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Sourcing and Global Distribution of Medical Supplies

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Summary

Introduction

The Department of Defense (DoD) provides medical care to its service members whether they are at their home station or deployed, at locations all over the world. To provide this patient care, DoD must ensure that its health care providers have the proper quantity and quality of medical materiel resources. To accomplish the mission of providing medical care to service members outside the continental United States (OCONUS), DoD procures medical materiel in the United States and ships it to OCONUS treatment facilities and operational units.

Procuring and distributing medical materiel carries a large annual cost: DoD spends approximately \$4 billion on these activities to support care facilities within the United States, and an additional \$750 million to procure and distribute medical materiel for OCONUS.² When the Office of the Secretary of Defense (OSD) directed all military organizations to find efficiencies,³ the Undersecretary of Defense for Acquisition, Technology and Logistics (USD AT&L) directed all military organizations in its reporting structure to initiate studies and analyses to identify potential efficiency opportunities.

In response to the direction from USD AT&L, the Army Medical Research and Materiel Command and Headquarters Operations of the DLA sponsored a project at RAND to investigate opportunities to gain efficiencies in the global military medical logistics enterprise without sacrificing capability. To perform this project, the RAND team surveyed current military medical logistics practices in regions around the world.

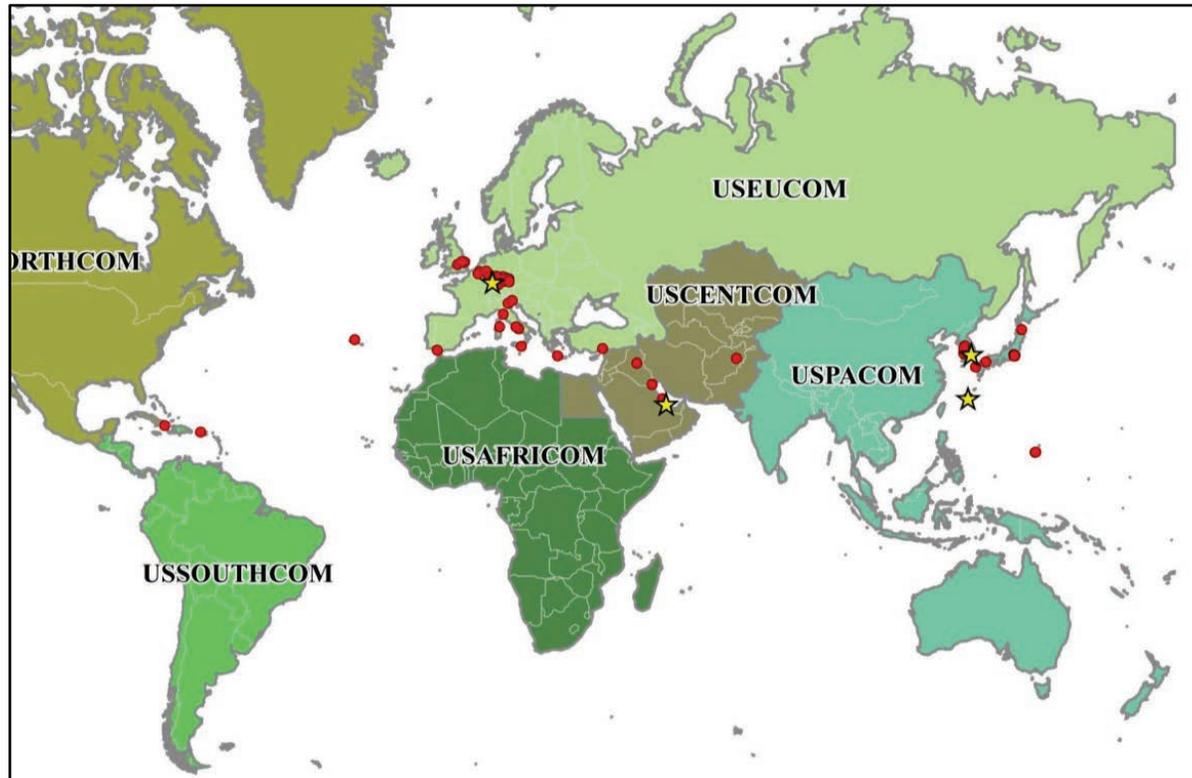
Figure S.1 shows the geographic combatant commands (COCOMs) with their respective boundaries. Red dots in this figure represent OCONUS MTFs and the yellow star icons indicate locations of the OCONUS theater lead agents for medical materiel (TLAMMs).

² Defense Logistics Agency (DLA) Troop Support interview, 2011.

³ DoD, *Defense Efficiencies Initiative* web page, undated.

S.1

Map of Geographic COCOMs, OCONUS MTFs, and TLAMMs



NOTE: USAFRICOM = U.S. Africa Command
USCENTCOM = U.S. Central Command
USEUCOM = U.S. Europe Command
USNORTHCOM = U.S. Northern Command
USPACOM = U.S. Pacific Command
USSOUTHCOM = U.S. Southern Command

Table S.1 profiles the OCONUS lead agents for medical materiel in each of the geographic COCOMs. Air Force Medical Operations Agency (AFMOA) is the lead agent for USSOUTHCOM, and is located in San Antonio, Texas.

Table S.1
Comparison of Theater Medical Logistics Agents

	COCOM	Service	Lines of Stock Held	Inventory Value	U.S. Military Manpower^a	Other Manpower^b
USAMMCE (Germany)	USEUCOM USCENTCOM USAFRICOM	USA	11,000+	\$33.5M	80	319
USAMMC-SWA (Qatar)	USCENTCOM	USA	2,600+	\$13.2M	73	39
USAMMC-K (S. Korea)	USPACOM (USFK)	USA	2,200+	\$2.5M	15	54
TLAMM-P (Japan)	USPACOM	USAF	—	—	4	—

^a U.S. military manpower is active duty and civilian

^b Other manpower is contract and other nation

SOURCE: Command briefings from U.S. Army Medical Materiel Center–Europe (USAMMCE), U.S. Army Medical Materiel Center–Korea (USAMMC-K), U.S. Army Medical Materiel Center–Southwest Asia (USAMMC-SWA) and Theater Lead Agent for Medical Materiel–Pacific (TLAMM-P).

Many military commodities other than medical ones are managed by a DLA global enterprise. The medical commodity has remained a shared logistics enterprise between DLA and the services. We interviewed senior leaders in DLA and in the service medical logistics commands as to why medical logistics continues to be service-led; Table S.2 offers a summary of the reasons mentioned.

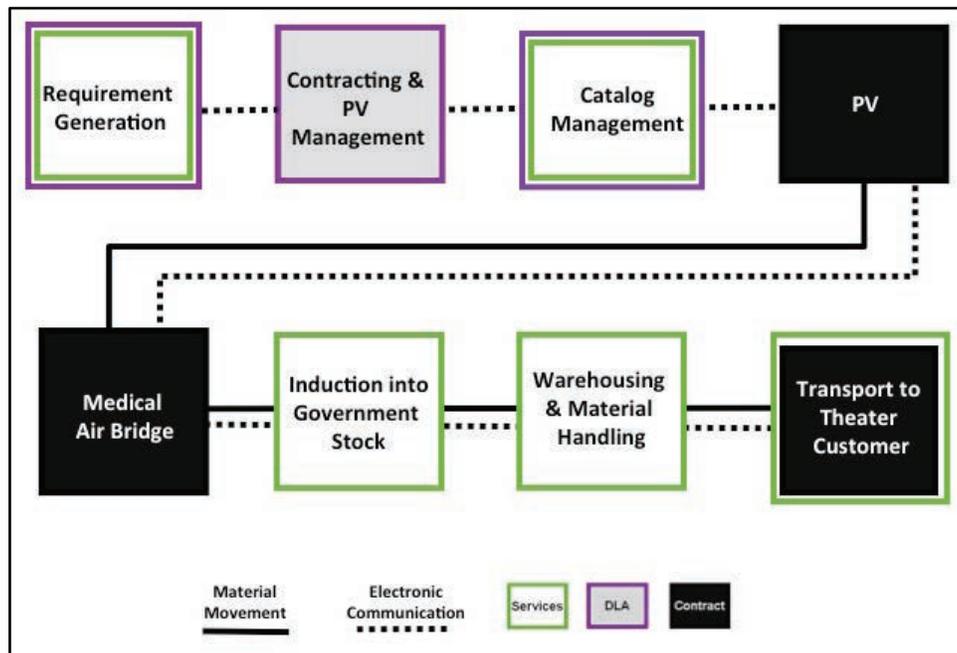
To capture all aspects involved with this service-led mission, we mapped a representative value chain for military medical logistics, and noted organizations responsible for each of the activities (see Figure S.2). The broad areas of the structure include:

- contracting/catalog management
- transportation to first delivery location
- intermediate warehousing
- transportation to final end-user.

Table S.2
Characteristics of Medical Logistics Enterprise

Characteristics	Requirements/Effects
Mission objective is medical care, tolerance for adverse outcomes due to supply is very low	Stockouts at end user are not tolerated for usage items, non-usage items should be expedited
Items are generally commercial	Military may be able to procure quickly, not need to maintain significant inventory
Reparables are updated every one to three years, consumables are updated even more quickly Pace of turnover in consumables catalog	It is burdensome but feasible to develop materiel for reparables and sets (NSNs); it is infeasible with current manpower to develop materiel for consumables.
Require specialty facilities: environmentally controlled, controlled access, etc.	Diverse materiel handling needs: narcotics, vault, perishable, HazMat, pilferable, reparables
Seasonality, mass casualty events, troop surges	variability in demand with high levels of uncertainty
Guidelines placed upon the commodity by federal agencies	Agencies include Food and Drug Administration, OSHA Expertise required to be responsive to recalls, shelf life extension, local procurement

Figure S.2
Military Medical Logistics Value Stream



NOTE: PV = Prime Vendor

Contracting/Catalog Management

In fiscal 2010, DoD spent approximately \$4.7 billion to procure medical materiel. More than 80 percent of this materiel was procured through acquisition programs (PV and Electronic Catalog [ECAT]) managed by DLA using federal pricing agreements. It is generally the case with medical materiel that DoD

- does not make the market for consumption
- generally procures medical materiel that is in wide use by the civilian community
- procures a small portion of the total quantity of items manufactured for U.S. consumption, relative to civilian health care organizations.

The entire U.S. consumption of pharmaceuticals and medical retail items is \$340 billion.⁴ DoD expenditures on medical materiel (composed largely of items that fall under these categories) represent only 1 percent of the total. As a result, we focused our analysis on opportunities for efficiency, other than leveraging DoD's purchasing power to achieve a reduction in materiel.

Each MTF maintains staff to do local procurement. We observe that it may be possible to consolidate the capability to do local procurement among MTFs that are geographically close, thus reducing a need for local presence to meet with local suppliers while gaining efficiency through economies of scale in collocating the balance of procurement staff. MTFs could also achieve efficiency through procurement best practices if it is possible to retain the best experts at local procurement and place more procurement staff in the same location.

In order to make items available for end users to procure from the DLA-managed medical materiel contracts, DoD staff at each MTF and medical material agent add data associated with item stock numbers. This way, the handling characteristics of the items are known when organizations receive the materiel and induct it into inventory. DoD staff also must make sure that the items' purchase prices have been vetted against federally negotiated lowest prices. During this process, DoD has the ability to decide whether to make such items easily available for end users to order. DoD can take advantage this necessary activity by standardizing the process and using it as an opportunity to vet whether newly requested items are truly necessary or whether items already approved for purchase may substitute.

If DoD were to restrict materiel used by deployed units to clinically necessary items and reduce the variety of substitutable items, it could achieve efficiencies in its medical materiel supply chain. The efficiencies would be achieved mostly in warehousing, and somewhat in shipping materiel in the second leg and receiving materiel at the location of the end user.

⁴ Kaiseredu.org, U.S. Health Care Costs, Background Brief, web page, undated.

Transportation to First Delivery Location

For PV-sourced materiel, transportation from the supplier to the first delivery location in the United States is provided by each PV within the distribution fee established by the PV contract. In the United States, all MTFs and some operational units are designated as routine ordering facilities (ROFs), and can place orders to PV and ECAT suppliers that will be delivered within negotiated delivery times, generally one to two days, depending on customer location. The majority of operational units that are not ROFs typically set up accounts with MTFs at their installations, order materiel to be delivered to those MTFs, and pick it up locally.

Outside the United States, most MTFs and all medical materiel agents are designated as ROFs. Most land-based operational units are not, however, and must set up accounts with ROFs through which to receive PV materiel.

The PV contracts for medical materiel mandate that materiel must be delivered in seven days from the time of order. But there are extensive clauses in place that restrict the circumstances under which PVs are held to the seven-day delivery standard. Ordering facilities must provide PVs with predicted item orders one month in advance. Even if they order fewer items, ordering facilities may be charged for the entire predicted amount, and PVs are not required to meet delivery performance standards for quantities of items ordered in excess of 110 percent of the predicted amount. Further, when an ordering facility requests an item that it has not previously ordered, the PV has 90 days to begin filling item orders. Table S.3 describes the effective PV delivery standards.

Shipping from PVs to first destination is done via contracts negotiated by the U.S. Transportation Command (USTRANSCOM). The Category A (Cat A) transportation contract is generally used to ship medical materiel. Under this contract, commercial carriers pick up materiel at PV locations in the continental United States (CONUS) on the East and West Coasts and transport it by air to OCONUS locations. Medical materiel is also shipped via the World Wide Express (WWX), but that method is used less often than Cat A because WWX only accepts packages under 150 pounds and does not permit hazardous materials or other items with special handling characteristics. Because the shipping rate in the Cat A contracts is comparable to or lower than other DoD rates for commercial shipping, we conclude that there is no efficiency to be gained in the activity of shipping items via air to locations in USPACOM and USEUCOM.

For end users and intermediate distribution points, inconsistency in item delivery time from the PV to the first delivery location makes it difficult to order materiel as needed. Moreover, greater amounts of materiel must be held in inventory to buffer against delivery time variance. By contracting for more consistent or flexible delivery of medical materiel, the medical logistics enterprise could gain efficiencies by reducing inventories while maintaining materiel availability.

Table S.3
Exceptions to the Seven Day Delivery Standard

Circumstance	Delivery Schedule
Customer orders items in quantities larger than projected	37 days
Customer orders items infrequently (no order for a part or item in 90 days)	90 days*

SOURCE: Defense Supply Center Philadelphia, Medical Surgical Prime Vendor GEN IV SOLICITATION, SPM2DS-09-R-001, August 3, 2009.

NOTE: PVs are allowed 90 days to re-establish support for the items, after which PVs are held to the seven- or 37-day delivery standard.

If DoD could pool usage projections across all its end users, this may allow for monthly variation in orders from individual units, while maintaining a fairly smooth aggregate rate of demand as a basis for projected order quantities, which would compel the PV to deliver materiel with the quicker performance standard.

Warehousing

DoD stores medical materiel locally at unit locations, and centrally at DoD warehouses. In the United States, supply from PVs can reach purchasers in one or two days, so units that order directly from these suppliers do not need to maintain very large inventories. Outside the United States, where supply lead times are longer, units must maintain larger inventories to meet demands over these time periods. In addition to storing materiel at the end-user locations, DoD maintains inventories intermediate warehouses in order to provide faster deliveries to end users than can be had from the original suppliers directly.

The first notable opportunity for efficiency is transporting materiel directly to end users when possible and eliminating “double-touching” at intermediate warehouses. When materiel flows to end users through DoD intermediate warehouses, DoD personnel and other nations must receive the materiel, place it in inventory, pick the materiel, and issue it to the end user. DoD will save costs by eliminating these intermediate activities.

Based on an analysis of manpower assigned to functional divisions, we estimated that 55 percent of the costs associated with operating USAMMCE result from the mission to receive, warehouse, and issue materiel, with the balance of USAMMCE costs associated with its other missions, such as optical fabrication and equipment maintenance. Because 40 percent of USAMMCE issues are to MTFs in Europe, we estimate that if USAMMCE decreased its distribution mission by an amount equal to

$$(0.55) \times (0.40) \times (\text{cost to operate USAMMCE})$$

the savings would be about \$4 million annually. Applying the same logic to USAMMC-K, we estimate DoD could save approximately \$2 million annually. Partially due to the high shipping costs incurred delivering medical materiel to USCENCOM, we also recommend closing

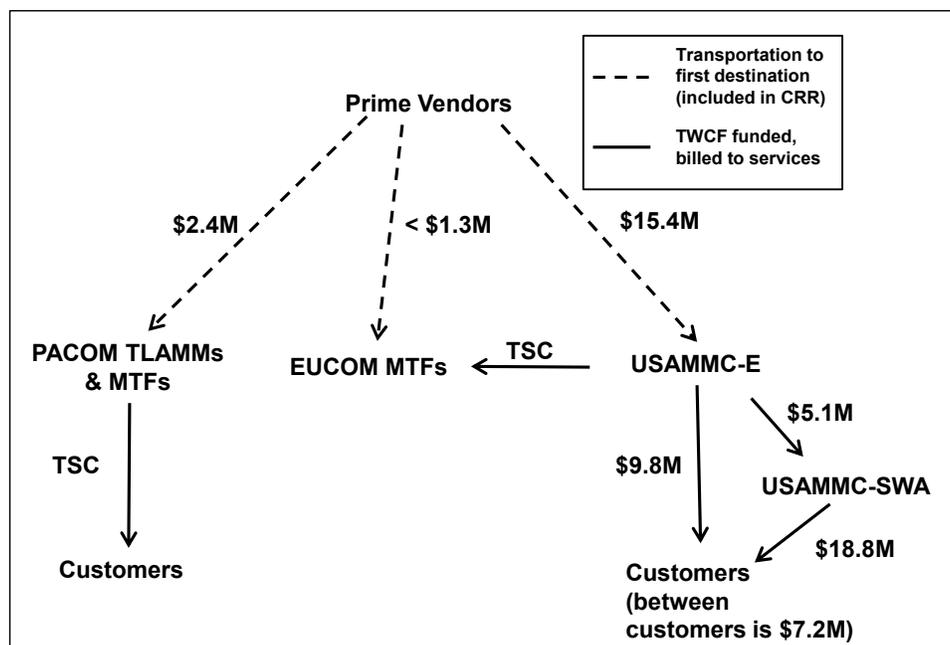
USAMMC-SWA as a distribution point. The cost of decreasing USAMMC-SWA operations alone may save DoD \$6 million to \$11 million annually, in addition to the savings in transportation costs that we will address in next, in the discussion of transportation from intermediate warehouses to end users.

Transportation to Final End User

Most CONUS consumers of medical materiel are ROFs in the PV contracts, who receive their materiel directly from the PV. Some operational units—such as infantry or combat units at Army installations—place orders with installation MTFs, which then place the orders on behalf of the operational units along with the rest of their medical materiel orders. Operational units who place orders with local MTFs can use unit or installation vehicles to pick up the materiel when it arrives at the MTF.

In USEUCOM, end users receive medical materiel through a number of means, including from PVs directly and through USAMMCE. Figure S.3 shows an overview of transportation costs.

Figure S.3
Medical Materiel Transportation Networks with Semiannual Costs



NOTE: Costs are semiannual, reflecting the data we received.

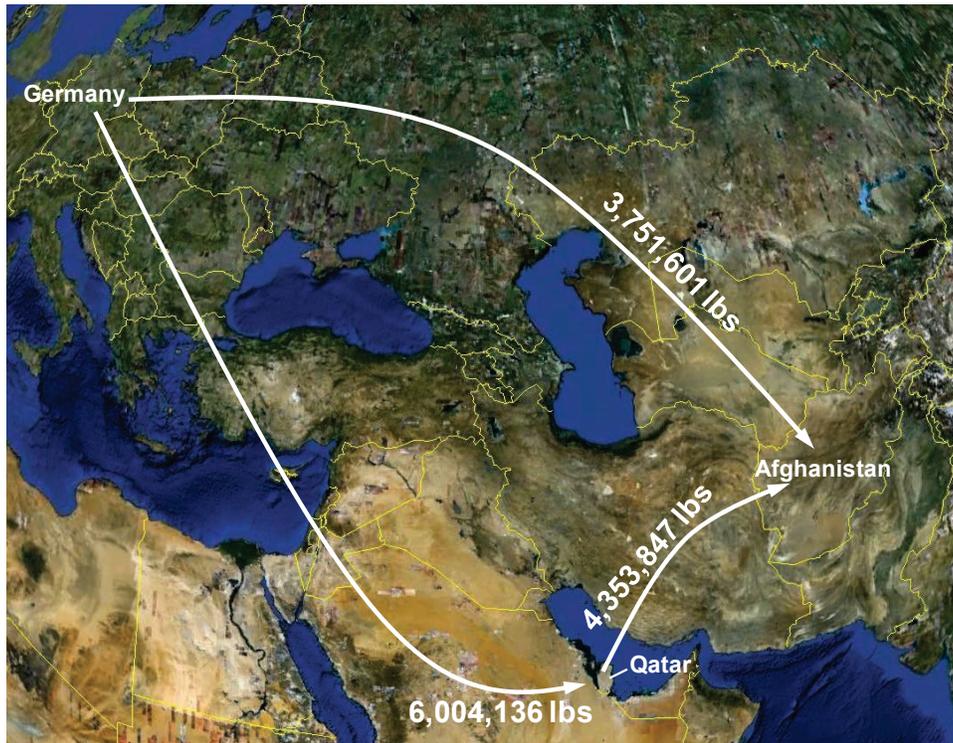
CRR = Cost Recovery Rate

TWCF = Transportation Working Capital Fund

USCENTCOM is far and away the most complicated theater for final delivery of medical materiel. All medical materiel that originates at a PV and is consumed in USCENTCOM passes through USAMMCE. After USAMMCE, this materiel may spend time in inventory at USAMMC-SWA, and then may be stored at a forward-positioned medical logistics company before it is delivered to the final end user. Medical materiel that is transported into or between USCENTCOM locations moves by military lift or commercial lift. Commercial lift operates at a level of service and price negotiated through the USTRANSCOM Class VIII tender. Once far forward, medical logistics teams may rely either on local logistics providers to move materiel to end-user locations; or end users may use unit vehicles to pick up medical materiel.

To reinforce how medical materiel is delivered to USCENTCOM units, Figure S.4 shows the weight of materiel that was distributed to USCENTCOM units using the Class VIII tender for commercial freight over the course of our research study. During this time, Class VIII tender for commercial freight constituted well over 90 percent of medical materiel shipments into USCENTCOM.

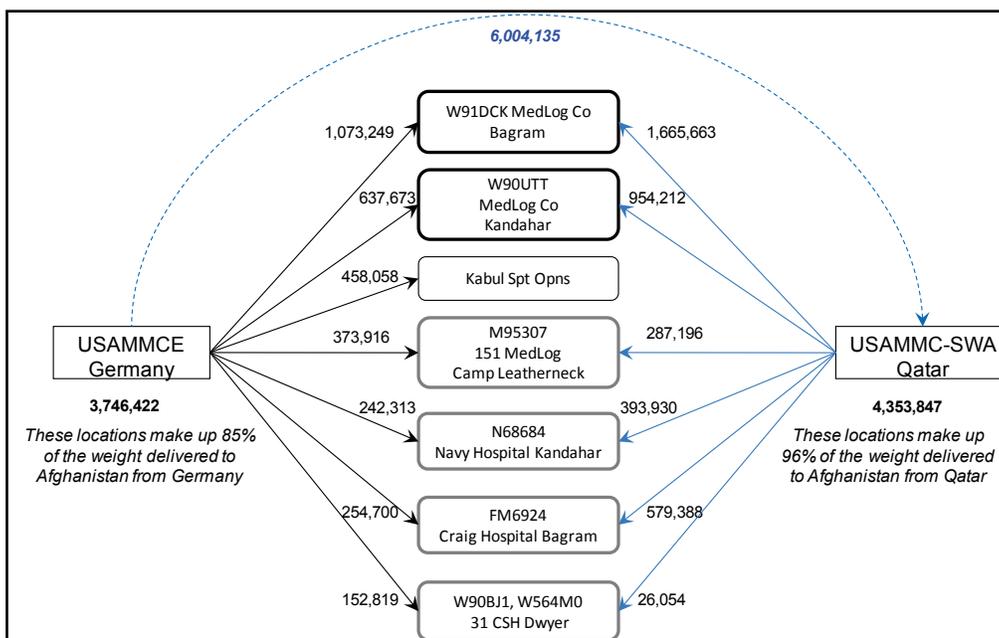
Figure S.4
Class VIII Commercial Tender Shipment Volume (in lbs.) from USAMMCE to USAMMC-SWA to Afghanistan and USAMMCE to Afghanistan (July 2010–December 2011)



SOURCE: Map provided by Google, with author overlay.

With the exception of one in Kabul, the shipments from USAMMCE and USAMMC-SWA went to the same set of receiving locations. As shown in Figure S.5, there is a strong overlap in USCENTCOM receiving locations. The locations to which USAMMC-SWA shipped materiel over this time were well served by USAMMCE—sometimes in even greater volume than from USAMMC-SWA.

Figure S.5
Consignees Receiving Class VIII Materiel from Both USAMMCE and USAMMC-SWA Using the Commercial Tender



NOTE: Weight amounts are in pounds
 MedLog Co = Medical Logistics Company
 Spt Opns = Support Operations
 CSH = Combat Support Hospital

We view the activity to receive, inventory, and issue materiel from USAMMC-SWA plus the additional shipping costs associated with the extra leg of commercial air freight as the largest single opportunity for efficiency in the medical logistics enterprise. Ceasing to use USAMMC-SWA to distribute medical materiel to USCENTCOM would save DoD approximately \$12 million annually by shipping materiel directly to these locations from USAMMCE, using extant Class VIII tender prices. We estimate that by renegotiating the Class VIII tender to approach the price of Air Mobility Command (AMC) tenders for commercial air freight from Europe to USCENTCOM, DoD could save on the order of \$10 million to \$20 million annually.

The mission in USCENTCOM is changing. Even over the course of our study, medical materiel shipments to USCENTCOM in 2011 were significantly different than in 2010. The projected savings to DoD reflect this change. It follows then, that when the mission changes further, opportunities for efficiencies will as well.

Conclusions

This report investigates opportunities for efficiencies in the medical materiel distribution structure. We specifically addressed opportunities in purchasing power, information technology (IT), warehousing, and transportation.

The purchase price of medical materiel represents more than 85 percent of the cost associated with medical materiel distribution. In total, DoD purchases \$4.7 billion of medical materiel annually, \$750 million of which is distributed OCONUS. DLA has incorporated 80 percent of medical materiel procurement into the PV contracts and the ECAT system of procurement, leveraging bulk purchasing power across the federal government. We did not see any obvious opportunity for efficiency in this process, which has already been centralized and standardized.

The main IT systems used by the military services to manage medical materiel procurement (Defense Medical Logistics Standard Support [DMLSS] and Theater Enterprise Wide Logistics System [TEWLS]) perform many of the same functions as each other, and simultaneously overlap and rely upon the enterprise business system (EBS) to pay PVs through the PV contract. DMLSS and TEWLS are also used to manage medical materiel warehouses, performing many of the same functions as Distribution Standard System (DSS). While DMLSS and TEWLS both can track items by commercial stock numbers, DSS can only download item information based on national stock numbers (NSNs). We were unable to do an exhaustive study of IT system costs due to a lack of detailed cost data on IT systems such as DSS and EBS. Where possible, we recommend DoD could find efficiencies by using a single IT system, as each of these systems bears enormous costs to develop and maintain, on the order of hundreds of millions of dollars.

The total annual cost of warehousing and distributing medical materiel to OCONUS locations is \$140 million. Providing materiel to USCENTCOM makes up 77 percent of the total OCONUS costs, and a correspondingly large portion of the identified efficiencies. Providing medical materiel to the balance of OCONUS locations incurs \$33 million in annual warehousing and distribution costs.

Over the past decade, DoD has made great leaps forward in finding efficiencies in medical logistics. The DLA-managed PV contracts have eliminated the need for large stores of medical materiel, especially in CONUS. By negotiating the Cat A contract for medical materiel, DoD has put the same materiel in the hands of providers overseas as it supplies to units in the United States.

The greatest opportunity for efficiency is in USCENTCOM. Utilizing the Class VIII tender for commercial airlift in second-leg transportation is very costly. By seeking lower costs for commercial air freight and supporting units in USCENTCOM directly from USAMMCE, DoD has the opportunity to achieve savings on the order of \$30 million to \$40 million annually.

We observe opportunities for continuing improvement through taking full advantage of the capabilities that the DLA- and USTRANSCOM-negotiated PV and Cat A contracts can deliver. We propose three approaches through which the medical logistics community can achieve further efficiencies:

- maximizing direct delivery to end users
- exercising control over the catalog and deliberately managing the quantity of materiel held overseas to support surges and supply chain interruptions
- managing usage items and the PV statement of work to maximize supplier responsiveness to end-user demand.

We did not observe any DLA warehouses that have the specialized holding areas required for appropriate storage of all classes of medical items. Additionally, the DLA warehouses we visited did not employ staff with professional knowledge of medical items, which may help ensure items are handled correctly and may allow orders to be filled with substituted items.

With no DLA facilities suited to incorporate medical materiel warehousing and distribution into their existing infrastructure, we conclude there would be no efficiency in immediately altering the current management roles of the Class VIII supply chain. If new locations for warehousing and distributing medical materiel are sought, collocating medical materiel management with an MTF, DLA facility, or military service logistics facility should be considered if it presents efficiencies in transportation or infrastructure.