific amounts of material ordered into that system when necessary. Actual receipt quantities are not entered into DHCP, either, as that system does not currently track inventory balances. The balances of controlled substances are tracked manually. Material is expensed on the pharmacy budget when it is purchased.

All dispensing is done using DHCP, and each transaction is recorded. That system keeps track of not only what was issued but also to whom. Each day, pharmacy personnel (usually technicians) review on-hand stocks and order more. No formal ordering parameters (reorder points or order quantities) exist either manually or within DHCP.

Control Mechanisms

Three control mechanisms in use at VA pharmacies are worthy of discussion.

First, ordering and receiving duties are separated. The individual responsible for checking and receiving drug stocks from the prime vendor is different from the one who orders the material. Theoretically, this means that it would take two people to divert material, because one would have to order it and then the second would have to divert it immediately prior to receipt. Unfortunately, because inventory balances of drug stocks (except controlled substances) are not maintained, this system is still vulnerable to diversion after the material is received without anyone immediately noticing. The practice of separating

ordering and receiving duties would be more effective if accounting control (e.g., inventory balances) were maintained until drug stocks were issued.

Second, access to pharmacies is limited. Only personnel assigned to the pharmacy (usually pharmacists and technicians) are allowed access to the pharmacy. In most cases no more than a few individuals are allowed inside the vault containing the controlled substances. In addition, most VA pharmacies have some kind of security or alarm system to prevent access by unauthorized people when the pharmacy is closed. Controlled access and security systems are sound ways to safeguard pharmacy material because they limit the number of personnel with the opportunity to divert drug stocks.

Third, controlled substances are inventoried frequently (usually every 72 hours), and accurate issue and receipt records are kept. Because of these frequent inventories and the limited access to the controlled drugs, the process of identifying and resolving inventory balance problems is greatly simplified. This tight level of control is driven by the DEA-enforced regulations in the Controlled Substances Act. In essence, there is a basic level of control applied to all items, and then a tight and effective level of control applied to controlled substances.

THE AUTOMATED SYSTEM

The VA uses the DHCP in its pharmacies and other parts of its medical centers. That system contains many pharmacy modules, but two under development are of interest in material control: "Controlled Substances" and "Drug Accountability/Inventory Interface." Those modules will eventually lead to some significant changes in the way the VA controls its material in the future.[1] In this section we describe developments in three areas of particular interest: the maintenance of perpetual inventory balances, the ordering process, and special features for controlled substances.

The DHCP will eventually maintain inventory balances for both controlled substances and noncontrolled substances. The dispensing process is already automated, and all dispensing transactions are recorded in DHCP. Prime vendors will send electronic receipt information (using electronic data interchange) to the IFCAP system. IFCAP will, in turn, send that information to DHCP. Unit-of-purchase quantities will be converted to tablet quantities for use by DHCP. When those modifications are completed, DHCP will have all the information it needs to track inventory balances. The controlled substance inventory balances will be updated on line, while the noncontrolled item records will be updated in a batch mode.

[1] Early versions of each module are currently in use, however those modules are being revised to provide more of the capability described here.

The DHCP could be even more useful in controlling pharmacy stocks if it could calculate quantities of drug stocks to order daily and then transmit those quantities directly to the prime vendor's automated system.[2] However, there are currently no plans to automate the calculation of stock replenishment quantities and subsequent ordering from the prime vendor in any way. There is a reorder point field in the data base for information purposes only, but there is no current intention to use that reorder point along with a reorder quantity to drive orders. Also, there is no current plan to use historical data to automatically set reorder points and order quantities. There are, however, three ways that the order calculation and placement process could be automated in the VA environment:

- *Using DHCP.* Some capability would have to be built in to handle the setting of reorder points and order quantities (either manually or automatically). In addition, the capability to produce suggested orders, edit them, and then send them to the prime vendor's automated system would have to be added.

- *Using the IFCAP system.* The IFCAP General Inventory Package (GIP) module already has this capability. The inventory balances, however, would first have to be converted to units of purchase and then placed in the appropriate IFCAP record (from DHCP). The IFCAP system would also have to be linked to the prime vendor's automated system in some way.

- *Using the prime vendor.* DHCP could be set up to transmit balances to the prime vendor's automated system. The VA could establish with the prime vendors some parameters to follow in providing stock (e.g., specified percentage availability and specified turns per year) and then let the prime vendors determine when and how much to send.[3]

The advantage to the VA in automating order calculation and placement is that, combined with perpetual inventory balances, it will reduce labor costs and possibly further reduce inventory investment.

The DHCP Controlled Substances module essentially automates current manual processes for tightly controlling these items. Its capabilities include

- accommodating portable data-entry units,

- maintaining perpetual inventories,

- releasing orders inside the vault,

- allowing inspections (by DEA personnel) using the portable data-entry units,

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[2] Pharmacy staff could verify system-calculated quantities and change them if needed prior to transmitting them to the prime vendor's automated system.

[3] This option would provide an additional control advantage, in that the ordering decisions would not be made by someone in the pharmacy with the opportunity to divert the material when it is received.

- providing an automated form for handling destruction,
- making system checks on inventory balances prior to dispensing, and
- allowing user verification of inventory balances immediately prior to dispensing.

In summary, the focus of automation has been on dispensing, and is now on controlled substance processes and maintenance of perpetual inventories for noncontrolled substances. The next logical step for further DHCP development is to zero in on the automated placement of orders with prime vendors.[4] By automating that step of the pharmaceutical receipt and issue cycle, the VA could increase its productivity and reduce its inventory investment.

SUMMARY

Although the VA does not measure control levels, it has pharmacy material control practices in place that focus on preventing diversion. Those practices include the separating of ordering and receiving duties, limiting and monitoring access, and taking frequent inventories of controlled substances to ensure record accuracy in accordance with DEA-enforced regulations. The VA is strengthening those practices by adding inventory balance tracking in DHCP for all items. With that improvement, the VA will have the opportunity to manage its purchases more carefully and improve its productivity by automating orders. In the next chapter, we examine the material control practices of other pharmacy organizations to find further ways to enhance control within the VA pharmacies.

[4] As a further extension to this, the prime vendor could supply each VA pharmacy with important information (e.g., historical receipts) that could be used to better manage and control stocks. Later in this report we discuss comparing receipts data against issues data to detect diversion. The receipts data could be supplied from either the VA's automated system or from the prime vendor's system.

CHAPTER 4

Material Control Benchmarks

Benchmarking is the continuous process of comparing the performance or practices of an organization against the best practices of other organizations. As part of this study, we performed a functional benchmarking analysis of material control practices involving 10 organizations that handle sensitive material. Instead of a continuous process of comparison, however, we compared control at the VA and the other organizations at a single point in time. Our intent was to explore the relationship between control and the cost of that control, and to identify other organizations' best control practices that are most applicable to the VA pharmacies.

We selected organizations that manage pharmaceuticals in support of hospitals with inpatients and outpatients, health maintenance organizations (HMOs), and retail outlets. We also benchmarked a military ammunition supply facility because of the similarities to the sensitive nature of the inventory and the implications of its diversion. We focused primarily on inventory control drivers, processes and procedures, and collected some performance measurement information to study the relationship, if any, between the levels of control and the cost of that control. This chapter reflects the data that we compiled on each organization that participated in the benchmarking analysis and some general findings on the practices of those organizations in controlling their material.

PARTICIPATING ORGANIZATIONS

Ten organizations participated: four hospitals, two health maintenance organizations, two retail pharmacies, one third-party pharmacy service provider, and one DoD Ammunition Supply Point (ASP). Those organizations are listed below. We visited each facility, obtained the desired data, and observed the actual operation.

- Bremo Pharmacy, Richmond, Va.
- Ukrop's Supermarkets, Richmond, Va.
- Mercy Hospital, Wilkes-Barre, Pa.
- University of Maryland Medical System, Baltimore, Md.
- Kaiser Permanente, Reston, Va.
- Walter Reed Medical Treatment Facility, Washington, D.C.

- The Mayo Clinic, Rochester, Minn.
- Choice Drug Systems, Baltimore, Md.
- Group Health Cooperative, Seattle, Wash.
- DoD Ammunition Supply Point.

Table 4-1 describes each of the participating organizations. To maintain confidentiality of the information provided by the benchmark organizations, we have identified each by a letter. The first row of the table indicates whether the participating organization is a retail organization, an HMO or hospital pharmacy, a third-party pharmacy service, or an ASP. The next three rows of the table indicate the method of control over Schedule 2 drugs; Schedules 3, 4, and 5 drugs; and nonscheduled drugs. "Units" signifies that the organization monitors the on-hand quantity of inventory units, either perpetually or at discrete points in time. "Value" signifies that the organization monitors only the value of its inventory at discrete points in time for accounting purposes.

The fifth row identifies whether the organization treats its inventory as an asset account or an expense item. The sixth row indicates the frequency of wall-to-wall inventories of the organization's entire on-hand stock. The seventh and eighth rows show whether the organization uses a computer to maintain perpetual on-hand balances of its total inventory, and to automate the calculation of items and quantities to order from the prime vendor.

The last four rows of Table 4-1 provide operational performance data for each of the organizations. The ninth row identifies the number of inventory turns per year as determined by the ratio of annual sales to inventory value. The 10th row, unless otherwise noted, identifies the number of prescriptions plus, as applicable, the number of inpatient doses issued annually. Note that most of the operations studied involved outpatient prescriptions as opposed to inpatient unit doses. The 11th row identifies the number of full-time-equivalent (FTE) employees involved in actually running the operation. The last row identifies the ratio of scripts and orders processed on a weekly basis to the number of FTE employees.

CONTROL STRATEGIES

Performance Measurement

In this study, we sought to define the relationship between the level of control and the cost of that control, but we were unable to do so. Most organizations do not measure material control explicitly, and when we examined the relationship between types of control employed and overall productivity (an indicator of cost), we found no consistent patterns.

Table 4-1.
Characteristics of Benchmark Organizations

Characteristic	Organiz					
	A	B	C	D	E	F
Type of organization	Retail	Retail	Hospital	Hospital	HMO	Hospital/
Schedule 2 control method	Units	Units	Units	Units	Units	Unit
Schedules 3, 4, and 5 control methods	Units	Units	Value	Value	Value	Unit
Nonscheduled control methods	Units	Units	Value	Value	Value	Valu
Inventory accounting	Asset	Asset	Asset	Asset	Asset	Exper
Inventory frequency	Annually	Quarterly	Quarterly	Quarterly	Semiannual	Twice w
Perpetual inventory	Yes	Yes	No	No	No	No
Automated order calculation	Yes	Yes	No	No	No	No
Inventory turns per year	10.2	10.0	11.7	–	10.0	12.4
Script/orders issued per year (000s)	43	328[b]	160	–	168	2,08
Operations staff FTE	7.3	19.5	18.9	–	11.2	100.(
Scripts per week FTE	113.3	323.1	163.2	–	288.5	400.(

Notes: Blanks indicate that data was not available.

[a]The ASP controls its entire inventory on a unit basis.

[b]Includes all stores.

[c]Includes outpatient operations only.

Organization					
F	G	H	I	J	VA
Hospital/ HMO	Hospital	Third-party service	HMO	ASP	Hospital
Units	Units	Units	Units	Units[a]	Units
Units	Units	Value	Units	Units	Units
Value	Units	Value	Units	Units	None
Expense	Asset	Asset	Asset	Asset	Expense
Twice weekly	Monthly	Bimonthly	Annually	Quarterly	None
No	Yes	No	Yes	Yes	No
No	Yes	No	No	No	No
12.4	14.0	14.6	11.8	0.4	16.9
2,080	210	1,560	3,400	15	63,000[c]
100.0	45.7	33.0	300.0	10.0	2,760.0[c]
400.0	88.5	909.1	209.6	28.8	439.0

With one exception, the organizations participating in the benchmarking analysis do not have explicit measures or standards for controlling loss and diversion of inventory. When asked, most organizations did not know the percentage or value of inventory written off due to loss or diversion for any given period of time. The exception, an HMO pharmacy, has established a dollar-value inventory discrepancy limit (with a range of plus or minus 2 percent).

The performance measurement that most organizations did monitor closely was the number of times their inventory turned each year. Higher turns result in less on-hand inventory, which reduces capital investment as well as the opportunity for diversion. Although the VA does not routinely measure inventory turns, we estimate that its inventory is turning 16.9 times per year, the highest of the organizations in the benchmark study.[1]

Automated, perpetual tracking of inventory balances and associated automation of prime vendor ordering result in improved productivity levels. Three of the 10 benchmarked organizations follow this approach and indicated to us that it reduces the work required to place orders. It also helps them better manage their inventory turns. However, because the type of workload and degree of services provided to customers varied greatly between the participating organizations, we could not demonstrate that effect mathematically.

The pharmacies we analyzed were 3 to 30 times more productive than the ASP, meaning that their unit cost of operation is much lower than that of the ASP. The reason the ASP is so much costlier is that its controls are much more stringent and it controls much more material. The ASP strives for and maintains 100 percent inventory accuracy. It does this through careful quality control of inventory management documentation, strict separation of duties, verification of issue counts by customers, and quarterly wall-to-wall inventories. It also requires the return of spent rounds and unused ammunition. Also, the ASP stocks 25 to 40 times as much material (in years of supply) as the pharmacies. The ASP comparison data suggest that very stringent control could be very costly to the VA and that large amounts of inventory in the pharmacy could be costly to control.

Focus

We observed that inventory control efforts of the benchmark organizations are driven more by financial accounting requirements than by fear of inventory diversion. With the exception of government organizations (the VA and DoD), benchmark organizations treat their inventory as an asset account and monitor its value to maintain their balance sheets.

With respect to automating pharmacy operations, we observed that the benchmark organizations have primarily focused upon the dispensing of pharmaceuticals and on the associated patient records and payment information,

[1]The VA annually buys $940 million worth of drugs. The turns estimate assumes that each of 171 medical centers has $325,000 worth of drug stocks.

rather than on generating orders for inventory replenishment. Three of the benchmark organizations have automated their ordering processes so that their computer systems produce recommended orders, and several of the other organizations are moving in that direction or want to.

Operations and Processes

Many organizations effectively limit the amount of material they have to control. The most notable limiting method is a formulary. Although its purpose is to control costs, all nonretail pharmacies we visited use formularies to identify "preferred" drugs to be prescribed by doctors. In an effort to increase inventory turns (and consequently provide better control), organizations attempt to limit the number of satellite pharmacies, and they tend to actively manage their inventory in such a way as to meet inventory turn goals.

All benchmark organizations use prime vendors to replenish most of their inventory. In most cases, the prime vendors deliver daily and fill orders the next business day. Additionally, they can maintain useful information regarding past usage, and in some cases, compute replenishment quantities based on that information. More and more prime vendor contracts require not only specific service levels for drug deliveries but also the provision of data used by their customers to better manage their pharmacy businesses.

Most of the benchmark organizations do not maintain perpetual inventory balances for noncontrolled substances. Those organizations that do maintain them have done so with their automated system, to automate the order calculation process rather than to establish tighter control of the inventory.[2] The computer generates recommended reorder lists by comparing the perpetual inventory balance to a predetermined reorder point. The organizations that use this approach manually enter predetermined reorder points and order quantities, rather than allowing the computer to compute them. In two cases, the organizations' computers are linked to the prime vendors to enable automatic placement of the order. Several of the organizations that do not use automated perpetual inventory systems indicated a desire to use this type of system. Two expressed a concern that it might create extra work in order to reconcile actual inventory balances with automated inventory balances.

The frequency of inventories at benchmark organizations varies greatly, but, with one exception, the purpose of taking inventory is the same: to compute the inventory's value for accounting purposes.[3] This holds true even for the organizations that have an automated perpetual inventory system. None of the organizations employed cycle counting or auditing of inventory balances to ensure inventory accuracy.

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[2]The organizations that do maintain automated inventory balances include three pharmacy organizations, one chain store that does so for one of its seven stores, and the ASP.

[3]The exception is a case where all items are inventoried into a computer tracking system to facilitate automated calculation of replenishment quantities.

Some organizations implemented special control procedures for high-cost or nonscheduled drugs with potential for theft or abuse. Those procedures included locked storage and maintaining minimum necessary on-hand inventories.

Control Mechanisms

Most of the benchmark organizations prevent diversion of inventory by frequently comparing inventory receipts to issues. An imbalance between the two or an unusually high value for both indicates the possibility of diversion. When that occurs, the organization performs further investigation to identify possible paperwork errors. If the imbalance cannot be explained, a higher state of vigilance is exercised. Several benchmark organizations related experiences in which, as the result of using this method of control, they caught an employee stealing drugs. Many of the organizations also have stringent procedures to ensure the integrity of the people they hire.

We observed that all the organizations exercise tight control over controlled (scheduled) items. This level of control is driven by DEA and state board regulations. Most of the organizations had experienced an audit by DEA or the state board.

Most of the benchmark organizations use alarm systems or surveillance systems to detect unauthorized access to the pharmacy. Access is also controlled to prevent entry by nonpharmacy personnel or sole access by nonpharmacists.

With one exception, the benchmark organizations do not separate pharmacy ordering and receiving functions for the purpose of preventing diversion. Two of the organizations do separate those duties, but for reasons other than preventing diversion.

SUMMARY

Although we could not find a mathematical relationship between the level of control and the cost of control, we observed several distinguishing inventory control practices among the benchmark organizations. First, one organization has established a material control standard and closely monitors performance against that standard (in this case the standard is 98 percent dollar-value accuracy). Second, some organizations use an automated system to track perpetual inventory balances, and use that information to calculate replenishment orders and to better manage stocks on hand. Third, all commercial organizations treat and manage their drug stocks as assets, and actively manage those assets as they would any financial investment. Finally, the primary method of control among most of the benchmark organizations is to frequently extract issue and receipt data from their systems to detect unusual amounts of material movement or large discrepancies between the two. These practices combined represent the

best practices found in our benchmarking analysis of pharmaceutical material control.

CHAPTER 5

Conclusions and Recommendations

The level of material control at VA pharmacies is as good as at most other organizations we studied, although we did identify some practices that the VA could adopt to improve its control. In this chapter we provide specific conclusions and recommendations about the existing level of control at VA pharmacies and how to improve it at little or no additional cost.

CONCLUSIONS

The VA pharmacy controls are already as comprehensive as in most other health systems. With respect to material control in the pharmacy, VA medical centers and most other health care organizations have similar practices. They perform frequent inventories and keep perpetual balances and complete transaction histories for controlled substances. They limit access and use alarm systems or security services. They do not track perpetual balances of noncontrolled substances, and they do not measure control explicitly. Unlike other organizations, the VA separates receiving and ordering duties. Unlike the VA, most other organizations take periodic inventories of noncontrolled substances, but they do so only to determine the financial value of their pharmacy stocks.

The VA has an excellent opportunity to enhance its pharmacy control while at the same time improving productivity. It is already recording all issue transactions in DHCP and automating the recording of receipt transactions within DHCP. This means that all the necessary information will be available to track inventory balances, and in fact DHCP is being modified to do just that. With system inventory balances in place, the ordering process can then be automated or semiautomated. This will free up some labor to do other things, and it will help ensure that only needed material is ordered from the prime vendor. In our benchmarking study, we found three organizations that have been successful at tracking perpetual inventory balances and automating their vendor ordering process.

Unlike in other organizations, the financial accounting system at the VA imposes little control over pharmaceuticals. Pharmacy items are currently expensed upon purchase from the prime vendors. All financial control is lost once this happens. In many organizations in various industries, low-cost items are expensed upon purchase, but medium-cost, high-cost, and highly pilferable items are treated as assets. If drug stocks were treated as assets, those items would not be expensed until they left the medical center and would thereby remain under financial control during their ownership by the VA. The FASAB recommendations, if adopted, will impose this type of financial control over pharmacy items. All of

the benchmark study participants except the VA and DoD treat their drug stocks as assets.

The VA needs an internal measure for control for pharmacy material. It is impossible to really understand the degree of control that exists without some performance measure. The VA wants to understand and improve its control and therefore needs to measure it. Some possible direct measures of control include line-item inventory balance accuracy, dollar inventory balance accuracy, or dollar losses per year. An indirect measure of control is inventory turns. The higher the turns, the less material in stock that requires control and the less opportunity for unintentional losses and diversion. One organization in our benchmark study has direct control measures in place and has set standards for those measures. Most of the benchmark study participants track inventory turns.

Once internal control measures are established and monitored, the VA needs to focus on specific elements of control to achieve specific levels of control. The control elements that appear to work best include

- frequent review of sales and receipts data by a qualified pharmacist, resulting in almost certain detection of diversion;
- restricting the range and depth of locations of stocked items through the use of formularies and active inventory management, including system-driven ordering from prime vendors; and
- limiting access and using alarm systems or security services during off hours.

We consider these control elements to be key ones. Other ones should be added as necessary to raise control to the desired level. We address this further in our recommendations.

RECOMMENDATIONS

We recommend the VA take specific actions to monitor and improve control at its pharmacies while at the same time improving overall productivity of those pharmacies. Those actions are listed below.

1. The Information Services Center (ISC) Birmingham should continue its system improvement efforts aimed at incorporating perpetual inventory accounting and automated receiving into the DHCP.

2. Each VA pharmacy should keep perpetual inventory balances for all items.[1]

[1]Inexpensive items requiring little or no control could be handled in one of two ways: they could be "issued" from stock in bulk to an "expended" area for further issue, or they could simply have much looser control measure standards.

3. The ISC Birmingham should further develop DHCP to compute recommended prime vendor orders.

4. Each medical center should measure and report pharmaceutical inventory turns to the Director, Pharmacy Service.

5. Each pharmacy should audit 10 randomly selected items daily and report the results of those audits monthly using two internal measures: a line accuracy index and a dollar accuracy index.[2] These indexes and associated measurement techniques are defined and discussed in Appendix B. The measures reflect how closely perpetual inventory records match actual stock levels. The line measure tracks individual line items, and the dollar measure tracks aggregate dollar adjustments.

6. Each pharmacy should incorporate other best practices defined in our study. Those practices include treating drug stocks as financial assets, minimizing the amount of material to control through use of formularies and active inventory management, and frequently comparing receipts and usage data to detect diversion. In addition, each VA pharmacy should continue other practices already in place, including using alarm systems or security services during off hours, limiting pharmacy access, separating ordering and receiving duties, and taking frequent inventories of controlled substances.

7. The Director, Pharmacy Service, should establish "acceptable" VA standards based on the median values (over all VA pharmacies) of inventory turns, and the line and dollar accuracy indices. Those standards can and should be adjusted over time.

8. Each pharmacy should perform other practices to safeguard stocks as deemed necessary by medical center pharmacy directors to raise actual line accuracy and dollar accuracy to the defined standards. Those practices include counting additional items to discover errors quickly, screening new employees, using scanning equipment to minimize errors, and using automated storage devices to ensure that transactions are recorded when stocks are issued.

Generally speaking, our recommendations consist of tracking perpetual inventories using the automated system, measuring the accuracy of the perpetual accounting records, adopting common control practices of other organizations, and continuing current control practices. We believe that VA can do all of these things without hampering productivity because it will gain the ability to automate (fully or partially)[3] the prime vendor ordering process, and that will free up

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[2]The sample of 10 items counted daily translates to 200 items per month. That number will usually be enough to provide reasonably tight statistical confidence intervals for the monthly line accuracy index.

[3]With partial automation, reorder points and order quantities are set and reset manually. With full automation, they are set by the software using historical data trends. In both cases, the software produces recommended replenishments from the prime vendor.

some labor to handle the additional auditing responsibility. We believe that by following our recommendations, the VA will have a control mechanism second to none among pharmacy organizations.

APPENDIX A

Benchmark Study Data

This appendix provides detailed documentation of a benchmarking study of pharmacy material control at various hospitals, health maintenance organizations (HMOs), and retail organizations. Also included, for comparison, is one military Ammunition Supply Point (ASP). To maintain confidentiality of the information provided by the benchmark organizations, we have identified each organization by a letter. The data appear in Table A-1.

The "Business Environment" section provides characteristic information about each of the organizations.

The "Control" section identifies the primary external influence that drives the method of inventory control and indicates the method of control over Schedule 2 drugs; Schedules 3, 4, and 5 drugs; and nonscheduled drugs. The description "inventory units" signifies that the organization monitors the on-hand quantity of inventory units, either perpetually or at discrete points in time. "Inventory value" signifies that the organization monitors only the value of its inventory at discrete points in time for accounting purposes. This section also identifies whether the organization treats its inventory as an asset account or an expense item. The row labeled "Inventory Frequency" indicates how often the organization conducts wall-to-wall inventories of its entire on-hand stock. The last two rows in the section indicate whether control procedures are differentiated for either scheduled or high-cost drugs.

The "Automation" section identifies the functions within each organization that are automated. Note that the row labeled "Order Calculation" indicates whether the automated system will calculate a suggested vendor order quantity for each item, and the row labeled "Stockage Parameter Computation" indicates whether the automated system will also calculate the parameters upon which the recommended ordering quantities are based.

The "Control Procedures" section indicates the type of security system used and whether ordering and receiving duties are assigned to separate individuals.

The last three sections — "Control Performance," "Productivity Information," and "Service Levels" — provide the performance data that we were able to collect from each participant. Blank data cells mean that the organization did not collect that information or would not provide it.

Table A-1.
Benchmark Study Data

Business environment	A	B (1)	C	D (2)	E	F
Business Environment						
Type organization	Retail	Retail	Hospital	Hospital	HMO	Hospital
Customers	2,200	–	–	–	28,000	500,000
Primary supplier	Prime vendor	Prime vendor	Prime vendor	Prime vendor	Prime vendor	Prime vendo
Number facilities	3	7	1	1	1	1
Other descriptive information	Home delivery	–	–	–	–	–
Formulary items	N/A	N/A	–	2,800	–	2,000
Stocked items	6,800	2,500	–	–	–	2,000
Control Procedures						
Primary external influence	State board	State board	State board	Joint comm.	None	Joint comm.
Schedules 2 control	Inventory units	Inventory units	Inventory units	Inventory units	Inventory units	Inventory unit
Schedule 3, 4, and 5 control	Inventory units	Inventory units	Inventory value	Inventory value	Inventory value	Inventory unit
Nonscheduled control	Inventory units	Inventory units	Inventory value	Inventory value	Inventory value	Inventory valu
Inventory accounting	Asset	Asset	Asset	Asset	Asset	Expense
Inventory frequency	Annual	Quarterly	Quarterly	Quarterly	Semiannual	Twice weekl
Differentiation of schedule drugs	Yes	Yes	Yes	Yes	Yes	Yes
Differentiation by cost	Yes	No	No	Yes	Yes	No
Automation						
Dispensing tracking	Yes	Yes	Yes	Yes	Yes	Yes
Perpetual inventory	Yes	Yes (6)	No	No	No	No
Order calculation	Yes	Yes	No	No	No	No
Stockage paramater computation	No	No	No	No	No	No

Note: (1) Productivity data for all stores; (2) Participant unable to provide performance, productivity, or service-level data; (3) Productivity data for corrections contracts (7) For pilferable items only; (8) Aim for 10 to 14 days of supply.

F	G	H(3)	I	J	VA(4)
Hospital	Hospital	Third-party service	HMO	ASP	VA medical centers (MC)
500,000	321,000	250,000	375,000	–	2,600,000
Prime vendor	Prime vendor	Prime vendor	Prime vendor	Depot	Prime vendor
1	2 in Rochester, N.Y.	16	35	1	171
–	–	–	2 hospitals	–	–
2,000	2,000	N/A	2,000	N/A	Each MC has one
2,000	4,000	N/A	–	N/A	1,000 to 2,000 per MC
Joint comm.	Accounting dept.	State regulations	State board	DoD/Army regulations	DEA, GAO
Inventory units	Inventory units	Inventory units	Inventory units	N/A	Inventory units
Inventory units	Inventory units	Inventory value	Inventory units	N/A	Inventory units
Inventory value	Inventory units	Inventory value	Inventory units	N/A	None
Expense	Asset	Asset	Asset	N/A	Expense
Twice weekly	Monthly	Bimonthly	Annual	Quarterly	None (5)
Yes	Yes	Yes	Yes	Yes (7)	Yes
No	Yes	Yes	Yes	No	No
Yes	Yes	Yes	Yes	Yes	Yes
No	Yes	No	Yes	Yes	No
No	Yes	No	No	No	No
No	No	No	No	No	No

ctions contracts only; (4) Productivity data for outpatient operations only; (5) Except for controlled substances; (6) Currently done for one store only;

Table A-1
Benchmark Study Data (Continued)

Business environment	A	B (1)	C	D (2)	E	F
Control Procedures						
Security system	Alarm system	Alarm system	Alarm system	Alarm system	Alarm system	Alarm syste
Separation of duties	No	No	No	Ordering only	No	Ordering on
Control Performance						
Dollar inventory value (000s)	$250	$780	$190	–	$269	$1,500
Inventory turns per year	10.2	10.0	11.7	–	10.0	12.4
Dollar inventory accuracy	98%	–	–	–	98%	–
Line-item inventory accuracy	–	–	–	–	–	–
Annual dollar loss (000s)	2	–	17	–	4	–
Dollar losses (% of inventory)	0.8%	–	8.7%	–	1.6%	–
Productivity Information						
Scripts issued per year (000s)	43	328	160	–	168	2,080
Scripts issued per week	827	6,300	3,085	–	3,231	40,000
Dollars issued per year (000s)	$2,550	$6,400	$1,367	–	$2,000	$18,600
Avgerage cost of prescription	$59.30	$19.54	$8.52	–	$11.90	$8.94
FTE – pharmacists	2.3	15.0	8.2	–	5.2	40.0
FTE – counseling pharmacists	0.5	3.0	0.8	–	1.0	10.0
FTE – nonpharmacists	5.0	4.5	10.7	–	6.0	60.0
FTE – total	7.3	19.5	18.9	–	11.2	100.0
Scripts per week per FTE	113.3	323.1	163.2	–	288.5	400.0
Service Levels						
Avgerage waiting tme	2 to 5 min.	5 min.	20 to 30 min.	–	10 to 15 min.	15 min.
In-stock availability	95.0%	97.0%	80.0%	–	99.0%	99.9%

Notes: (1) Productivity data for all stores; (2) Participant unable to provide performance, productivity, or service-level data; (3) Productivity data for corrections con only; (7) For pilferable items only; (8) Aim for 10 to 14 days of supply.

F	G	H (3)	I	J	VA (4)
Alarm system Ordering only	Private comp. Ordering only	Alarm system No	Alarm system No	Alarm, guards Yes	Alarm systems Yes
$1,500	$1,000	$0	$3,700	$5,000	$55,575
12.4	14.0	14.6	0	0	16.9 (8)
–	–	–	–	100%	–
–	–	–	–	100%	–
–	20	–	54	0	–
–	2.0%	–	1.5%	0.0%	–
2,080	210	1,560	3,400	15	63,000
40,000	4,038	30,000	65,385	288	1,211,538
$18,600	$14,000	$8,190	$43,600	$2,000	$658,000
$8.94	$66.67	$5.25	$12.82	–	$10.44
40.0	15.7	9.0	151	–	1,360.0
10.0	3.1	–	–	–	–
60.0	30.0	24.0	161.0	10.0	1,400.0
100.0	45.7	33.0	312.0	10.0	2,760.0
400.0	88.5	909.1	209.6	28.8	439.0
15 min.	10 to 15 min.	–	20 min.	15 min.	40 min.
99.9%	99.5%	–	99.0%	98.0%	98.0%

orrections contracts only; (4) Productivity data for outpatient operations only; (5) Except for controlled substances; (6) Currently done for one store

APPENDIX B

A Framework for Measuring Material Control

In Chapter 5 we recommend that each pharmacy audit 10 items daily and report the results of those audits monthly using two internal measures: a line accuracy index and a dollar accuracy index. The line accuracy index measures inventory balance accuracy across line items, and the dollar accuracy index measures the accuracy of inventory dollars tracked in the automated system. Although the measurement of inventory record accuracy is not yet common among pharmaceutical organizations, it is common among other organizations in other industries. Businesses have taken many approaches to measuring record accuracy, and it is often difficult to compare measures across organizations because of those differences. It is important for the VA to have standard measures with which to monitor success over time and make comparisons between medical centers.

This appendix presents one methodology for performing these inventory balance audits and calculating the two performance measures and their statistical significance. We suggest that this methodology be used as a general framework for measuring record accuracy. It should be modified or changed as necessary, and then incorporated into the Decentralized Hospital Computer Program.[1]

Our methodology is best described as a series of steps to be followed each month at each pharmacy. Although these steps could be used for all drugs, we envision them being used primarily for noncontrolled substances, since the VA already has a rigorous system for ensuring that records for controlled substances are accurate. Each step is described below.

1. Select 200 items randomly from the population of stocked items at the beginning of each month for auditing during the month.[2]

2. Count 10 items daily and record both system balances and actual balances for those items. Before each count, ensure that system inventory balances have been updated to reflect current issues or receipts. There should be no recent issues or receipts for which transactions have not yet been processed. It is best to perform the counting during the very first part of the day to minimize this type of problem.

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[1] Automating the methodology minimizes the workload required to perform it. Automation, however, is not necessary. The proposed accuracy measurement methodology can be achieved using a simple spreadsheet software package.

[2] The sample size of 200 allows for about 10 items counted daily and will usually be enough to provide reasonably tight statistical confidence intervals for the VA pharmacies.

3. Tabulate the number of items passing the audit by using specific criteria (defined by the Director, Pharmacy Service) for the items. An example of these criteria would be the following:

   - Items are coded according to the dollar value of issues. The codification is standard across all VA pharmacies. The coding classifies items as A, B, C, D, or Y items, where

     - A items, comprise the top 20 percent of dollar issues;
     - B items, the next 30 percent;
     - C items, the next 40 percent;
     - D items, the remaining 10 percent; and
     - Y items comprise items requiring very tight control, such as those that are not scheduled drugs but have potential for abuse or those that have high value when sold illicitly.

   - Balances must be within a specific tolerance of usage since last count to pass the audit:

     - A items within 0.5 percent
     - B items within 1.0 percent
     - C items within 2.0 percent
     - D items within 5.0 percent
     - Y items within 0.5 percent.

   - Usage since last count is approximated by tracking average monthly demand and the date of the last count and then multiplying the months since the last count by the average monthly demand.

4. For items that do not pass the audit, recount them once to ensure that no counting errors were made. Revise as necessary the tabulation performed in Step 3 of items passing the audit and actual balances.

5. For those items passing the audit whose inventory balances differ from system balances, adjust the system balances to reflect the true amount in stock. For those items failing the audit, investigate to determine the cause of the error. Frequently this involves examining past transactions for possible errors. Approval at the local pharmacy director level or higher should be required before any adjustments are made. The Director, Pharmacy Service, should define the adjustment procedure for those items failing the audit.

6. Tabulate the total amount of system inventory dollars during the audit by multiplying the system balance by the unit cost for each audit item and then summing over all the audit items.

7. Tabulate by item the absolute differences between system balances and actual balances, and then multiply those values by the unit cost of each item to obtain dollar inaccuracy for each item. Sum these dollar inaccuracies to obtain a total for all items. Note that gains and losses do not cancel each other out.

8. Compute the monthly line accuracy index by dividing the total number of items counted (200) by the number passing the audit (from Steps 3 and 4).

9. Use Table B-1 to determine the 95 percent confidence interval range for the line accuracy index. The statistical result is a 95 percent probability that the true line accuracy index is within the range specified in Table B-1 of the value computed in Step 8.[3]

10. Calculate the monthly dollar accuracy index by dividing the total dollar inaccuracy (from Step 7) by the total dollar inventory of the sample (from Step 6) and then subtracting from 1.0. The result represents the proportion of dollars counted that was accurate. We do not propose assigning a statistical significance to this value, since it was obtained by randomly sampling items rather than dollars. Nonetheless it is a 100 percent accurate value for the absolute dollar accuracy of the 200-item sample.

The line accuracy index and dollar accuracy index should be collected monthly from each pharmacy by the VA Central Office . That data can be used to compare one month to the next and one pharmacy to another. In this way, the VA can internally measure its level of control of pharmaceuticals and identify problems where they exist.

[3]Because the line accuracy index value is obtained from a random sample of items, that value may not reflect true line accuracy. The statistical confidence interval provides a range of values for the index into which the true line accuracy is likely to fall.

Table B-1.
Table of 95 Percent Confidence Interval Ranges

Accuracy index	Confidence interval range (+/–)
0.75	0.06
0.76	0.06
0.77	0.06
0.78	0.06
0.79	0.06
0.80	0.06
0.81	0.05
0.82	0.05
0.83	0.05
0.84	0.05
0.85	0.05
0.86	0.05
0.87	0.05
0.88	0.05
0.89	0.04
0.90	0.04
0.91	0.04
0.92	0.04
0.93	0.04
0.94	0.03
0.95	0.03
0.96	0.03
0.97	0.02
0.98	0.02
0.99	0.01
1.0	0.0

Note: Computations assume that the parameter p of a Bernoulli random variable representing the audit pass or fail is distributed normally with the mean p and variance $p(1-p)$. Computations also assume that the sample size is large compared to the 0.975 percentile or the normal distribution (1.96). The formula used is [z/sqrt(n)] × sqrt[xbar(1 – xbar)] where:

z = 0.975,
n = sample size (200),
xbar = observed line accuracy index in sample, and
sqrt(v) = square root of v.

APPENDIX C

Glossary

ASP	=	Ammunition Supply Point
CFR	=	Code of Federal Regulations
DEA	=	Drug Enforcement Administration
DHCP	=	Decentralized Hospital Computed Program
DoD	=	Department of Defense
FASAB	=	Federal Accounting Standards Advisory Board
FDA	=	Food and Drug Administration
FMFIA	=	Federal Managers' Financial Integrity Act of 1982
FTE	=	full-time-equivalent
GAO	=	General Accounting Office
GIP	=	General Inventory Package
HMO	=	health maintenance organization
IFCAP	=	Integrated Funds Distribution Control Point Activity Accounting and Procurement
ISC	=	Information Services Center
SC	=	United States Code
VA	=	Department of Veterans Affairs

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13. ABSTRACT ***(Maximum 200 words)***

The Department of Veterans Affairs (VA) operates the largest healthcare system in the United States. Included in that system are 224 pharmacies that dispense over $900 million worth of pharmaceutical items annually. Those pharmacies have material controls that are as comprehensive as in most other healthcare systems; however, the VA has an excellent opportunity to enhance its pharmacy control and at the same time improve its productivity. In this study, we recommend that the VA keep perpetual inventory records for both scheduled and nonscheduled drugs and that it automate its replenishment process by using those inventory balances to drive new orders from its prime vendors. We also recommend that the VA treat its pharmacy stocks as assets, measure the degree to which those assets are turning, and measure material control using two indices of inventory record accuracy. By following these recommendations, the VA pharmacies will become the material control model for other pharmacy organizations.

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