

# Chapter 17

## MEDICAL LOGISTICS

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## INTRODUCTION

Few elements of health service support (HSS) are as routinely underappreciated by the medical caregiver as is medical logistics (“MEDLOG”). In a world in which Internet-enabled purchasing of everything from books to clothing to groceries and toiletries has made face-to-face encounters with a salesperson nearly obsolete, where delivery trucks make round-the-clock home deliveries, and even drones are being explored for supplying just-in-time commercial products, the many processes and network of relationships in logistics have become invisible to the customer. In a tribute to the professional success of medical logisticians, these processes are often even less apparent in a clinic or hospital. Drugs are ordered electronically and either unit-dosed to a ward or dispensed promptly in a pharmacy. The surgeon—swaddled in disposable sterile gowns and mask and sheathed in latex gloves—asks for a specific suture, instrument, or device and is almost instantly provided the right tool.

Yet no aspect of medical support for global military operations is more complex or demanding of agility, adaptive processes, specificity, and creativity than MEDLOG. In addition, effective and efficient MEDLOG in the dynamic field of healthcare must be concerned with the entire supply chain, from manufacturer to end-user, and from initial deployment of a device or piece of equipment, through obsolescence, disposal, and replacement with a more current or updated version. Joint Publication 4.02 describes MEDLOG as an integral part of the Military Health System that provides capabilities to organize and provide life-cycle management of the specialty medical products

and services required to operate an integrated health system anywhere in the world.<sup>1</sup>

MEDLOG support must be responsive to differences in professional training and specialty requirements. Proactive planning is required to predict materiel requirements and logistics support based on mission requirements and the operational environment. Close rapport, continuous communication, and mutual respect and understanding between the medical logistician and the healthcare provider are all essential for maintaining the health of military personnel, ensuring the lifesaving ability of the medical force, and conserving the fighting force. This chapter provides new medical officers and other healthcare providers with a primer on the Department of Defense (DoD) MEDLOG functional area, on the operational, strategic, and tactical levels. This is by no means a doctrinal document; rather, it is a guide for understanding the roles of medical logisticians in garrison and for developing the MEDLOG support plan in an operational environment. The primary tasks of the MEDLOG function is to provide:

- medical materiel management,
- medical equipment maintenance and repair,
- optical fabrication,
- blood distribution management,
- centralized management of patient movement items,
- health facilities planning and management, and
- medical contracting.

## INTEGRATED MEDICAL LOGISTICS MANAGEMENT

The differences among US Army, Navy, Air Force, and Marine Corps medical operations are often contextually specific. MEDLOG support is therefore normally a USC Title 10 service responsibility. However, in joint operations, a single integrated medical logistics manager (SIMLM) and a theater lead agent for medical materiel (TLAMM) are designated. The SIMLM’s mission, assigned to a service component command or joint task force, is to provide MEDLOG support of the joint force and government or multinational partners. The mission assignment is specific and depends on the supported force, complexity of distribution processes, and duration of need. The SIMLM promotes supply chain efficiency and minimizes the theater MEDLOG force.

TLAMMs are units or organizations designated by the Chairman of the Joint Chiefs of Staff, in coordination with the geographic combatant commands and secretaries of the military departments, to serve as

the major theater medical distribution point. These units provide the face to the customer for MEDLOG and supply chain management. TLAMMs manage demand-supported medical materiel inventories to support HSS operations and maintain relations with theater customers, national-level suppliers, and theater distribution management activities. TLAMMs are geographically based and assist the geographical combatant commander, SIMLM, and Defense Logistics Agency (DLA) in MEDLOG planning, provide direct medical materiel support to theater medical forces, and ensure operational and tactical units are integrated into the end-to-end medical supply chain. They are resourced through their parent service, operate through the command and control structure of their parent organization, and provide support under the authority of the Chairman of the Joint Chiefs of Staff designation and DoD policy.

Army TLAMMs execute supply operations using DLA's Defense Working Capital Fund, while the Air Force TLAMMs use the Air Force Working Capital Fund. Core MEDLOG functions required to support medical operations, as defined in Joint Publication 4-02, include medical supply; medical equipment maintenance and repair; assembly and fielding of medical assemblages; and management of vaccines, investiga-

tional drugs, special equipment, and any other materiel subject to special interest or control by the joint force surgeon.<sup>1</sup> The joint force surgeon's office coordinates HSS and force health protection capabilities for the joint force, including MEDLOG. Synchronization of HSS among the joint force and the SIMLM leads to integrated MEDLOG support across the geographic combatant command.

## ORGANIZATIONAL ROLES AND MISSIONS

For an enterprise of the magnitude required to provide and maintain medical supplies and equipment for military operations on a global scale to be successful, it must have an orderly approach and a coherent structure from the highest level of DoD acquisition to the smallest unit or the sole provider at the point of use anywhere in the world. Imagine a combination drug store, appliance store, and repair garage serving a small community coupled to an ever-changing research and development and manufacturing consortium capable of staying abreast of the community's demands for the most effective, safest, and targeted needs. Military MEDLOG performs these functions on a continuous basis with few interruptions or miscues.

### Strategic Role

Like any large health maintenance and healthcare organization, the DoD is an enormous consumer of medical supplies, pharmaceuticals, and equipment. At the highest organizational level, the demands of the individual services can be unified into large bulk purchases, resulting in cost advantages, reduced variation in quality and form, and simplified warehousing and distribution. DoD designated the DLA director as the single representative for all of the services—the DoD executive agent for medical materiel (known in DoD parlance as Class VIII)—in 2005.<sup>2</sup> (DLA also serves as the DoD executive agent for several classes of supply besides medical, including food [Class I], uniforms [Class II], and fuel [Class III].) DLA in turn delegated executive responsibility to the commander of DLA-Troop Support (DLA-TS), located in Philadelphia.

DLA-TS provides the overarching contracts for the DoD worldwide. Major multiyear contracts are negotiated with the major suppliers of materiel ("prime vendors") at great savings for the DoD through economies of scale. DLA-TS procures medical materiel and equipment for the DoD and "sells" them to the military service end-users. DLA-TS establishes contractual arrangements for the acquisition and distribution of surge and sustainment materiel in support of the services' contingency shortfalls. DLA-TS provides the operational infrastructure enabling high-priority medical

materiel to be shipped through a single consolidation hub directly into theater. As a result, medical customers in the Army Central Command (CENTCOM) and European Command (EUCOM) have in-transit visibility, which allows limited transportation resources to be used more efficiently, thereby improving the effectiveness of the DoD MEDLOG supply chain.

### Service Agencies

As mentioned above, each of the medical services maintains a service-specific MEDLOG capability to meet the unique demands of their respective end-users. But it should be noted that each of three principal service MEDLOG coordinating centers are collocated at the Defense Medical Logistics Center facility located at Fort Detrick, Maryland—in many regards, the center of MEDLOG for the DoD.

The **US Army Medical Materiel Agency** (USAMMA), a subordinate command of the Army Medical Research and Materiel Command, acts as the Army surgeon general's focal point for strategic MEDLOG programs and initiatives. USAMMA's mission is to develop, acquire, provide, and sustain world-class solutions and capabilities to enable medical readiness globally. Accordingly, the USAMMA's principal skills and technologies focus on the medical logistician's role in lifecycle management, sustaining and modernizing the medical force (active, Guard, and reserve), supporting exercises and contingency operations, and promoting MEDLOG information and knowledge.

The **Navy Medical Logistics Command** (NMLC) is focused on operational/expeditionary MEDLOG support and military treatment facility logistics support, acquisition, and analytics. It also offers commercial law advisors to Navy medicine. NMLC possesses a unique capability by centrally owning the technical, legal, and contracting execution arms for Navy medicine. In addition to the Fort Detrick location, NMLC operates a detachment in Germany; the Naval Expeditionary Support Command in Williamsburg, Virginia; and the Naval Ophthalmic Support and Training Activity in Yorktown, Virginia.

The **Air Force Medical Logistics Operations Center** (AFMLOC) provides equipment, materiel, services, and information to the Air Force medical mission and MEDLOG activities at the unit level. AFMLOC is the center for Air Force medical supply chain management; it publishes and monitors guidance on supply chain management for Air Force major commands and deployed medical units. Deployed Air Force units use expeditionary MEDLOG and a “reach back” system of support for sustainment of early-deployed platforms until a TLAMM becomes available.

### Operational Roles

The link between commercial vendors, military acquisition, and distribution occurs at key MEDLOG oversight and distribution centers. These centers are distributed to optimally serve the geographic combatant commands while exploiting economies of scale whenever possible. In addition, modifications of MEDLOG support of US and coalition partners can be adapted for specific needs to build host nation capacity.<sup>3-6</sup> The major centers are listed below.

The **6th Medical Logistics Management Center** (6th MLMC) deploys to provide centralized medical materiel lifecycle management to designated forces to sustain worldwide combatant command contingency operations and defense support of civil authorities. The 6th MLMC is a direct reporting unit to US Army Forces Command under the administrative control and training readiness authority of the Army Medical Research and Materiel Command (USAMRMC). (As of October 1, 2018, USAMRMC is a subordinate command of the US Army Materiel Command.<sup>7</sup> The impact of this reorganization on the strategic and operational dimensions of MEDLOG is unclear at the time of this textbook’s publication.)

The **US Army Medical Materiel Center–Europe** (USAMMC-E), also a subordinate command of the Medical Research and Materiel Command, is the TLAMM for EUCOM, US Africa Command (AFRICOM), and State Department activities. USAMMC-E is located in Pirmasens, Germany, near Landstuhl Regional Medical Center and the major airhead at Ramstein Air Force Base. The core functions of USAMMC-E are lifecycle management and distribution of Class VIII materiel; clinical engineering support; clinical advice and consultation; optical fabrication; and assembly, reconstitution, and disassembly of medical sets, kits, and outfits. USAMMC-E also trains logisticians on supply chain management, including military occupational specialty proficiency training for enlisted MEDLOG specialists, overseas deployment training for Guard and reserve troops, and predeployment training to deploying units.

The **US Army Medical Materiel Center–Korea** (USAMMC-K), located in Camp Carroll, South Korea, serves at the TLAMM for US Forces Korea and organizations located in the Korean theater. USAMMC-K provides unit-level medical maintenance to outlying health, dental, and veterinary clinics and operational units across the Korean peninsula.

Other centers are listed below.

- The **US Army Medical Materiel Center–Southwest Asia** (Provisional) serves as the TLAMM for CENTCOM. Its mission is to provide, project, and sustain MEDLOG support across the full spectrum of operations throughout the CENTCOM area of responsibility.
- The **Air Force Medical Operations Agency**, located in San Antonio, Texas, is the TLAMM for US Southern Command.
- The **18th Medical Group**, located on Kadena Air Base, Japan, is the TLAMM for US forces and organizations operating inside the Pacific Command (PACOM) area of responsibility, excluding the Korean theater.

### Tactical Roles

Different types of units perform MEDLOG at the tactical level for the services. An **Army medical logistics company** (MLC) is normally subordinated to a multifunctional medical battalion (MMB). If an MMB is not available, the MLC is aligned to a combat support hospital. The MLC mission is to provide direct support for medical supplies, single and multi-vision optical lens fabrication and repair, and medical equipment maintenance to brigade- and corps-level medical units or to a maximum force of 22,000 soldiers. It can receive and process 11.1 short tons and store up to 51 short tons of Class VIII supplies and equipment, and is capable of deploying forward distribution and contact repair teams.

Unlike the Army MLC, the **Marine Corps MLC** is organized as a part of a Marine supply battalion, combat logistics regiment, and Marine logistics group. The Marine Corps MLC is not a part of the Marine medical battalion; like the Army MLC, it has materiel management, distribution management, and biomedical maintenance capabilities within the company.

In the Air Force, a **medical logistics flight** is a part of a medical support squadron in a medical group. Air Force MEDLOG support is not designed to provide area support to other services without augmentation.

An Army **brigade medical supply office** (BMSO) is located in a medical company with a brigade support battalion. The BMSO mission is to provide direct sup-

port for Class VIII supplies and medical equipment maintenance to the brigade, it has limited capacity to provide area support in an operational environment. Another MEDLOG tactical unit is the Army **blood support detachment**, described below.

### **Blood Management**

The Armed Forces Blood Program Office is responsible for managing the DoD's blood supply, also known as Class VIII (B). At the strategic level, the geographic combatant command surgeon creates a joint blood program office to jointly manage the blood program and an area joint blood program office (AJBPO) in support of the theater directly. In theater, the Air Force expeditionary blood transshipment center (EBTC) provides initial reception processing from one of the two armed services whole blood processing laboratories based in the continental United States: West for PACOM and East for EUCOM, CENTCOM, and AFRICOM. Upon direction and coordination from the AJBPO, the EBTC ships whole blood or blood products to a blood support detachment in the Army or blood product depot in the Navy.

The Army **blood support detachment** may be attached or assigned to an MMB. If a unit deploys without the MMB, the detachment will rely on the unit to which it is assigned for command and control and life support. A blood support detachment is generally collocated with an MLC or combat support hospital. The detachment provides flexibility to shift personnel between blood collection and distribution missions, as required. The basis of allocation is one blood support detachment per 100,000 soldiers in theater and one per 150,000 service members for joint operations. The blood support detachment provides refrigerated storage for 4,080 units of packed red blood cells, collecting up to 432 units of whole blood and distributing boxes of packed red blood cells and other blood products to echelon-above-brigade medical treatment facilities through three blood distribution teams (while not collecting or manufacturing blood).

Medical units such as Army combat support hospitals and forward surgical teams, Marine Corps forward surgical groups, and Navy ships at sea or fleet surgical teams submit their requisitions to the supporting blood support detachment or blood product depot for emergency resupply or sustainment. MEDLOG units assist in blood distribution, planning, and delivery depending on the mission and location.

### **Medical Maintenance**

Acquisition and distribution of high-quality, technically sophisticated, accurate, and often delicate medical

equipment such as radiograph machines, computed tomography scanners, laboratory equipment, ventilators, and electrocardiogram machines require timely maintenance and repair. Military MEDLOG functions as the lifecycle technology manager for medical devices and systems. MEDLOG responsibilities include financial and budgetary management, service contract management, data processing systems for managing the medical equipment, and coordination of service agreements and in-house operations, acquisitions, property accountability, facilities, and patient safety.

A primary function is to ensure that the medical equipment is safe, effective, and highly reliable for use by surgeons and other clinicians, nurses, and allied health staff members. This responsibility requires participation in the planning process and in the assessment of new technology, assuring regulatory compliance in the medical technology management area, investigation of incidents, and active participation in training and education of technical and medical personnel. The scope of these activities is expanding significantly as medical technology continues to become integrated into systems, and as the lines between medical, communications, and information systems continues to blur. At the operational level, the most readily available biomedical technician is located in the BMSO in the Army. Across the services, biomedical technicians are most often located at the MLC level and theater Role 3 hospitals.

### **Optical Fabrication**

From the MEDLOG perspective, optical fabrication focuses on the production of combat eye protection, protective mask inserts, tinted lens, frames of choice, flight frames, and standard issue ("5A") frames. At the strategic level, the DoD executive agent for the optical fabrication enterprise is the Navy surgeon general; this authority is designated to the commanding officer of the Naval Ophthalmic Support and Training Activity to act as the program executor's representative to provide the day-to-day oversight of the optical fabrication enterprise. At the operational level, the optical fabrication enterprise is comprised of 26 Navy and Army medical treatment facilities and TLAMM fabrication laboratories strategically located worldwide to manage fabrication assets and meet requirements for all services. At the tactical level, optical fabrication assets are located within MEDLOG companies, optometry detachments, and some ships at sea.

### **Patient Movement Items**

Patient movement items (PMIs) are specific medical equipment and supplies that are required to sup-

port patients during evacuation. PMIs include more expensive equipment requiring accountability at the intra-theater level, as well as less expensive, more numerous items such as litters, blankets, and litter straps, that must be a part of the planning process at the tactical level. The function of the PMI system is to support in-transit patients, exchange in-kind PMIs without degrading medical capabilities, and provide prompt recycling of PMIs. The PMI system provides seamless in-transit visibility for the equipment management process from initial movement to the patient's final destination. Without accountability and a process of PMI exchange and replenishment, evacuation of patients and associated PMIs would quickly deplete front-line medical units of essential transport items.

The US Transportation Command is the DoD's single manager for patient movement (with the exception of intra-theater patient movement) and the program manager for the PMI system. The Air Force is responsible for resourcing, maintaining, and re-

cycling PMIs to support contingency operations for patient movement. The Air Force is also responsible for the establishment of theater PMI centers and cells. Medical equipment designated for use as a PMI must be tested and certified for use on the appropriate patient evacuation platform (for example, fixed-wing or rotary-wing aircraft). A joint certification label is required to designate airworthiness certification for all PMI equipment. The label must be affixed to each piece of aeromedical evacuation-certified equipment.

Intra-theater movement of PMIs is the responsibility of the combatant commander. As the theater matures, the combatant commander may establish a TLAMM or SIMLM. If established, the services will coordinate as necessary with the SIMLM for support in the areas of requisitioning, storage, maintenance, and distribution of PMIs. Forward distribution and exchange of PMIs is a SIMLM or service responsibility. Theater medical treatment facilities, MLCs, and surgical teams must coordinate with the theater PMI center for replacement in kind for PMI items.

## MEDICAL LOGISTICS LESSONS LEARNED

The medical staff officer and medical provider must work closely with MEDLOG staff at all levels to ensure required MEDLOG support. In every aspect of field medical operations, MEDLOG support requires close coordination with the personnel and systems that provide supplies, equipment, medical equipment repair, and other aspects of MEDLOG for effective mission execution. As described above, MEDLOG operations are a specialized, complex, and interconnected network of manufacturers, vendors, and other suppliers with automated tracking and delivery systems, all intended to meet medical support plan requirements as well as needs that emerge as the mission progresses. This includes sophisticated subsets of the overall process, such as cold chain management, which ensures the maintenance of temperature-controlled shipping and handling for items such as blood, medications, and vaccines. Success depends on clear communications, habitual training, and good working relationships between providers and the MEDLOG support community. The following section lists lessons learned and tips to assist medical staff officers and providers requiring MEDLOG support.

### Tips for the Provider

- When coming to a new operational unit, first have the junior leaders describe their section's capability and review the local standard operating procedures, then find the time to visually inspect the equipment and processes

with the leaders you will be working with.

- Look for anything expired, not calibrated, or missing, and ask who performs reconciliations with the supplier and how often. This will give you a sense of your organization's readiness and operational capability. The budget may not support maintaining sets, kits, and outfits at 100%; however, the unit should maintain a current status of all shortages—even expendable items. Being aware of potential shortages will be key when requesting funds in support of exercises or deployments.
- In general, every operational unit has a group of items designed to perform a specific task that provides basic essential combat casualty care for the military population (eg, medical equipment set in the Army, allowance standard in the Air Force, authorized medical and dental allowance lists in the Navy and Marine Corps). Each of these groups is designed to meet a specific set of treatment or prevention criteria. You must learn these criteria. No group of items will meet 100% of your needs, because the overall intent is to provide basic essential supplies and equipment. Therefore, if your mission requires more than what is available at your location, careful initial outfitting and sustainment planning must be done prior to deployment.
- Know the difference between a request and a requisition. Just because you request some-

thing in theater does not necessarily mean the medical logistician has completed all of the necessary steps to translate a request into a requisition, especially when faced with a large number of requests in a high operational tempo environment. Conduct measured follow-up by asking for the document number, and get updated informal status reports.

### Checklists and Planning Considerations

The following is a short list of key MEDLOG considerations for the healthcare provider in every mission.

- What is the source of Class VIII materiel? Who provides your tactical and operational level

MEDLOG support?

- Do you have a close working or habitual relationship with your MEDLOG support? Have you adequately trained on the information systems and other administrative processes to ensure the outfitting and sustainment of your entire medical plan—from acute care and area medical support; to operative, nonoperative, nursing, and other care; laboratory and imaging; and biomedical equipment?
- What is the funding source for use of military Class VIII materiel?
- Will blood products be required in this mission?
- Will other US government or non-DoD entities need our support?
- What is the flow of patient movement items?

### RESOURCES

Policy and practice change over time. Doctrine, that is, published official guidelines and policies, will change in content, but military references will retain their numeric designation. These publications can be monitored over time for key principles and practices.

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### SUMMARY

MEDLOG is a vital and irreplaceable element of medical support for global military operations. To be effective in contributing to mission success, MEDLOG requires agility, adaptive processes, specificity, and creativity. The primary tasks of the MEDLOG function are to provide medical materiel management; medical equipment maintenance and repair; optical fabrication; blood distribution management; centralized management of patient movement items; health facilities planning and management; and medical contracting. MEDLOG is a dynamic field of both peacetime and operational health services support that is concerned with the entire supply chain, from manufacturer to end-user of supplies, and from initial outfitting of a

unit and its deployment of a device or piece of equipment, through obsolescence, disposal, and replacement with a more current or updated version.

The entire system of military MEDLOG involves organizations and units from the level of the DoD, through service-specific agencies, to organic elements of deployed field units. The MEDLOG tasks of acquiring and distributing Class VIII medical supplies and equipment are focused on supplying the combatant command-oriented organizations that manage these materiel needs globally on a regional basis.

The medical staff officer and healthcare provider must have an intimate understanding of MEDLOG, and they must develop key relationships with MED-

LOG personnel involved in tactical and operational actions. There is no substitute for careful planning for MEDLOG support, including training whenever pos-

sible with those who will provide this support during deployments and contingencies, while in garrison operations or predeployment preparations.

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