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Report to the Chairman, Subcommittee on Oversight of Government Management, Committee on Governmental Affairs, U.S. Senate

December 1991

DOD MEDICAL INVENTORY

Reductions Can Be Made Through the Use of Commercial Practices

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The Honorable Carl Levin
Chairman, Subcommittee on
Oversight of Government Management
Committee on Governmental Affairs
United States Senate

Dear Mr. Chairman:

This report was prepared as part of your request that we compare commercial logistics practices with similar Department of Defense operations. It summarizes the results of our review of medical logistics practices at Department of Defense hospitals and warehouses and selected private hospitals. As requested, we also looked at the logistics practices of the Department of Veterans Affairs.

We are sending copies of this report to appropriate congressional committees; the Secretaries of Defense, the Army, the Navy, and the Air Force; the Director, Office of Management and Budget; and other interested parties.

If you have any questions, please call me on (202) 275-8412. Other major contributors are listed in appendix I.

Sincerely yours,

Donna M. Heivilin
Director, Logistics Issues

Executive Summary

Purpose

The value of the Department of Defense's (DOD) secondary inventories, which include general supplies and spare parts for weapon systems, increased $60 billion between 1980 and 1988. Because of this increase, the Chairman, Subcommittee on Oversight of Government Management, Senate Committee on Governmental Affairs, asked GAO to compare DOD's logistics operations with similar practices of private industry and the Department of Veterans Affairs (VA).

GAO selected medical supplies for one comparison because of the many similarities between military and civilian requirements. GAO's specific objectives were to (1) compare DOD's inventory practices for medical supplies with those used by very progressive civilian hospitals and by VA and (2) identify practices DOD could adopt to reduce its logistics costs for medical supplies.

Background

Of the 164 DOD medical centers and hospitals worldwide, 125 are located in the continental United States. In fiscal year 1990, these 125 medical facilities purchased approximately $1 billion in consumable medical supplies such as drug items, needles, and sponges. To support this hospital network, DOD maintains 443 warehouses and a depot system of 17 warehouses that hold inventory valued at more than $824 million. It also maintains additional warehouses overseas to support worldwide activities.

VA also operates a large health care system in the United States. It operates 172 hospitals and maintains warehouses and a depot system to provide medical supplies to its hospitals. In fiscal year 1990, the VA system purchased approximately $2.1 billion of medical supplies for government agencies, of which about half were used by VA facilities.

Results in Brief

DOD's health care system can save millions of dollars by increased use of inventory management practices pioneered by leading civilian hospitals. Military medical facilities and warehouses GAO visited hold layers of supplies to satisfy peacetime requirements and also provide initial supplies for wartime. The warehouses GAO visited held inventory that would last for 36 to 95 days. In addition, the Defense Logistics Agency, through its depot system, stores another layer of supplies that would last approximately 250 days.

In contrast, very progressive civilian hospitals maintain much smaller levels and fewer layers of supplies and have no depot system. These

hospitals, through improved ordering systems, standardization of supplies, and better communication with vendors, have greatly reduced supply inventories and have vendors deliver supplies where and when they are needed. These hospitals claim that such improvements have reduced their inventory costs and that the supplies needed for quality patient care have still been provided.

Both the Departments of Defense and Veterans Affairs are working to improve medical logistics. A test program that eliminated the Departments' storage of large quantities of intravenous solutions resulted in significant savings. In addition, VA recently started a test program at 32 of its hospitals to eliminate the need to store certain pharmaceuticals. Finally, DOD is examining its medical logistics business practices under the corporate information management initiative. Preliminary results strongly support exploring commercial practices.

Principal Findings

DOD Can Reduce Duplicative Inventory

DOD buys and stores large inventories to ensure that it has medical supplies when needed. DOD medical facilities often store quantities of the same medical supplies on their wards, in basement storerooms, and in 443 separate warehouses in the continental United States.

Civilian medical facilities GAO visited took aggressive measures to reduce inventory costs and have achieved large savings by standardizing items being used, eliminating bulk storage locations, and relying on vendors to deliver smaller quantities of supplies when and where they are needed. For example, Vanderbilt University Medical Center reduced inventory levels by $1.7 million (38 percent) by taking an aggressive approach to inventory management, including requiring its two vendors to deliver supplies within 4 hours of use. Other hospitals GAO visited typically require deliveries within a few days of when they are needed. DOD facilities have been encouraged by the Under Secretary of Defense for Acquisition to adopt similar practices, but they have not been widely used.

Military hospitals also store more supplies than are needed within the hospital. Some military hospitals use an exchange cart system to transfer supplies from the hospital storeroom to the floor where the supplies are needed. This system, which requires additional inventory,

is not as efficient as some civilian hospitals' practices, such as restocking stationary storage locations on the hospital floor.

Civilian hospitals GAO visited have also been aggressive in reducing unofficial inventory stored in the hospital by nurses, partly by increasing the nurses' confidence that vendors will deliver supplies when they are needed.

Defense Logistics Agency's Role Results in Added Inventory

The Defense Logistics Agency (DLA) stores approximately $540 million of bulk medical supplies in at least 17 warehouses to support peacetime and wartime requirements. In general, DLA's current role is to buy and store bulk quantities of supplies that it sells to warehouses for final distribution to the medical facility. Some items in the depot system are very old, having been packed in the 1940s and 1950s. In fiscal year 1990, DLA sold medical supplies valued at approximately $813 million to DOD warehouses. DLA obtains discounts for volume buying. DLA customers pay a 21.7 percent surcharge over the cost of items to defray DLA's operating costs.

Civilian hospitals GAO visited do not have a depot system. Instead, they rely on the manufacturer or distributor to deliver supplies to the hospital when needed, and the warehouse and delivery costs are included in the price of the supplies. A hospital organization GAO visited had a centralized contracting and paying function that allowed the organization to obtain quantity discounts and at the same time reduce inventory holding costs.

DOD and VA Initiatives to Improve Medical Logistics

The Departments of Defense and Veterans Affairs are pursuing initiatives to improve medical logistics. In 1988, VA initiated a program that had vendors deliver certain intravenous solutions and related supplies directly to its hospitals. VA expects this program to save approximately $75 million over a 5-year period. In 1990, DOD used this concept in three of its hospitals and plans to use it in others.

VA also has a pilot program to test a distribution system for 32 of its hospitals. Using this new system, VA expects to eliminate the need to store some of its pharmaceuticals in its warehouse system.

DOD, under its corporate information management initiative, is evaluating business practices associated with its medical logistics systems. Preliminary results support a greater use of commercial practices.

According to the evaluation, changes that may be called for include revising military regulations, policies, and procedures and changing the role of the Defense Logistics Agency to contracting and paying for, but not storing, military supplies.

Recommendations

GAO recommends that the Secretary of Defense direct the services and DLA to conduct pilot programs to demonstrate the applicability of commercial practices to military medical facilities. GAO recommends that these programs (1) include facilities from all three services, (2) test initiatives encompassing all aspects of inventory management, and (3) quantify the cost and benefits of the changes. These programs should comprehensively test the extensive changes in the total logistics system needed to dramatically reduce inventory costs. Among the practices that should be included in the tests are

- significantly reducing duplicative inventory requirements in medical facilities,
- establishing electronic ordering capabilities with private vendors and DOD medical facilities,
- using prime vendors to deliver supplies from a variety of manufacturers directly to medical facilities,
- eliminating the need to store medical supplies in separate warehouses adjacent to medical facilities and in DLA depot warehouses, and
- contracting with private firms to maintain and rotate war reserve material.

Once these steps have been accomplished, the services should tailor the changes required in each of their facilities so the successful results of the pilot programs can be applied.

Agency Comments

GAO did not obtain written DOD comments on a draft of this report. However, GAO did discuss its findings with DOD, VA, and civilian hospital officials and incorporated their comments where appropriate. DOD generally agreed with our conclusions and recommendations.

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Abbreviations

CIM	Corporate information management
CPD	Central processing and distribution
DLA	Defense Logistics Agency
DOD	Department of Defense
GAO	General Accounting Office
PAR	Periodic automatic replenishment
VA	Department of Veterans Affairs

Introduction

The federal government is one of the world's largest health care providers. The Departments of Defense (DOD) and Veterans Affairs (VA) manage approximately 336 hospitals and medical centers and 628 medical supply warehouses. The military health care system must prepare for wartime requirements, establish a worldwide supply system, and contract for medical supplies according to federal procurement requirements. Faced with rising health care costs, civilian hospital administrators and manufacturers and distributors of medical supplies have developed ways to reduce inventories and the cost of medical supplies. These new techniques can be compared to current government logistics practices.

Worldwide Military Health Care System

The military services operate a worldwide medical care network that includes medical centers, hospitals, clinics, and other facilities to provide health care for military personnel and their dependents and support wartime requirements. This network includes 125 medical centers and hospitals and 443 warehouses in the continental United States. In general, military facilities receive supplies from their warehouses, which in turn obtain supplies from either the Defense Logistics Agency (DLA) or directly from vendors of supplies. In fiscal year 1990, these warehouses distributed to medical facilities approximately $1 billion in supplies such as drug items, needles, gloves, and sponges. Table 1.1 shows the number of medical centers and hospitals operated by the Army, the Navy, and the Air Force.

Table 1.1 DOD Medical Centers and Hospitals (Fiscal Year 1990)

Service	Continental United States	Overseas	Total
Air Force	63	16	79
Army	38[a]	13	51
Navy	24	10	34
Total	**125**	**39**	**164**

[a]Includes Alaska and Panama facilities.

The medical care provided by these facilities includes inpatient care; outpatient services, including filling prescriptions; and dental care. According to DOD, 44 million outpatient visits were made to DOD facilities in 1988. These medical facilities also support other DOD activities, such as reserve and national guard units, within the local geographic region.

DLA has a major role in providing medical supplies to military facilities. It provides approximately 50 percent of the supplies used by medical

facilities in the continental United States and most of the supplies used by overseas facilities. It buys supplies in bulk quantities to obtain quantity discounts, stores items until they are requested by facilities, and then ships items to medical facility warehouses. In fiscal year 1990, DLA sold $813 million of medical supplies to military warehouses and other federal agencies in the continental United States and overseas. As of December 31, 1990, DLA held in its warehouses both peacetime and wartime medical supplies valued at approximately $540 million.

Military facilities are similar to private medical facilities in some ways. Both are responsible for providing quality inpatient and outpatient health care, use the same or similar supplies, and provide training to physicians. In addition, both must control the cost of health care as prices for supplies and equipment escalate.

A unique function of the DOD medical care system is to provide health care to its troops during wartime. To prepare for this contingency, all three services store additional medical supplies (called war reserve material) that can be used in the early stages of a conflict. DOD can also expand its medical treatment facilities to accept more patients.

Military medical facilities are different from civilian facilities in several other ways. First, military facilities do not charge their patients for services rendered. Therefore, their cost accounting requirements are different from those of private sector hospitals, which track costs to the patient level as the basis for establishing their fees. Second, military facilities are generally smaller in size, but they generally treat more outpatients than their civilian counterparts. Third, military facilities also serve as pharmacies for active and retired military personnel and their dependents, while private sector pharmacies are largely separate and independent from medical facilities.

Finally, a significant difference is the requirement for government agencies to follow federal acquisition regulations when purchasing supplies and services. Among other things, these regulations and policies are intended to ensure that federal agencies award contracts through a competitive process and small and disadvantaged businesses obtain a fair portion of government business. DOD officials cited laws such as the Competition and Contracting Act and the Small Business Act as impediments to change. DOD officials also expressed concern that under section 4401 of the Omnibus Budget Reconciliation Act of 1990,[1] implementing

[1]Public Law 101-508, 104 stat. 1388, 1388-143 (1990).

some commercial practices could adversely affect the prices DOD pays for pharmaceutical products.

Veterans Affairs Health Care System

The Department of Veterans Affairs is another government organization that has a massive health care delivery system. It currently operates 172 medical centers and its own depot system in the United States and its territories. In fiscal year 1990, the VA system purchased approximately $2.1 billion of medical supplies, of which approximately half were used in its own facilities and half were for other government agencies. Its three depots and 165 medical center warehouses held approximately $106 million of supplies on December 31, 1990.

The General Services Administration has delegated to VA the authority to negotiate with suppliers the federal supply schedule prices for medical supplies sold to government organizations. This schedule is designed to allow government agencies to procure commercial items in varying quantities while benefiting from terms, conditions, and discounts reflecting the government's favored status in the marketplace. DOD uses these contracts to purchase a portion of its medical supplies.

New Civilian Health Care Initiatives

In response to growing inventory costs, some civilian medical facilities have begun to change the way they buy, store, and distribute medical supplies. Some of these civilian facilities have made dramatic changes, such as eliminating inventory in adjacent warehouses by contracting with vendors to provide supplies when needed.

Manufacturers and distributors of medical supplies have also changed their operations in response to rising health care costs. They are working with medical facilities to provide better services, including new distribution practices that minimize inventory costs. One civilian medical center official has characterized these new practices as requiring a "partnership" between the center and the supplier with the common goal of better patient care at lower costs.

We discussed new inventory practices with officials at the civilian medical facilities that have successfully reduced inventory costs. These officials are enthusiastic about the savings they have achieved using these new techniques and predict even greater savings in the future. They cautioned us, however, that the techniques they have adopted may not be universally adaptable to all DOD facilities because of geographic limitations and proximity to supply distributors. Each facility must examine

the alternative inventory management practices available to them and select the techniques that will be the most effective for their particular institution.

Objectives, Scope, and Methodology

On August 15, 1990, the Chairman, Subcommittee on Oversight of Government Management, Senate Committee on Governmental Affairs, asked us to compare DOD logistics operations with similar practices of private industry and VA. We selected medical logistics for one of our comparisons because of the many similarities between military and civilian requirements. Our specific objectives were to

- compare the medical logistics operations of the Army, the Navy, and the Air Force with similar hospitals in private industry and VA and
- identify commercial practices the services could adopt to improve logistics operations and reduce the cost of medical supplies.

To determine the current inventory practices used in private medical facilities, we visited four medical facilities of various sizes. Some of these civilian facilities are atypical in that they use very aggressive inventory management to reduce inventory costs. Table 1.2 lists the private and military medical centers and hospitals we included in our comparison and their relative bed size and patient work load.

Table 1.2: Comparison of Private and Military Medical Facilities

Facility	Beds	Admissions	Outpatient visits
Medical center			
Civilian			
Vanderbilt University	661	24,698	231,091
Baylor University	1,455	40,706	225,056
Military			
Wright-Patterson (Air Force)	235	9,581	473,531
Walter Reed (Army)	886	26,493	808,081
Bethesda (Navy)	494	16,266	529,027
Hospital			
Civilian			
Good Samaritan (Dayton, Ohio)	560	19,400	307,700
Humana (average)	220	20,408	[a]
Military			
Langley (Air Force)	80	4,138	317,728
Belvoir (Army)	94	7,771	593,706
Charleston (Navy)	184	10,308	371,486

[a]Figure not available.

The civilian facilities we visited generally have more beds and more admissions but fewer outpatients visits. Military hospitals provide ambulatory, preventive, and acute care; fill prescriptions; and provide dental care. In the private sector some of these services are provided by separate organizations.

In addition to reviewing these facilities' practices, we discussed current and future trends in hospital inventory management with the Arthur Anderson Healthcare Consulting Group in Dallas, Texas. We also visited the Johnson and Johnson Hospital Service's ordering center in New Brunswick, New Jersey, and its medical supplies distribution center in Dallas, Texas. In addition, we visited the Baxter medical supplies distribution center in Nashville, Tennessee.

To obtain information on DOD's medical logistics operations, we held discussions with officials from the following organizations:

- Office of the Assistant Secretary of Defense, Production and Logistics, Washington, D.C.;
- Corporate Information Management Office, Medical Logistics Subgroup, Washington, D.C.;
- Defense Personnel Support Center, Philadelphia, Pennsylvania; and

- Defense Medical Standardization Board, Ft. Detrick, Maryland.

To obtain information about DOD medical logistics policies, we met with officials from the following organizations:

- Air Force Office of Medical Support, Medical Logistics Division, San Antonio, Texas;
- Army Health Services Command, San Antonio, Texas;
- Army Surgeon General Office, Washington, D.C.; and
- Navy Bureau of Medicine and Surgery, Washington, D.C.

To determine the nature and extent of DOD logistics operations we contacted the following:

- Air Force Medical Logistics Office, Ft. Detrick, Maryland;
- U.S. Army Medical Material Agency, Ft. Detrick, Maryland; and
- Navy Medical Logistics Command, Ft. Detrick, Maryland.

In addition to the facilities listed in table 1.2, we visited

- Wilford Hall Medical Center, Lackland Air Force Base, San Antonio, Texas, and
- Portsmouth Naval Hospital, Portsmouth, Virginia.

We also visited a DLA supply depot near Mechanicsburg, Pennsylvania, to examine the type and quantity of medical supplies held at that location.

Our discussions at all of these locations focused on the current inventory practices used by military and civilian hospitals. In addition, we discussed legal and regulatory issues that DOD officials believe inhibit the use of commercial practices in military medical facilities.

We attempted to obtain quantity and price information for comparison purposes but were unable to obtain needed information.

We conducted our review from September 1990 through September 1991 in accordance with generally accepted government auditing standards.

DOD Can Reduce Duplicative Inventory Layers

The military services store medical supplies within each treatment facility and in 443 separate warehouses to support peacetime operating requirements and war reserve material requirements. In contrast, the civilian hospitals we visited are reducing or eliminating their warehouses by contracting with a vendor to periodically buy and deliver small quantities of supplies directly to the hospital. The Secretary of Defense has encouraged the services to use existing commercial distribution systems and practices whenever possible to reduce inventory levels. As discussed in chapter 4, DOD has taken some initiatives to improve its medical logistics; however, DOD continues to hold large quantities of inventory.

DOD Holds Large Quantities of Inventory

DOD holds large quantities of medical supplies for several reasons. First, it stores inventory in each of its hospitals and adjacent warehouses to support both peacetime and wartime requirements. Second, some military hospitals use less efficient methods to distribute supplies inside the hospital, and as a result, inventory levels are increased. Third, military hospital personnel store extra inventory throughout the hospital because they believe it is necessary to ensure that they have medical supplies when needed.

DOD does not maintain centralized information on the value of the inventory held on floor locations inside its facilities, but the amount may be significant. For example, at Walter Reed Army Medical Center, inventory stored adjacent to the operating rooms was estimated by the hospital staff to be sufficient to last more than 30 days (see fig. 2.1). We saw similar levels of inventory in each of the facilities we visited.

Figure 2.1: Inventory at Walter Reed Army Medical Center

Bulk supplies stored in adjacent warehouses are more centrally accounted for and can therefore be more accurately measured. Table 2.1 provides the value of inventory held by the three services in 443 warehouses.

Table 2.1: Military Medical Supply Storage in the Continental United States

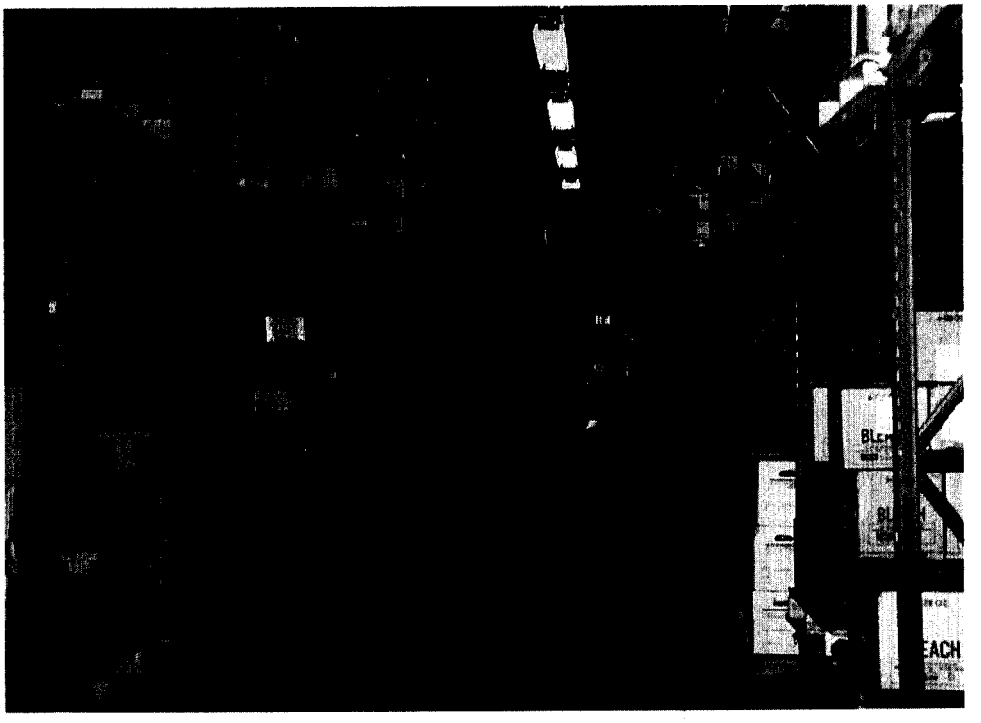
Service	Warehouses	Peacetime inventory	War reserves	Total
Air Force	165	$46,375,000	$114,106,000	$160,481,000
Army[a]	240	63,166,000	32,400,000	95,566,000
Navy	38	27,822,000	644,000	28,466,000
Total	**443**	**$137,363,000**	**$147,150,000**	**$284,513,000**

[a]Facilities in Alaska and Panama are included in the Army's warehouse and inventory values.

Except as noted for the Army, these warehouses are located in the continental United States only. Additional warehouses are located overseas to support worldwide operations.

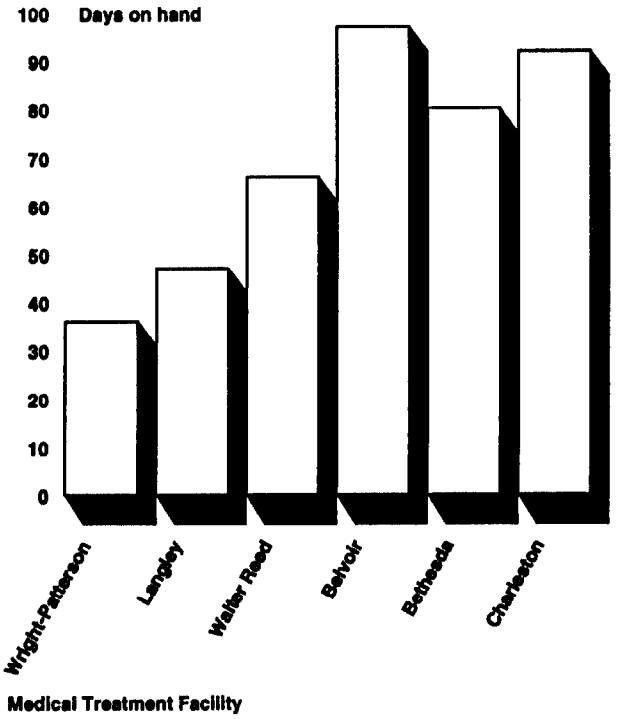
DOD uses many of these warehouses to store war reserve material. For example, 55 of the 165 Air Force warehouses are dedicated to holding war reserve medical supplies. Also, DOD medical centers and hospitals support local DOD clinics and provide health care services to other DOD activities such as national guard and reserve units. Figure 2.2 shows inventory stored at a Navy warehouse in Portsmouth, Virginia.

Figure 2.2: Inventory in Warehouse at Portsmouth Naval Hospital



According to DOD officials, DOD needs the multiple inventories to ensure that supplies will be available to meet its requirements. We calculated the number of days it would take six military facilities to use the inventory stored in their warehouses under peacetime conditions, assuming the usage rates in 1990. This amount, called days of supply on hand, is shown in figure 2.3.

Figure 2.3: Inventory Levels at Medical Treatment Facility Warehouses



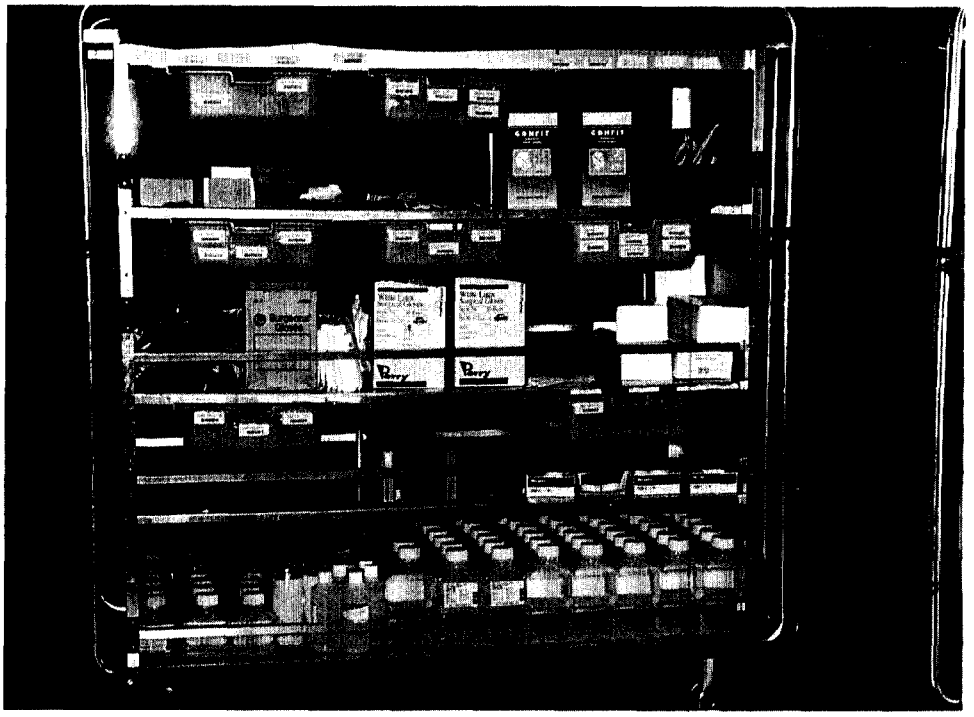
As figure 2.3 shows, the days of supply on hand in the outside warehouses dedicated to each hospital ranged from 36 days for Wright-Patterson Medical Center to 95 days for the hospital located at Ft. Belvoir.

Hospital Restocking Systems Result in Multiple Inventories

Military hospitals use different methods to transfer supplies from their storerooms to the hospital floors. In four of the eight military facilities we visited, an exchange cart system was used for internal supply distribution. Under this system, a cart is loaded with supplies and taken to where the supplies are needed on the floor. A cart that is already on the

floor is returned, taken to the storeroom, and restocked with the necessary supplies. These carts are exchanged on a periodic basis. Figure 2.4 shows a typical exchange cart used in this system.

Figure 2.4: Exchange Cart



This system requires an investment in carts and may also require a conveyor system to move the carts from the supply room to the hospital floor. Also, because inventory is stocked on two separate carts to fill the needs of one location, the inventory requirements may increase.

Some of the civilian facilities we visited are replacing the exchange cart system with a periodic automatic replenishment (PAR) system. Under this system, the hospital materials management department establishes a specific stock level for each item needed on the floor, periodically checks those levels, and resupplies the floors from the internal storeroom as necessary. A materials management official from one civilian hospital stated that PAR is the most efficient internal hospital replenishment system because it eliminates the duplication of inventory requirements that is experienced under an exchange cart system and eliminates the need for a conveyor system.

According to DOD, fewer than 15 percent of military medical centers and hospitals use the exchange cart system. Of the four facilities we observed using the exchange cart system, however, two—Walter Reed Army Medical Center[2] and Bethesda National Naval Medical Center—are among the largest medical facilities in DOD.

Unofficial Inventories Increase Inventory Levels

One of the initial steps civilian hospitals have taken to reduce inventory costs is to count and reduce as much as possible the inventory stored outside main storage locations. This step is important because inventory records are not kept on these items. In some cases, this "unofficial inventory" was as high as two to three times the amount of inventory held in approved hospital storage locations. For example, Baylor University Medical Center estimated it held inventory valued at $2.3 million in its official inventory and an additional $6.1 million in "unofficial inventory" in hospital floor storage locations. According to a Baylor official, nurses held these extra caches of supplies because they were not confident that supplies would be available when they were needed.

Baylor removed excess supplies and installed and stocked new storage racks that organized supplies and facilitated periodic inventories. The hospital also established new policies and procedures that set maximum inventory levels at 14 days for locations on the hospital wards, increased the frequency of inventory counts, and provided a more precise tracking system of item usage. More frequent inventory counts also enabled the hospital to restock the shelving units more often. By taking these steps, Baylor University Medical Center anticipates a $2.1 million reduction in its inventory requirements and an annual carrying cost savings of $320,827.

These new measures also increased the nurses' confidence in the material management system. As nurses began to see that the new inventory control procedures were actually ensuring that supplies would be available when needed, they began to minimize the amount of extra supplies they would keep in unofficial locations as a precaution against running out. One medical center supervising nurse stated she was much more comfortable with the new controls and processes than with the previous systems. She stated that, as a result, the nurses could focus more on providing health care to patients.

[2]Walter Reed uses a combination of exchange carts and PAR level stocking systems.

DOD has also recognized the need to reduce and manage unofficial inventories. DOD officials cited the central processing and distribution (CPD) system used in some hospitals and medical centers by all three services as an example of their efforts to reduce inventory levels. The CPD system is an automated information system that tracks supplies through the hospital logistics system and provides managers with item usage and ordering information.

An internal Navy inspection of one hospital revealed a stored inventory of medical supplies that may have been greater than needed. An internal Navy inspection report states that inventory information about on-hand balances, usage rates, and reorder points was inadequate. During our tours of three services' facilities, we also saw excessive quantities of supplies stored on hospital floors.

Commercial Hospitals' Initiatives to Reduce Inventory Costs

Hospitals in the private sector have recognized the need to reduce the cost of medical supplies and have developed aggressive inventory management programs to accomplish this. For example, some hospitals have standardized inventory where practical, used an information management system that provides an automatic ordering capability, and replaced the exchange cart system with the PAR system. According to a hospital official, these improvements have resulted in better patient care as well as reduced inventory costs.

Baylor University Medical Center officials noted that medical supplies account for approximately 54 percent of Baylor's operating room operating expenses and instituted an aggressive program to reduce inventory and its associated costs. Baylor officials also noted that having extra amounts of inventory on hand can obscure problems such as low product quality, excessive time to obtain supplies, and inaccurate or inadequate inventory information.

Alternate Delivery Systems Reduce Warehouse Requirements

Certain hospitals have used "just-in-time"[3] and "stockless"[4] delivery systems to eliminate the need for many layers of inventory. These major steps have significantly reduced the hospital staffs' need to buy, manage, and distribute medical supplies. Stockless operations require a

[3]According to Vanderbilt officials, in the just-in-time system, suppliers deliver smaller quantities of inventory to a central location within a medical facility.

[4]According to Vanderbilt officials, in a stockless system, the distributor delivers inventory in very small quantities to the user within 4 hours of its need.

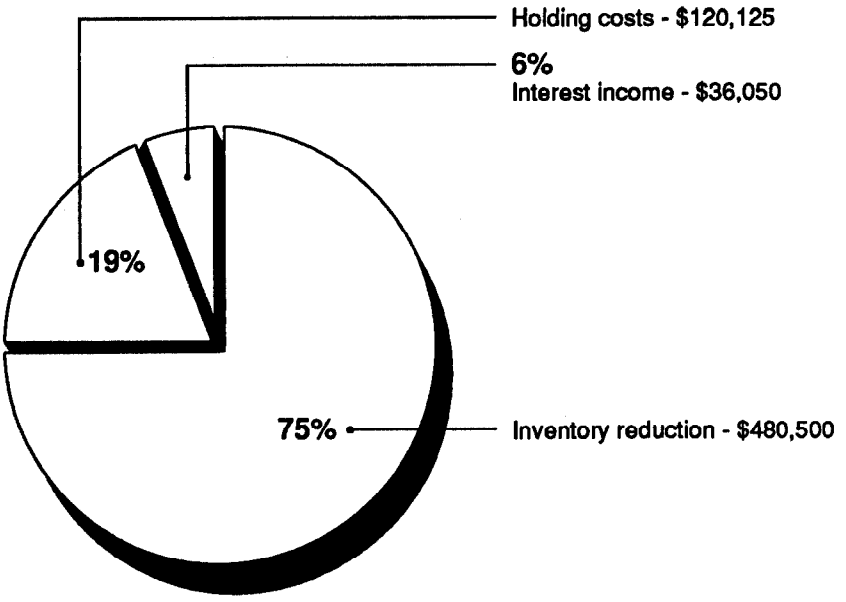
prime vendor to buy and distribute supplies for the hospital. The hospital pays the prime vendor a fee for these services, but according to the hospital we visited that used this practice, the fee is less than the hospital's costs to hold and distribute the inventory.

The resulting changes to material management in the hospital can be significant. For example, Vanderbilt Medical Center implemented a stockless system for medical supplies to serve its 661-bed medical center and satellite facilities. In total, two prime vendors distribute supplies to 61 locations inside Vanderbilt Medical Center and about 650 locations on the Vanderbilt University campus. As a result of changing to a stockless system, Vanderbilt estimated it reduced inventory levels from $4.5 million to $2.8 million, a difference of $1.7 million (38 percent). It also reduced its material management operating costs by $800,000 a year, a 50-percent reduction. Vanderbilt officials said they also

- consolidated deliveries of over 2,000 sources of supplies to two prime vendors,
- eliminated the receiving dock function,
- reduced hospital-stocked lines of supply from over 6,000 to less than 350,
- eliminated 18 delivery personnel positions,
- established nightly inventory replenishment on the hospital floor, and
- adopted an inventory management information system that automates inventory counts, provides material usage information, and electronically orders supplies.

Baylor University Medical Center adopted a just-in-time program that included a suture reduction plan for its operating room. The first objective of this plan was to identify the total dollar amount of suture inventory on hand in all locations of the medical center. Second, the hospital identified slow and non-moving items and returned any obviously overstocked items to the manufacturer. After Baylor evaluated suture usage histories, it implemented other initiatives such as deleting stock backup locations, reducing the amount of inventory kept on hand, and standardizing the sutures actually stocked in the operating room. In the first year, the savings realized by controlling and standardizing inventory and moving to a just-in-time system for operating room supplies amounted to over $600,000. Figure 2.5 illustrates the components of this savings.

Figure 2.5: Baylor University Medical Center Savings From Reduction in Operating Room Supplies



Note: Total first-year savings was $636,675.

As figure 2.5 shows, the majority of the savings is a one-time reduction in the amount of inventory stored by the hospital. According to a Baylor official, reducing the inventory held by the hospital also reduces the costs to hold and manage inventory and provides an opportunity to earn interest on funds previously invested in inventory.

Steps to Improved Inventory Management

According to Vanderbilt officials, just-in-time and stockless systems are developed in sequential steps. First, the hospital contracts with suppliers to establish the price for each item used. Second, it contracts with prime vendors to buy the medical supplies at the preestablished price and deliver them to the hospital. Third, the hospital and the prime vendor develop just-in-time delivery procedures for selected items. Gradually, all inventory items are delivered on a just-in-time basis. When the hospital and the prime vendor have developed a significant level of confidence in the just-in-time delivery system, the prime vendor can begin developing a stockless delivery system.

According to both Baylor and Vanderbilt officials, before implementing just-in-time or stockless programs, inventory management information systems must be improved. These new systems provide accurate supply usage information and a capability to electronically order, invoice, and

pay for medical supplies. They also enable hospitals to order supplies from many different sources and can be expanded to incorporate inventory management functions such as calculating reorder points.

Baylor University Medical Center officials stressed that a totally automated system is key to effectively managing the supply system. In discussing the requirement for improving inventory management operations, one hospital official stated that "accurate, integrated system data is the key to any inventory reduction program." They further stated that as confidence builds in inventory accuracy, the purchasing process should be automated as much as possible.

DOD uses many different information systems to manage medical supplies; these systems do not provide the electronic ordering functions required for just-in-time or stockless techniques. As a result, military hospitals hold more stock to accommodate the longer period of time it takes to obtain supplies.

DOD Can Use Commercial Practices

In May 1990, the Under Secretary of Defense for Acquisition established a 10-point inventory reduction program that is an essential element of DOD's overall effort to accommodate force and budget reductions and base closures. The objectives of this program are to revise material requirements and to create efficiencies in overall material management operations.

One of the 10 points in this program is to vigorously pursue alternatives to current DOD material stockage programs. The initiatives included in this area are greater use of commercial, instead of military-specified, items; application of just-in-time delivery methods; the increased use of commercial distribution systems; and the increased use of direct vendor delivery.

DOD believes reductions in inventory will result from eliminating, where possible, the middleman role of the DOD warehousing system. In fact, its May 1990 inventory reduction plan states that

> "Where DOD requirements can be met through commercial distribution systems in a timely and cost effective fashion, no value is added by pushing items through the DOD warehousing systems. Instead, increasingly constrained resources and facilities are unnecessarily tied up through investment in material and warehousing of items [that are] available through commercial distribution systems."

Defense Logistics Agency's Role Results in Added Inventory

DLA depots hold a layer of inventory additional to the inventory previously discussed in chapter 2. These depots satisfy approximately 50 percent of military medical facility supply requirements in the continental United States and almost 100 percent of the requirements for overseas facilities. The cost of operating the depot warehouses handling medical supplies was over $50 million in fiscal year 1991, with approximately $540 million of inventory on hand as of December 31, 1990.

The private medical facilities we visited do not maintain a depot system to support their requirements. Instead, they rely on commercial distribution systems to provide supplies as they are needed. To remain competitive with commercial distribution networks that can provide supplies to military hospitals, DLA is developing new programs to better serve its hospitals at a lower cost.

Depot Operations Are Costly

Traditionally, the military depot system has been responsible for purchasing, storing, and distributing supplies in bulk quantities to medical facilities. DLA purchases items in large quantities to obtain discounts for volume buying.

Medical supplies worth $813 million were sold by DLA to military facilities and other federal agencies worldwide in fiscal year 1990. DLA stores supplies in 17 warehouses at three depots. These warehouses provide over 550,000 square feet of storage space and in December 1990 held approximately $540 million of supplies. Of this amount, about 10 percent ($52 million) was designated as war reserve material.

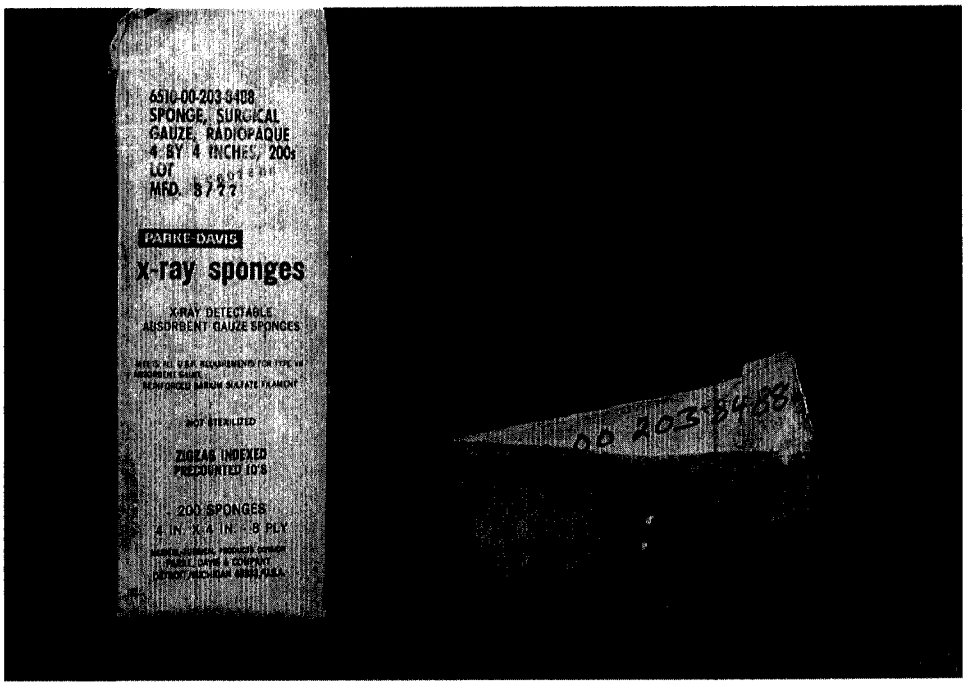
Depots Hold Large Amounts of Inventory and Old Stock

The DLA depot system holds a large amount of inventory to support the peacetime requirements of DOD medical facilities. In fiscal year 1991, DLA centrally managed and stocked approximately 12,000 medical items in three DLA depots. In fiscal years 1988 through 1990, DLA held an average of 248 days of medical inventory on hand. DOD officials said it keeps this amount of inventory to cover safety levels, procurement cycle times, and war reserves. Figure 3.1 shows inventory held in one of the warehouses at the DLA depot near Mechanicsburg, Pennsylvania.

Figure 3.1: Inventory Stored in DLA Warehouse

These high inventory levels, along with the requirement to hold inventory to support possible wartime conditions, cause DLA to hold stock for long periods of time. In fact, the depot system holds inventory that dates from the mid-1940s. In some cases, supplies are held indefinitely because they do not have a specified shelf life or depot officials are not directed to dispose of them. Figure 3.2 shows a package of 4"x4" sponges packed and held in the depot since 1977.

Figure 3.2: 4"x4" Sponge Inventory From 1977



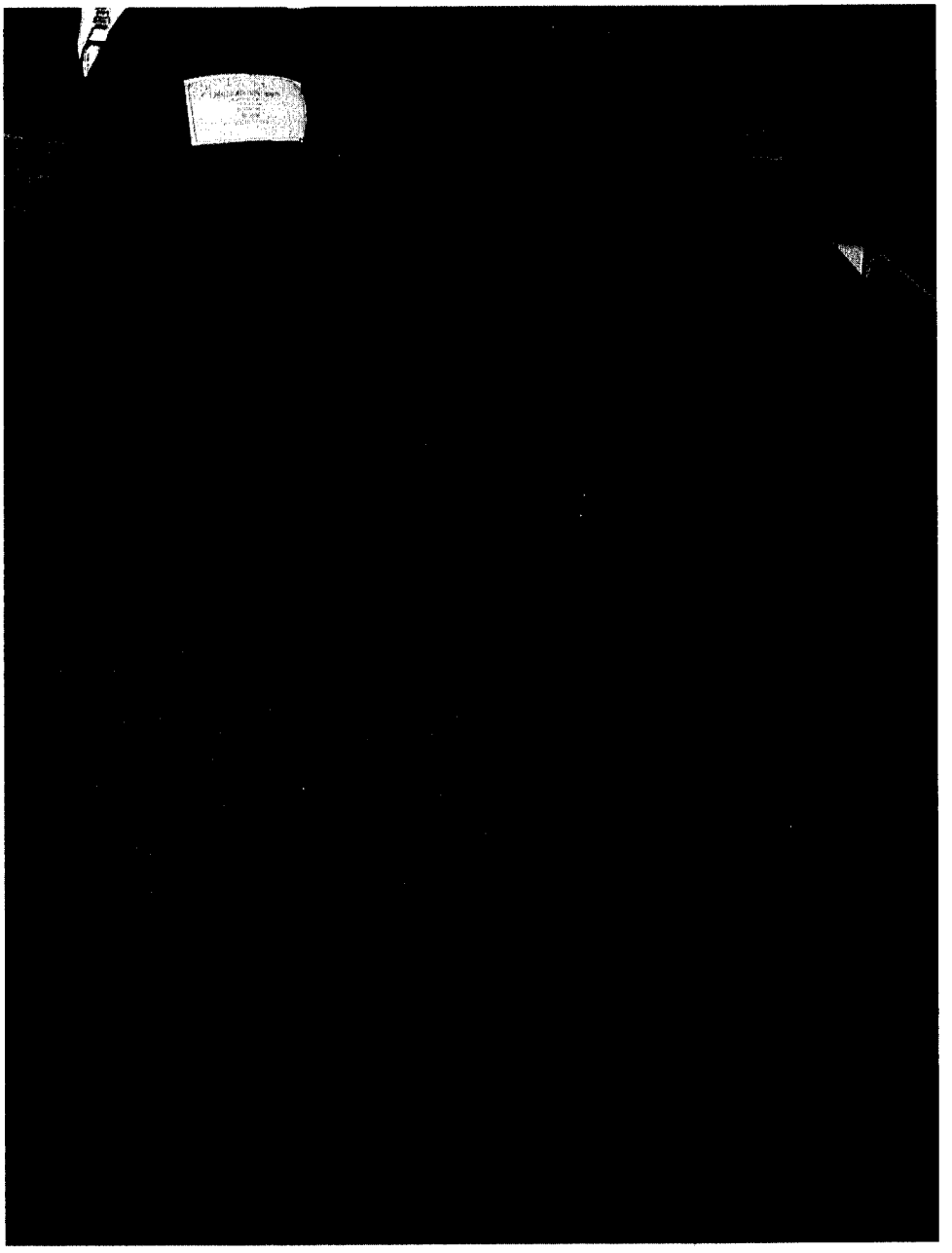
The DLA depots hold about 50,000 packages of these radiopaque 4"x4" sponges dated from 1973 to 1980. The Army and Navy own approximately 1,500 of these items for wartime purposes. DLA issues about 11 packages of these sponges daily, which, at this rate, equates to approximately 13 years of inventory on hand. For Operation Desert Storm, DLA issued 580 packages of radiopaque sponges and almost 100,000 packages of a new sponge that is not radiopaque.

This same warehouse also holds about 5,100 patient robes packed in 1952 and 1967. A newer robe has been bought, but the older robes, owned by the Army and the Navy, are kept for wartime purposes. However, DLA records indicate that none of these older robes were issued for Operation Desert Storm.

The warehouse where these items are stored also holds many other items not commonly requested by the services. In total, approximately 25 percent of the line items held in this building are over 10 years old, and over 40 percent are at least 5 years old. The oldest item we observed in this warehouse was a patient jacket from 1945. Currently, DLA depots store 29,474 of these jackets, of which almost half are owned by the Army. These jackets range in age from 1945 to 1983. Approximately 6,700 are stored at the Mechanicsburg depot, of which about

85 percent are dated 1945 and 1969. The depots issue about one of these jackets a week. Figure 3.3 shows one of these jackets packed in 1969.

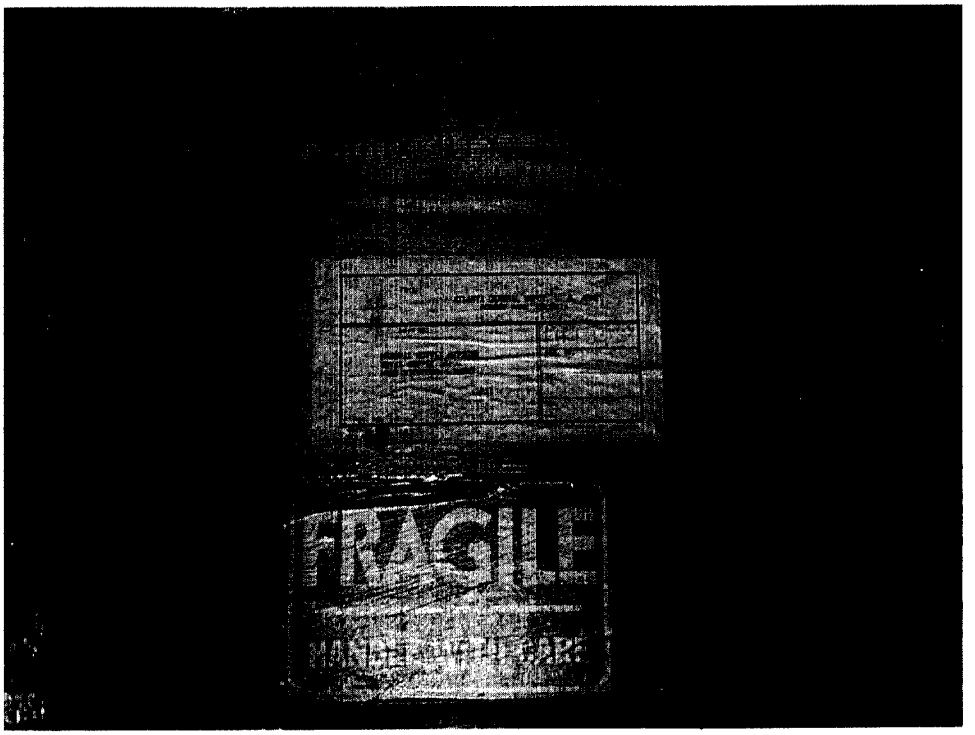
Figure 3.3: Patient Jacket From 1969



In order to reduce the number of jackets owned by DLA, a 90-percent price reduction went into effect in 1988. Since that time, only about 170 jackets were issued to the services, none of which were used during Operation Desert Storm. Subsequent to our visit to the depot, DLA officials requested that this item be placed in a terminal status to prevent more purchases from being made in the future.

During our visit, we also observed glass needle-protecting tubes from 1951 (see fig. 3.4). These tubes were used when needles and tubes were sterilized and reused. However, the services now use disposable needles. According to DLA reports, about 40,000 glass needle-protecting tubes are currently stored in the depots. Since this item has not been requested during the past year and it has been classified as an item that will no longer be purchased, DLA officials have requested disposal of this item through the Defense Reutilization and Marketing Service.

Figure 3.4: Glass Needle-Protecting Tubes From 1951



Finally, DLA holds 14,829 men's pajama trousers dated 1966 and 1967. These trousers are being held exclusively by the Army and Navy for wartime purposes. However, none of these supplies were issued for use during Operation Desert Storm. Instead, the services requested a newer type of trouser.

Private Hospitals Do Not Use Depots

Private medical facilities we visited rely upon commercial distribution channels to provide their medical supply needs. Supplies are delivered directly either from item manufacturers or vendors. These facilities can receive discounts for guaranteed amounts of purchases without actually purchasing and storing the supplies in bulk quantities at their own warehouses.

For example, Humana Corporation contracts for supplies at its headquarters and monitors contract usage to ensure that price discounts are achieved. Vendors are responsible for shipping the supplies in small quantities directly to each of Humana's 82 hospitals. Humana officials do not believe using a depot system is practical, since vendors are located close to their hospital facilities. Instead, vendors deliver supplies on an as-needed basis, and Humana thus avoids the cost of holding supplies in bulk quantities.

DLA Provides Other Services

DLA has implemented new programs to provide better service to military facilities and reduce the costs these facilities pay for supplies. These initiatives have almost exclusively used electronic ordering and direct delivery of supplies to medical facilities. DLA continues to contract for supplies and orders them for individual medical facilities, but DLA does not store or deliver the supplies.

One of DLA's more aggressive programs is an effort to electronically order supplies from 93 vendors for military hospitals. Under this program, military hospitals send orders for medical supplies to the Defense Personnel Support Center, which then electronically sends these orders to a vendor. The vendor then delivers the supplies directly to the hospital, bypassing the depot warehousing function. After the hospital receives supplies, the Center receives confirmation of delivery and pays the invoice. DLA currently charges military hospitals 4.3 percent for this service.

DLA officials believe that by increasing the use of electronic ordering, DLA can reduce inventory levels and associated holding costs. Instead of

warehousing medical supplies, DLA will electronically transmit the orders and pay for supplies.

In addition to electronic ordering, DLA has also set up decentralized blanket purchase agreements with vendors. Under these agreements, a hospital can order up to a specified amount of supplies directly from the vendor without individually negotiating contract terms and conditions for the items. The Air Force is currently the largest user of these agreements. It has increased the use of these agreements from $6 million in 1983 to $60 million in 1990. The Navy and the Army use these agreements less frequently, with a combined usage of approximately $9.3 million in 1990.

Government Initiatives to Improve Medical Logistics

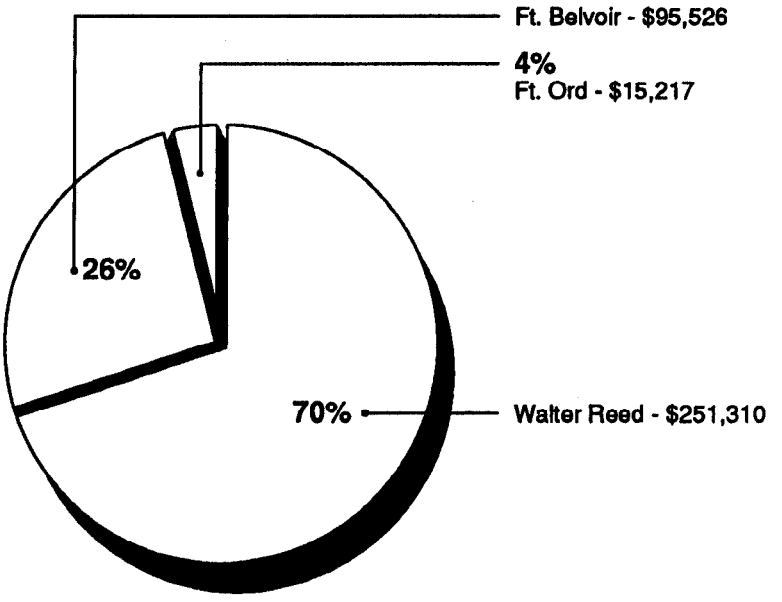
Both DOD and VA are testing ways to improve their logistics systems. One program involved electronic ordering and direct delivery of intravenous solutions from the vendor to the medical facility. VA has recently initiated a prime vendor program in four geographic regions nationwide that should reduce the requirement to store pharmaceuticals in medical facility warehouses. Under a longer term project being pursued as part of DOD's corporate information management (CIM) initiative, the entire medical logistics process is being evaluated and compared to existing commercial practices.

Intravenous Solution Program

On August 4, 1988, VA awarded a contract to one manufacturer to supply VA medical centers with approximately 100 different types of intravenous solutions and related supplies. VA uses electronic ordering to purchase these items, which are then delivered directly to the medical center. During the first 2 years of the contract, these facilities experienced a cost avoidance of $29.3 million. They expect a potential cost avoidance of approximately $75 million over the life of the 5-year contract.

The Army recently tested this program in three of its facilities and realized an inventory reduction savings of over $300,000 for a 9-month period during fiscal year 1991. For example, inventory levels of intravenous solutions dropped at Walter Reed from approximately $290,000 to $73,000, a 75-percent reduction. Figure 4.1 shows the total savings realized at Ft. Ord, Ft. Belvoir, and Walter Reed during the 9-month program.

Figure 4.1: Army Savings From Test of Direct Delivery of Intravenous Solutions



Note: Total savings was $362,053.

Army Health Services Command officials stated that these savings resulted from a reduction in days of inventory held and in the cost of obtaining these supplies. Days of inventory on hand were reduced from 150 to 40 days. Much of this reduction was due to the fact supplies were directly delivered to the medical facilities instead of through the DLA depot system.

DOD is expanding this program to 10 more military facilities. As the number of facilities using this program increases, the intravenous solutions and related supplies will be eliminated from the depot distribution system, and the amount stored in individual warehouses and treatment facilities should also decrease. If all DOD hospitals and medical centers were to achieve similar savings to the test facilities, DOD would save millions of dollars.

VA Prime Vendor Program

In November 1991, VA implemented a prime vendor program that should reduce the number of pharmaceutical products stored in selected VA warehouses and medical centers. The prime vendors are drug wholesalers that have been awarded contracts for the warehousing and subsequent distribution of pharmaceutical products to individual medical centers. VA negotiates prices and awards contracts for products directly

with the manufacturers or suppliers. The prime vendor in turn buys the products at these prices and distributes the products to the hospital. It charges a distribution fee for these inventory management and distribution services.

VA contracted for this program using four solicitations covering 32 medical centers in four geographic regions. After a bid protest, which required VA to reevaluate the proposals, final contracts were awarded in September 1991. VA will evaluate the success of this program by comparing it to other VA facilities that will use the traditional VA supply systems during the same time period. After this evaluation, VA will determine whether to expand the program to other facilities and include other medical supply items.

Corporate Information Management Initiative

Recognizing the need for overall improvements in DOD information systems, the Deputy Secretary of Defense established the CIM initiative in 1989. Medical logistics is one of the areas being evaluated under this initiative. As part of this effort, the CIM group is examining DOD's business practices in the functional areas selected and recommending improvements.

The CIM subgroup reviewing medical logistics practices includes senior Army, Navy, Air Force, and DLA medical logistics officials who receive guidance from their logistics chiefs. The subgroup's recommendations are reviewed and approved by a steering group that includes the Surgeons General of the three services.

As of July 1991, the CIM review of DOD medical logistics had resulted in the development of strategies to improve DOD's current business practices. Some of these strategies affect DLA's role in providing medical supplies to DOD treatment facilities and encourage the use of commercial practices and distribution systems. Among the opportunities for improvements are

- the adoption of electronic communications with vendors to save administration costs and permit the use of just-in-time programs and
- the use of a just-in-time supply system.

The subgroup believes that these improvements will result in "substantial savings from the draw down of inventories and the costs associated with their maintenance. . . ." It also believes that the just-in-time system will provide "increased operational flexibility, allowing relatively quick

changes in medical emphasis, without the costs of the traditional [way of doing business]. . . ."

This subgroup has also reviewed government initiatives to improve medical logistics. Related to pharmaceutical supplies, it recognizes that the VA prime vendor program has the potential to "revolutionize drug purchasing practices in the federal government. It can substantially reduce costs and overhead administration, while greatly improving the system's responsiveness to the user." However, the VA prime vendor program does not eliminate the need for a depot system and warehouses, which is what the private hospitals we visited are doing.

The subgroup has also recognized that the intravenous solutions test case pursued by VA and DOD has been "highly cost effective and has received wide professional acceptance and support." Finally, the subgroup cited a DLA pilot program to electronically purchase X-ray film using a decentralized blanket purchase agreement. This initiative provides direct electronic ordering capability through DLA and direct vendor delivery of the item.

This subgroup has also suggested changes to improve DOD's medical logistics system. These changes are currently being coordinated with appropriate DOD agencies and have not been reviewed and approved by the steering committee or formally approved by DOD. The subgroup anticipates the following:

- Changes in regulations to permit "partnership agreements" between medical facilities and vendors.
- Changes in DLA policies and operational role. DLA would become the central buyer and bill payer for the DOD medical community, emphasize the use of electronic communications, and limit depot storage to military-unique items.
- Changes in military policies to combine and coordinate the activities of the three services and increase the use of just-in-time supply concepts and other commercial practices.
- Changes in DOD training for medical personnel.

Conclusions and Recommendations

DOD could reduce medical inventory through a more vigorous pursuit of practices used by civilian and VA medical facilities. These practices include standardization of supplies, electronic ordering, and just-in-time and stockless delivery programs. Using these practices, some civilian medical facilities have reduced or eliminated the need for outside warehouses and central supply rooms and have reduced the volume of work on loading docks.

DOD recently initiated programs involving electronic ordering and the direct delivery of items to certain medical facilities. These programs have demonstrated that inventory and costs can be reduced. DOD could expand these programs to other medical facilities without impairing its war readiness requirements or violating existing statutes. Tailoring the programs to each facility's needs would optimize savings; at the same time, quality patient care would be maintained.

Recommendations

We recommend that the Secretary of Defense direct the services and DLA to conduct pilot programs that will demonstrate the applicability of commercial practices to military medical facilities. We recommend that these programs include facilities from all three services, test initiatives encompassing all aspects of inventory management, and quantify the cost and benefits of the changes. These programs should comprehensively test the extensive changes in the total logistics system needed to dramatically reduce inventory costs. Among the practices that should be included in the tests are

- significantly reducing duplicative inventory requirements in medical facilities,
- establishing electronic ordering capabilities with private vendors and DOD medical facilities,
- using of prime vendors to deliver supplies from a variety of manufacturers directly to medical facilities,
- eliminating the need to store medical supplies in warehouses adjacent to medical facilities and in the DLA depot system, and
- contracting with private firms to maintain and rotate war reserve material.

Once these steps have been accomplished, the services should tailor the changes required in each of their facilities so the successful results of the pilot programs can be applied. This approach would allow DOD the flexibility to accommodate special conditions such as remote facility locations, access to commercial distribution systems, and support for

overseas operations and at the same time improve its logistics systems and save money.

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