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# Class VIIIA Materiel: What Problems Were Encountered Transiting OIF Air Transshipment Nodes?

Jessica L. Buck


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THESIS

Jessica L. Buck, Captain, USAF

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**DEPARTMENT OF THE AIR FORCE**
**AIR UNIVERSITY**

**AIR FORCE INSTITUTE OF TECHNOLOGY**

**Wright-Patterson Air Force Base, Ohio**

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Jessica L. Buck, BS

Captain, USAF

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Jessica L. Buck, BS
Captain, USAF

Approved:

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| _____ | _____ |
| Dr. Alan Johnson (Chairman) | date |
| _____ | _____ |
| John Bell, Lt Col, USAF (Member) | date |

# Abstract

Medical cargo (Class VIIIA) is critical to the success of the United States military stationed across the globe; therefore, the military must successfully ship its Class VIIIA materiel to the Warfighter. The shipping and handling of the time and temperature sensitive Class VIIIA materiel is a complex process. Since the initial stages of Operation IRAQI FREEDOM (OIF) the medical field has complained about Class VIIIA materiel arriving unserviceable to the final destination. Unserviceable materiel includes items that expired over time and items that expired from exposure to temperatures outside of their allowable range. This thesis focused on one possible area of concern, the air transshipment nodes used for OIF. The researcher used interviews to accomplish a case study and answer the research questions. The interviews focused on the training of the personnel handling the materiel at the transshipment nodes and the amount of instruction relating to the materiel the personnel are given while deployed. The results of the interviews showed that training and instruction for handling the temperature sensitive materiel is not an issue. The contributing issues are the mass amount of cargo transiting the transshipment nodes, the lack of airlift, and the lack of storage space with proper capabilities.

## Acknowledgments

I would like to express my sincere appreciation to the personnel that contributed to my accomplishing this thesis. The many Air Force and Army personnel that gave me their time and knowledge made it possible for me to study the Class VIIIA shipping and handling processes.

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# I. Introduction

## Background

Cargo handling and shipping within the military transportation system is critical to mission success. Every item that military personnel use at overseas locations must be packed, palletized, labeled, stored, shipped, tracked, and received. The transportation specialists of each service accomplish the majority of these tasks. If the items are shipped overseas by way of Air Force airlift, rather than by overseas vessel, the shipping and handling is accomplished by aerial port personnel. These personnel are trained to accept prepared cargo from the shipping units, handle the cargo until the airlift arrives, and load the cargo correctly onto aircraft. Additionally, they ensure that the cargo is secure until loading and that the cargo will not interfere with the safety of the flight.

While all cargo is important, some cargo is more crucial to accomplishing the overall operation. For example, if an aircraft breaks while in Kuwait, the repair parts must be shipped immediately to the aircraft's location. These parts are called AMC MICAP (Air Mobility Command mission capability parts), and are one of the highest priority in the Air Force's transportation system. Without that shipment, the aircraft will not be able to accomplish its particular mission. (HQ AMC/A4RMP, 2006, p. 2)

Military personnel also have missions to accomplish. In order to be successful, personnel must be kept physically healthy by their medical units. Maintaining the health of our fighting forces takes a great deal of equipment and supplies. Considering the uncertainly of how long military personnel will be stationed in Iraq, it was not possible to transport all of the medical supplies and equipment needed to last the entire operation. Therefore, the medical units must continuously reorder supplies. Also, if equipment becomes unserviceable, deployed units must order replacements. This medical cargo (technically called Class VIII) is essential to the health and well-being of the military personnel in contingency areas, such as Iraq. Class VIII cargo is separated into two categories Class VIIIA and Class VIIIB. Class VIIIA materiel includes "pharmaceutical, medical-surgical, dental, medical-laboratory, radiology, and optometry supplies, as well as preventive medicine items and medical equipment. These supplies and equipment items are supported by the medical supply chain," (HQ DLA, 2003, p. 4). Class VIIIB items are blood and blood products, (HQ DLA, 2003, p. 4). The material studied for this thesis included only Class VIIIA materiel. While the medical supply chain supports both Class VIIIA items and Class VIIIB items, the transportation techniques used for each are significantly different. Additionally, the complaints researched for this thesis are specific to Class VIIIA materiel; therefore, this research focused only on Class VIIIA materiel.

**Problem Statement**

During the initial stages of Operation IRAQI FREEDOM (OIF), in 2003, Class VIIIA materiel often arrived to the final destination either late or unserviceable due to a variety of reasons. Class VIIIA arriving in an unserviceable condition means that the

items could not be used because they had expired or were exposed to temperatures outside of their allowed temperature range (HQ DLA/MSC, 2006). The prevailing assumption was that this problem was caused at the U.S. military *transshipment nodes* within the theater of operations, such as Kuwait City International Airport (KCIA), Qatar's Al Udeid Air Base (Al Udeid AB), Iraq's Bahrain International Airport (BIAP), and other transfer points (HQ DLA and USTRANSCOM, 2006). Transshipment nodes are points along the supply chain that accepts and delivers cargo. It may be the transition point from one mode to another (i.e. air to truck) or one aircraft to another (HQ DLA/MSC, 2006). The problem was identified to the U.S. Transportation Command (USTRANSCOM) and the Defense Logistics Agency (DLA) (HQ DLA/MSC, 2006).

In 2005, DLA and USTRANSCOM leadership saw the need to research this problem further, along with 28 other problems (also called gaps) within the distribution system (HQ DLA/MSC, 2006). These 29 gaps specifically address logistics concerns during Operations ENDURING FREEDOM and IRAQI FREEDOM (OEF/OIF). Transportation experts scoped their investigation by focusing only on delivery activities within the distribution system. An initial interview with the DLA Medical Commodity Program Section revealed a great deal of background information needed before starting this study. Teams were created from DLA and USTRANSCOM to research reported logistics problems from OEF/OIF and to determine if the problems were capability-based, process-based, or management-based. When deciding what to study, the teams used the Supply Chain Operations Reference (SCOR) Model to analyze each of the gaps that were initially reported, including the Class VIIIA materiel-handling gap (HQ DLA/MSC, May 2006). The SCOR model was created by the Supply Chain Council to

improve processes within supply chain activities, such as transportation and storage (Lockamy, 2004). The DLA-USTRANSCOM team could use the SCOR model by analyzing every detail of the current process (much like a process map), with the goal of creating a picture of the desired process. While some process maps have been completed, the DLA-USTRANSCOM team has not yet mapped the process for all of their gaps. The team used the SCOR model to find potential causes of the problems and created packets that were sent out for assistance. The "Capability Gaps and Process Opportunities" packet of 29 issues was formulated, and the USTRANSCOM part of the team was assigned as the Distribution Process Owner. The Distribution Process Owner is to ensure the resolution of the capability gaps (HQ DLA/MSC, May 2006).

DLA is the process owner for shipping all Class VIII materiel (HQ DLA/MSC, May 2006). When the problem of Class VIIIA materiel arriving late and unserviceable to the contingency areas was brought to their attention, DLA looked into initial reasons behind the issues. The initial reasons were (1) there were not enough aircraft for transportation, (2) the location of the medical war reserve materiel was not conducive to the shipment process, (3) the process of prioritizing and shipping the materiel was flawed, and (4) the personnel at the Aerial Ports of Debarkation (APOD) (also called and referred to as *air transshipment nodes* throughout this paper) were not handling the shipments correctly (HQ DLA and USTRANSCOM, 2006). See Appendix A for the originating issue document leading this thesis. This research begins where the Air Force Logistics Management Agency (AFLMA) study (explained in Chapter Two) and the DLA-USTRANSCOM team left off.

## Research Questions

There are two parts to this study:

1. During the initial stages of OIF, what were the limitations at the air transshipment nodes that caused Class VIIIA materiel to arrive at its destination unserviceable?

2. If Class VIIIA materiel is still arriving at its destination unserviceable, what continuing problems at the transshipment nodes are contributing to the problem?

## Investigative Questions

In order to explore the problem statement, the following investigative questions were answered throughout this research effort:

1) What was the shipping and handling process of Class VIIIA materiel at the transshipment nodes during the initial stages of OIF?

2) What problems occurred during the initial stages of OIF concerning Class VIIIA materiel shipping and handling at the air transshipment nodes?

3) What improvements have been made since the beginning of OIF to improve the shipping and handling of Class VIIIA materiel at the air transshipment nodes?

4) What is the current process of shipping and handling Class VIIIA materiel at the transshipment nodes?

5) What, if any, problems are still occurring, concerning Class VIIIA materiel shipping and handling at the air transshipment nodes?

6) What improvements still need to occur to improve the process?

These questions are further broken down into interview questions used for the research. A sample of the interview questions is in Appendix B.

## Methodology

DLA felt that the situation driving this study had not been resolved and needed further investigation. The researcher focused on the area that the DLA-USTRANSCOM

team believed needed adjustments: process management and personnel training at the air transshipment nodes used for OIF. In order to gather the needed information interviews with field experts and document reviews were accomplished. These interviews gave the researcher a look into the "real" processes versus the written military instruction processes. Available and relevant documentation was also collected. Documents reviewed included Air Force instructions, Department of Defense (DoD) regulations, DLA instructions, and related local policies from the transshipment nodes.

Participants in this study were Air Force and Army experts within the medical logistics and transportation fields who are involved in the process of distribution, shipping, and handling of Class VIIIA materiel.

**Summary and Preview**

This chapter described the background of the Class VIIIA materiel handling issue within the OIF contingency area. Chapter 2 summarizes literature that has already been written on the topic and reviews process instructions. Chapter 3 explains the methodology used for the study. The findings from the study are described in Chapter 4. Conclusions reached from the study and recommendations are discussed in Chapter 5.

# II. Literature Review

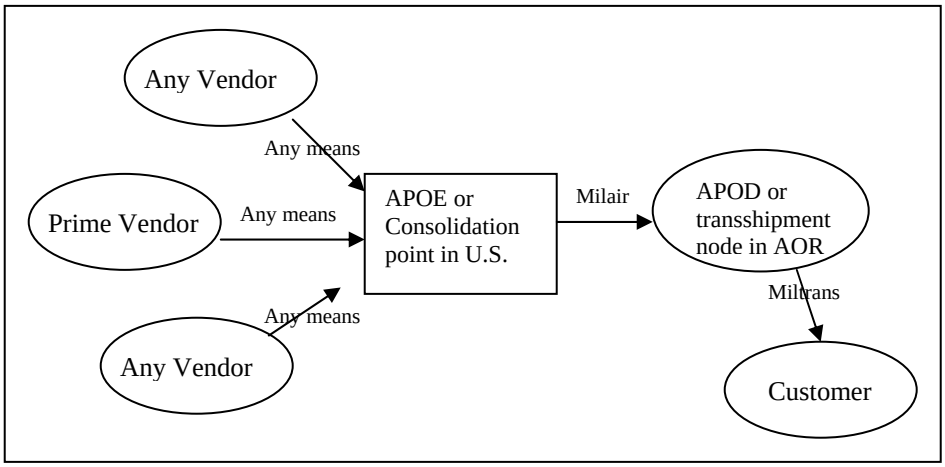
## Introduction

Chapter 1 briefly described the research objective of this thesis. This chapter summarizes typical problems related to handling Class VIIIA materiel in contingency areas as described from literature. Additionally, this chapter describes related articles and military instructions pertaining to Class VIIIA materiel handling. The important topic of improvements to the Class VIIIA materiel-handling processes that have been made or that have been identified as necessary, according to recent literature, is also discussed. Some of the literature pertains to both types of Class VIII materiel. Discussions of this literature will not include the "A" or "B" designators.

## Class VIIIA Transportation

The medical supply chain transports Class VIIIA materiel to U.S. military personnel around the world by means of truck, rail, ship, and plane. This supply chain is a complex logistics process that is critical to supporting military personnel in contingency areas. A representation of a potential supply chain using military airlift is shown in Figure 1. The figure shows that Class VIIIA materiel ordered from any commercial vendor in the U.S. is transported by the vendor via any means (i.e. air or truck; organically owned or delivery company) to the commercial or military airports. The materiel is then flown via military airlift to the air transshipment node (i.e. Al Udeid AB). The last leg of transportation is accomplished via military air or truck shipment (AFLMO/FOC, 2004, p. 18).

**Figure 1: Potential Class VIIIA Commercial Supply Chain** (AFLMO/FOC, 2004, p.




## Class VIIIA Transportation Difficulties

Some complexity within the process is introduced by materiel that requires special handling, such as environmental control or expedited shipping (DLA-USTRANSCOM, 2006). Handling environmentally sensitive items is particularly challenging. Many problems with Class VIIIA materiel occur due to improper care of the items. They must either be maintained at a certain temperature, or used within a certain time period before expiring (DOC, 2004). While these time and temperature sensitive requirements present specific transportation challenges to the logisticians, the unique Class VIIIA cargo shipping requirements also affect general Class VIIIA cargo which is not time or temperature sensitive since they are competing for airlift.

A briefing presented at the 2004 War Reserve Materiel In-garrison Conference discussed lessons learned from shipping medical cargo to contingency areas. The briefing stated the "root causes" of Class VIII distribution problems were "constrained airlift," along with the "leaning" of the medical cargo packages (HQ AFMSA/SGSL, 2004, p. 6). Assembling the medical cargo packages in a lighter and leaner fashion

actually worked against the medical logisticians. Lighter and leaner medical cargo takes up less space on an aircraft, so it is less likely that the cargo will generate an airlift mission of its own. There must be other cargo available to fly and fill the rest of the aircraft (HQ AFMSA/SGSL, 2004, p. 6). This briefing also listed the specific problem of Class VIIIA cargo sitting on the flight line for extended periods of time "exposed to extreme temperatures" because it was not of high enough priority to be loaded on the aircraft before other cargo of higher priority (HQ AFMSA/SGSL, 2004, p. 8). Two other major problems listed in this briefing are 1) a lack of in-transit visibility, and 2) medical teams and their cargo were split up at the aerial ports. This meant that the personnel arrived on location on one day and their equipment arrived later (HQ AFMSA/SGSL, 2004, p. 9).

The briefing also described a study conducted by the Air Force Logistics Management Agency (AFLMA). This study is described in an article published in the Air Force Journal of Logistics as well (Overstreet, 2004). At the time of this literature review, the AFLMA study was the only other research relating to Class VIIIA materiel handling and shipping at the air transshipment nodes in contingency areas. Other studies focused on ordering processes and technology. AFLMA was tasked by the Air Force Surgeon General to investigate how the medical field could improve the shipping process by studying "the establishment of central war reserve materiel storage and deployment centers," (HQ AFMSA/SGSL, 2004, p. 10; Overstreet, 2004, p. 34). In other words, AFLMA was tasked to not only find the causes of the problems of deploying the lighter Expeditionary Medical Support (EMEDS) system and aeromedical evacuation supplies but also find solutions and their associated costs. Many of the problems they found were

the same as those listed previously in this paper and apply to all Class VIIIA cargo at the transshipment nodes, not just the EMEDS. Specifically for the EMEDS, AFLMA found that consolidating the widely dispersed EMEDS would improve management of the cargo (HQ AFMSA/SGSL, 2004, p. 10-18). AFLMA recommended that the medical war reserve materiel, including the EMEDS, be consolidated at a specific number of strategic locations for shipping to contingency areas (Overstreet, 2004, p. 34).

**Time and Temperature Sensitive Items**

Temperature sensitive items have proven to be more difficult to ship than time sensitive items. Just as a "Supply Chain" is used to ship products and supplies around the globe from manufacturers to customers, a "Cold Chain" is used to ship temperature sensitive items around the globe. The U.S. Army Medical Materiel Agency (USAMMA) defines Cold Chain management as:

> "The process of preparing temperature sensitive medical products for shipment utilizing approved systems and procedures. This includes ensuring that required temperatures are maintained throughout the supply chain and validating that those conditions are met during all phases of distribution until issue or administration," (USAMMA, 2006, p. 7).

To combat this difficulty, USAMMA created a cold chain management training video that educates personnel on managing cold storage temperature sensitive items (DOC, 2004). Cold storage items need to be either frozen or refrigerated, depending on their handling instructions. It is more difficult to keep refrigerated items between specific temperature ranges than it is to keep items frozen. Refrigerated items must be packed and later repacked in order to stay within their temperature range for the duration of transit (DOC, 2004). One may think that packing items colder than necessary would be

helpful because the items would stay colder for a longer time period. Unfortunately, this will not work because packing items colder than the specified temperature is often more damaging to the items than allowing them to be slightly warmer than the recommended temperature range. The specified temperature ranges and the repacking of ice procedures should always be posted on the outside of the box where personnel can see it (DOC, 2004).

The other major consideration when handling Class VIIIA materiel is time sensitive items. Some medical-related items, such as pharmaceuticals, expire over time (HQ AFMSA/SGSL, 2004, p. 3). These items need to be packed, shipped, and delivered as quickly as possible. The faster the items arrive to the end customer/doctor in the contingency area, the more time the doctor has to use them. DLA provides specific instructions for their non-military vendors of time sensitive items (DMM online, 2006).

Combining time and temperature sensitivity with transportation into contingency areas creates a complex situation. During times of war, resources are used to their maximum capacity, and difficult situations become exacerbated. This was observed during the initial stages of OIF. The *Medical Logistics Support to OIF: lessons learned & observed* presentation created by the Office of the Surgeon General (OSG) in December 2003 listed Class VIIIA transportation problem areas observed so far during OIF (OSG, 2003, p. 9-10). The problem areas listed that relate to the transshipment nodes are: 1) cargo space on military aircraft from Germany to Qatar, and Qatar to Iraq is highly competitive, and 2) distribution capabilities are not adequate to meet medical requirements (OSG, 2003, p. 9-10). Examples of inadequate capabilities are lack of refrigeration space and lack of sheltered storage space. Sub-components to problem area

two are that Class VIIIA does not have the highest priority for airlift, a lack of capabilities caused long order-ship times, cold chain management problems, and in-transit visibility problems. An overarching problem discussed throughout the briefing was the lack of metrics to monitor performance (OSG, 2003, p. 9-10). One transportation improvement shown in this presentation was a change in Class VIII distribution routes. In March 2003, the medical cargo supply route was from Germany to Qatar to Kuwait to the final onward destinations in Iraq; four stops. In July 2003, the route was improved by skipping Kuwait. Supplies went from Germany to Qatar to the final destination; three stops (OSG, 2003, p. 5-6). Also, in July 2003, commercial air routes were contracted to carry all high priority and cold chain management items (OSG, 2003, p. 6).

**Class VIII Handling Journal Articles**

While there are multiple briefings concerning *Theater Medical Logistics sustainment* and the Class VIIIA materiel shipping difficulties referenced throughout this document, there are very few published journal articles discussing the shipment of Class VIIIA materiel to contingency areas. The majority of information found within journals dwells on Army processes for blood shipments and product ordering computer systems. For example, in a 2005 article, 1LT Maria Johnson wrote about the 226th Medical Logistics Battalion, 30th Medical Brigade that was deployed to Balad, Iraq in 2004. Their mission was to supply blood for OIF II (Johnson, 2005). Their blood was delivered from Qatar by medical evacuation aircraft; however, the medical evacuation unit could not sustain their own mission in addition to shipping the blood. The 30th then started using

Army aircraft, helicopters and airplanes. "Ninety percent of their shipments were sent as routine shipments using opportune airlift," (Johnson, 2005).

Another article about Army practices described how they supplied soldiers with their personal prescriptions while deployed. This was a large problem when the Iraqi war started; however, they now have an effective process that satisfies all requirements (Bennett, 2005). They created a system called P-Mart that tracks the deployed soldiers' medication requirements. The system will automatically refill and ship the order so that the soldier does not go without medication (Bennett, 2005).

The only pointedly related article found during the literature review summarized a presentation delivered by the personnel who helped organize the capability gaps package. Col (ret) Kissane and Maj Bennett presented at a convention for the Association for Healthcare Resource and Materiel Management in August 2004 their OIF experiences of supplying combat hospitals (DeJohn, 2004). They identified the following problems during their experiences:

- Originally, the medical planners didn't know when or where the fighting would take place, and they didn't know if chemical or biological weapons would be used.

- Medical logisticians were sent to walk the transshipment nodes' flight line to find their Class VIIIA materiel.

- Class VIIIA materiel was left to sit in the heat, even if it was heat sensitive.

- Medical troops were separated from their cargo during transport into the nodes, their cargo being the medical materiel they needed for treating patients.

- Medical cargo arrived late due to a lack of priority within transportation system.

- Today's soldiers are older than in previous wars; therefore, today's soldiers need chronic/daily prescriptions while in the field.

- Even though the cargo had locator tags, computer time was limited. Logistics was a low priority for communication bandwidth; therefore, the tags were often not used to their full potential (DeJohn, 2004).

**Class VIIIA Shipping/Handling Military Instructions**

Official military instructions or regulations telling personnel how to accomplish their duties are abundant. There are many Air Force Instructions (AFIs) telling aerial port personnel how to transport general and special cargo. They describe how to secure items in the security cage, how to re-ice packages, how to document information on special handling labels, and how cargo is prioritized to get loaded on the aircraft (HQ AMC/A4TC, 2006). However, these topics are not Class VIIIA specific.

The most detailed AFI with cargo handling instructions for aerial port personnel is the Air Mobility Command Instruction (AMCI) 24-101, volume 11. It was last updated in April 2006. There are a number of paragraphs that the aerial port personnel can refer to for assistance with Class VIII materiel handling specifically, section D: Special Cargo. Special Cargo is cargo that requires "any special handling involving acceptance, air movement, environmental control, handling, packaging, security, or any combination of these factors," (HQ AMC/A4TC, 2006, p. 44). Much of the Class VIII materiel falls under this category. Section D, paragraph 42 covers frozen, chilled and perishable shipments. These shipments are to be "expedited" and given "preferential handling within the guidelines of the movement indicators, and assigned movement priority, and use missions providing minimum total transit time," (HQ AMC/A4TC, 2006, p. 50). The section continues by describing the responsibilities of the special handling section of the aerial port: what forms to fill out, what paperwork to refer to for special instructions,

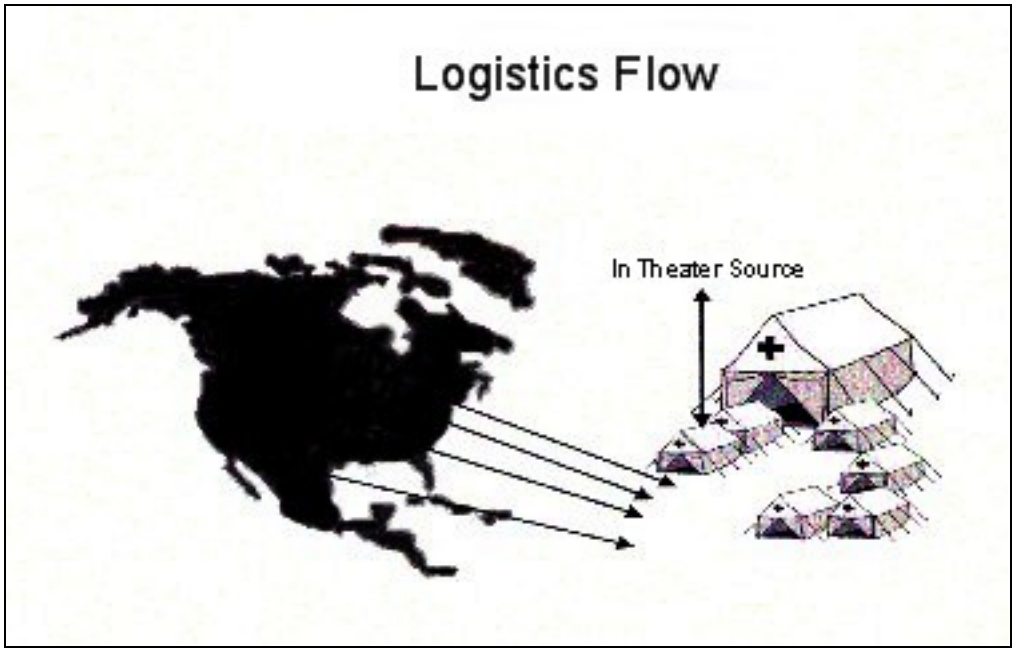
which packages they can re-ice and those they cannot, and who to contact for further assistance. The majority of Class VIII materiel that requires icing (including vaccines) cannot be re-iced by non-medical personnel; therefore the aerial port personnel must know who to contact when the materiel needs to be re-iced, per the special handling paperwork the aerial port receives with the cargo (HQ AMC/A4TC, 2006, p. 50).

The medical field has a number of instruction manuals related to handling and shipping Class VIII materiel. Air Force Tactical Techniques and Protocols 3-42.81, *The Expeditionary Medical Logistics Concept of Operations* (EML CONOPS) describes "how deployed medical forces will be sustained in accordance with Air Force doctrine," (AFLMO/FOC, 2004, p. 2). It is the medical extension of Air Force Doctrine Document (AFDD) 2-4, *Combat Support*, which describes how deployed forces will be sustained. The AFDD 2-4 states,

> "…resupply of deployed forces will begin upon arrival, reducing initial lift requirements. Time-definite delivery will form the basis for all resupply in the theater, thus reducing the total lift requirement. When combat commanders require an item, the system will reach back to CONUS and deliver it where and when needed," (AFLMO/FOC, 2004, p. 2).

Medical resupply is based on the same concept and the EML CONOPS clearly describes how to accomplish it. See Figures 2 for a visual representation of the 2004 logistics flow (AFLMO/FOC, 2004, p. 7). The process described in the EML CONOPS and shown in Figure 2 took cargo seven to fourteen days to arrive at the final destination. The figure shows how the deployed customer could order and receive Class VIIIA materiel from military bases and commercial suppliers (AFLMO/FOC, 2004, p. 6, 7).

**Figure 2: 2004 Class VIIIA Cargo Logistics Flow** (AFLMO/FOC, 2004, p. 7)




The EML CONOPS explains how the end user is to make resupply orders, along with the responsibilities of the medical chain of command to ensure the orders arrive on time. A large piece of this puzzle is the unit type code team of three medical logisticians (UTC: FFLG1) (AFLMO/FOC, 2004, p. 19). These teams are deployed to transshipment nodes to ensure the medical cargo is shipped expeditiously over the entire route. The EML CONOPS outlines how FFLG1 personnel will work with the aerial port personnel at the transshipment nodes to assist with the onward movement of the Class VIII materiel (AFLMO/FOC, 2004, p. 19).

"The team's (FFLG1) responsibility is to oversee, manage, and ensure the continuous, rapid, and unbroken flow of materiel and information from the source of supply to the deployed unit. The team will also coordinate with the Transportation Management Office and the Aerial Port Squadrons to ensure the Global Transportation Network is updated on all cargo moves, providing in-transit materiel visibility at all times," (AFLMO/FOC, 2004, p. 6).

Following the EML CONOPS ensures Class VIII materiel will arrive at deployed locations as efficiently and quickly as needed (AFLMO/FOC, 2004). One way to make the process of shipping Class VIII more efficient is to "minimize the number of nodes and consolidation points" for the materiel, thus "allowing materiel to flow rapidly and nonstop" (HQ USAF/SGMD, 2004, p. 11).

The *DoD Directive for Executive Agent for Medical Materiel,* DODD 5101.9, written in August 2004, is a top management view of Class VIII materiel. This directive designates the Director of the DLA as the DoD Executive Agent for medical materiel (DoD, 2004, p. 1). It lists the responsibilities and functions of offices from the Under Secretary of Defense (Acquisition, Technology, and Logistics) to each of the Service Secretaries to the Commanders of the Combatant Commands. Unfortunately, this document does not assist the base level Logistics Readiness Squadron Commander with training his troops for contingency operations and handling Class VIIIA materiel (DoD, 2004).

In June 2005, a Logistic Management Institute representative discussed the Executive Agent Concept of Operations in a presentation at the 73rd Military Operations Research Society Symposium (Cocrane, 2005). The Logistic Management Institute is a not-for-profit organization that was founded to provide logistics expertise to government leaders. They work closely with DLA in Washington D.C. on topics concerning medical logistics (LMI website, 2006). The presentation pointed out that in 2000, the Joint Warfighting Capabilities Assessment found that prime vendors could support the Warfighter (Cocrane, 2005). Then in 2002, the Combat Support Agency Review Team found that "exclusive reliance upon medical prime vendor suppliers increases the risk of

not meeting surge requirements for a large-scale contingency," (Cocrane, 2005). The author of "DoD, War on Waste" agrees with this, saying that vendors cannot be relied upon 100% of the time (Waste, 2002). The executive agent was tasked to "improve supply chain responsiveness to contingency and wartime operations," (Cocrane, 2005). The presentation also listed problem areas, the purpose of the solution, and anticipated issues with those areas. Two areas related to the Class VIII transportation problem were addressed:

1. *Improve transportation options and priorities.*
- Solution purpose: Display to the Combatant Commands the amount and location of Class VIII items.
- Metric: Percent of items in the Joint Medical Asset Repository.
- Anticipated issue: Having an effective systems architecture.

2. *Movement capabilities.*
- Solution purpose: Inform the Combatant Commands that resources are earmarked and priorities are adequately assigned for distribution.
- Metric: USTRANSCOM assets (off of the TPFDD), and the Air Bridge Program.
- Anticipated issue: Effective coordination between DLA and USTRANSCOM (Cocrane, 2005).

The presentation went on to describe what the executive agent needs to accomplish, such as a maximization of standardization between all nodes and between peace, war, and contingency processes, a requirement-forecasting tool, an integrated asset visibility report, and a more integrated information system between DLA and the Services (Cocrane, 2005). While the briefing offered in-depth information and suggestions for improvements, tasking are not provided to ensure the accomplishment of those improvements.

## Improvements

There are some documented improvements within the processes and training for shipping and handling Class VIIIA materiel. The previously discussed USAMMA cold chain management training video is very useful in the training of medical personnel who will be tasked to pack and repack materiel requiring temperature control. The AFLMA EMEDS study, mentioned previously in this chapter, was also useful in finding improvements in the overall process of transporting Class VIIIA materiel to contingency areas. AFLMA specifically found that consolidating the materiel in storage locations would assist in faster and easier shipping to contingency areas (Overstreet, 2004, p. 34). At the time of this study, there has not been a firm suspense placed on the consolidation completion.

A new technology being used to assist in shipping Class VIIIA materiel to the end customer in a serviceable state is sensor tags (Savi, 2006). The tags are placed in the packing container of the temperature sensitive materiel, and they constantly record the temperature and humidity within the container. Once the container arrives at the final location, trained personnel can look at the data within the tag to know if the Class VIIIA was compromised. The tags also track the container as it is shipped (Savi, 2006).

## Airlift Availability Analysis

Many of the documents found during the literature review mentioned that a lack of airlift availability was a problem. There are two previous thesis documents concerning airlift availability for OEF/OIF cargo. Captain Pelletier completed the first thesis in 2004. Pelletier found that "on average, C-5 and C-17 strategic airlift missions supporting

OEF/OIF flew with less than their planning factor payloads," (Pelletier, 2004, p. 46). This means that they flew missions without the maximum amount of cargo weight allowed. Pelletier did not delve into why these aircraft did not fly with a full payload. Pelletier explained that when aircraft fly with less than what was planned, the number of flights needed to accomplish missions increase which causes more stress on airfield personnel and facilities (Pelletier, 2004, p. 46-47). A second thesis was completed in 2005 by Captain Kuenzli and continued the research started by Pelletier. Kuenzli analyzed why the aircraft flew without a full payload. Kuenzli found that "the most frequent reasons for light payloads were aircraft bulking out before reaching weight limitations, low user requirements, inefficient user load plans, and Aerial Port of Debarkation performance-limiting factors," (Kuenzli, 2005, p. iv). Kuenzli explains that he used data from the *planning* phase of missions, unlike Pelletier who used *actual* payload data (Kenzli, 2005, p. 32).

**Commercial Shipping of Temperature Sensitive Items**

Today's air delivery companies such as DHL, FedEx, or UPS can transport cargo anywhere around the world within 48 hours, including temperature sensitive items. In order to round out this research, a commercial company was questioned about their shipping and handling of cold chain management items. The interviewed company spokesperson requested that the researcher not record the name of the company. The unidentified company easily accepts cold chain item shipments with dry ice as the coolant. This particular company is regulated by International Air Transport Association (IATA) regulations, which do not require any special handling of cargo with dry ice.

Since the cargo arrives at the destination within 24 to 48 hours, dry ice suffices as an acceptable coolant. This also means that the company does not have to reice (add more dry ice to) the boxes. The lack of special requirements holds true only if the cargo is not considered dangerous goods. The company always has to check the dry ice box and enter the dry ice information on the airbill (cargo manifest). They also must mark and label the packages including the dry ice with the dry ice information. If there is ever a problem, the company has contact numbers for the customer to call.

**Summary**

This chapter defined Class VIIIA materiel, and described the multiple difficulties encountered when transporting Class VIIIA materiel to contingency areas. There are many briefings describing the problems that have occurred in the past, and what the presenters believe need to be fixed. However, few instructions are given for transshipment nodes to fix these problems. The literature leads one to believe that all of the problems concerning Class VIIIA materiel handling at transshipment nodes are still occurring. As will be seen from the interviews, there have been many improvements to the Class VIIIA shipping and handling processes that need to be published.

The next chapter discusses the methodology of this research effort. A description of the case study and interview methods is also provided, followed by specific methods used for this study.

# III. Methodology

## Introduction

This chapter provides a general methodology overview of case studies, interviews, and process maps. It describes how this specific study used those methodologies to accomplish information gathering. It also provides the assumptions and limitations specific to this study.

## Case Research Overview

Yin defines the case study as the preferred method of research to use when "how or why questions are being posed, when the investigator has little control over events, and when the focus is on a contemporary phenomenon within some real-life context," (Yin, 2003, p. 1). Additionally, these real-life events are situations that cannot be manipulated. Yin stresses that a case study is a whole strategy, not just a data collection technique or design feature (Yin, 2003, p. 14). Later in this chapter, steps for a successful case study, created by Professor Palmquist of the University of Texas, are discussed (Palmquist, 1997).

There are multiple applications for case studies and multiple methods used to accomplish them. Within the research community, case studies are seen in both positive and negative lights, depending on who one discusses it with. According to Palmquist and Yin, a large advantage to case studies is "the applicability to real-life, contemporary human situations and its public accessibility through written reports (case studies) facilitate an understanding of complex real-life situations," (Palmquist, 1997). Case study research is unique in that it takes multiple types of evidence and incorporates them

into one study (Yin, 2003, p. 8). Palmquist proposes six steps that create a successful case study. She created this list by compiling information found in the writings of case study experts such as Yin, Stake, and Simons (Palmquist, 1997). The steps are:

1. *Determine and define the research questions.*

The researcher must define the reason for the case study. A well-defined study will be driven by research questions that focus on a limited number of events. The event will be something historical, personal, social, or political. There are multiple types of methodologies within case study research to find qualitative information needed to reach a conclusion. (Palmquist, 1997)

To narrow the focus of the research the researcher must conduct a thorough literature review. The literature review will provide information about research that has already been completed about this issue or related issues. It will also provide definitions and methodologies the researcher can utilize (Palmquist, 1997; Yin, 2003, p. 9).

2. *Select the cases and determine data gathering and analysis techniques.*

Selecting which cases to use in the research is important. The researcher must ensure that the cases being studied and the methodologies used work well together. There needs to be construct validity, internal and external validity, and reliability. Construct validity is "the extent to which an instrument measures a characteristic that cannot be directly observed" (Leedy, 2005). Internal validity allows the researcher to show causal relationships within the data; however, multiple data sources are needed to find these relationships. External validity ensures that the conclusions reached in this study can be applied in other contexts. Reliability tells the researcher that when using the same measurements, the same conclusions can be reached repeatedly, as long as the case does not change (Leedy, 2005).

3. *Prepare to collect the data*

When accomplishing case studies, it is normal for the researcher to become overwhelmed with the amount of data collected. The researcher must organize before starting the research process.

It is also important for the researcher to be trained in the methodologies being used. If interviews are a method, the researcher should have training in asking questions and listening skills. A researcher also needs to be adept at reviewing documents (Palmquist, 1997).

4. *Collect data in the field.*

The collected information will include databases of information and separate field notes. The databases allow all the information to be accessed easily and cross referenced as necessary. The field notes are notes annotating the researchers thoughts about answers, specific topics, possible additional questions, etc. (Palmquist, 1997)

The data is typically retrieved in the form of the six most commonly used sources of evidence: documentation, archival-records, interviews, direct observations, participant-

observation, and physical artifacts (Yin, 2003, p. 85). Yin states that, "interviews are essential sources of case study information," (Yin, 2003, p. 89). The interviews for this research will be discussed later in this chapter.

5. *Evaluate and analyze the data.*

While evaluating and analyzing the data, the researcher must stay open to new possibilities and possible disconfirmations of the hypothesis. It is possible that conflicting evidence will create doubt concerning the assumed conclusion. In order to confirm the conclusions, quantitative data can be used to back up the qualitative data, if it is available. Additionally, conclusions are stronger if multiple researchers reach the same conclusions, individually. Also during this stage, the researcher may have to conduct additional interviews with past interviewees (Palmquist, 1997).

6. *Prepare the report.*

The report should be written so that the reader understands the information without having the researcher present to explain details further. The reader should be confident with the conclusions reached per the information given in the report (Palmquist, 1997).

The report can be written in many different formats. No matter what format is used, Palmquist recommends that the participants review it before final printing (Palmquist, 1997).

Some researchers see case studies only as being part of a larger study. Since case studies don't always use statistical data, these researchers don't believe that the results of case studies are conclusive on their own. They need to be supported with more quantitative research (Yin, 2003).

**Interview Methods**

The majority of this study was conducted through interviews. Professor Suler of Rider University has an excellent definition for an interview. He states in his on-line course document that it is one method for gathering "in-depth information about one particular research issue or question…All the bits of data from the interviewee provide you the "big picture" that transcends any one single bit of data," (Suler, 2006). Dr. Newbury of the Central University of England has a more creative view of interviews.

He discusses how an interview can be viewed as many different ways of communicating. According to Dr. Newbury, interviews can be a gift from the respondent to the researcher, a conversation with an informal atmosphere, an informal contract where the researcher agrees not to place the respondent in a negative light or reveal their identity, or the interview can be a performance where the respondent acts how they think the researcher wants them to act. All of these different ways of interviewing have their disadvantages and some have advantages. The researcher must decide beforehand what type of communication is best suited for the research being conducted (Newbury, 2004).

In a more structured light, the research community acknowledges specific types of interviews; however, depending on the author, the types are listed differently. There is the list of three standard types of interviews (structured, semi-structured, and unstructured) with an attached list of "special types of interviews," such as the diary interview, photo-elicitation interview, oral history interviews, and focus groups (Newbury, 2004). Then there is the list of four types of interviews (informal/conversational, general, standardized/open-ended, and closed/fixed-response) (McNamara, 1999; Valenzuela, 2002). The two lists describe very similar interviews. The main difference is that the second list breaks apart the unstructured type into conversational and general.

The structured or closed interview consists of a set of questions that do not change. The interviewer asks every respondent the same question, and there is a list of specific answers from which the respondent will choose. This type of interview is often used for census interviews conducted over the telephone (Newbury, 2004; McNamara, 1999; Valenzuela, 2002).

The semi-structured or standardized interview consists of a common set of questions that the respondent may answer in any way. As the interview proceeds lines of questions can be adapted to the respondent and different topics relating to the study can be discussed. This is the most common type of interview (Newbury, 2004; McNamara, 1999; Valenzuela, 2002).

The unstructured or general/conversational interview consists of a common topic that the researcher will discuss with each respondent; however, there is no list of specific questions to be asked. This type of interview is typically used for longer observations or ethnographic research (McNamara, 1999; Newbury, 2004; Suler, 2006; Valenzuela, 2002).

There are multiple advantages and disadvantages to interviewing. Newbury created a list of advantages and disadvantages that relate specifically to the characteristics of interviewing (Newbury, 2004).

***Advantages:***

*Flexibility*: "The researcher is able to continue with ideas or shape questions to extract more information from the respondent," (Newbury, 2004).

*Transparency*: "The researcher can explain questions that the respondent doesn't understand," (Newbury, 2004).

*Depth*: "The quality of information gathered during an interview is much more in depth than a questionnaire," (Newbury, 2004).

*Spontaneity*: "The respondent is able to bring up new topics relating to the study, and the researcher is able to immediately find out about this new topic," (Newbury, 2004).

*Intersubjectivity*: "Communicating back and forth allows the interviewer to understand the respondent's point of view on the topic," (Newbury, 2004).

***Disadvantages***

*Time consuming*: "The time of the interview plus the time it takes to transcribe the notes can be lengthy," (Newbury, 2004).

*Complex picture*: "The mass amount of information received from interviews can be difficult to sort and organize," (Newbury, 2004).

*Replicability*: "Interviews are difficult to replicate. The respondent's mood can change, an event can occur to change the respondent's opinion," (Newbury, 2004).

*Comparability*: "Considering interviews will typically give different information, it is difficult to compare them, making cross-case analysis difficult," (Newbury, 2004).

*Dependence on respondents*: "The researcher must trust that the respondents are giving honest answers," (Newbury, 2004).

There are also lists of what qualitative interviews should be used for and what they should not be used for. For example, Megan Sewell of the University of Arizona created the following.

"Qualitative interviewing is most useful for:

- Evaluating programs that are aimed at individualized outcomes
- Capturing and describing program processes
- Exploring individual differences between participants' experiences and outcomes
- Evaluating programs that are seen as dynamic or evolving
- Understanding the meaning of a program to its participants
- Documenting variations in program implementation at different sites" (Sewell, 2006).

"Qualitative interviewing is not as useful for:

- Evaluating programs that emphasize common outcomes for all participants
- Measuring specific, predetermined effects of a program on participants
- In impact evaluations, deciding whether your intervention caused changes or effects in participants (since determining causality requires more controlled conditions)" (Sewell, 2006).

***The process of interviewing***

Dr. Suler of Rider University describes the simple, yet important, steps of accomplishing an interview.

1. *Establish rapport.* It is acceptable to begin a unstructured interview with casual conversation in order to put the interviewee at ease. Introductions and small talk. (Suler, 2004)

2. *Describe the project*. The researcher tells the interviewee how the interviewee was recommended for the research, what the information gathered from the interview will be used for, and what will be the outcome of the research. (Suler, 2006)

3. *Obtain informed assent*. This can be written or verbal assent (Suler, 2006). Also, in respect to this study, as the researcher completes her notes from each interview, she emails the interview notes to the respective interviewee for verification and agreement.

4. *Go ahead with the interview*. All interviewees react to interviews differently. It is the researcher's responsibility to help the interviewees "(1) open up and express their ideas, (2) express their ideas clearly, (3) explain and elaborate on their ideas, (4) focus on the issues at hand rather than wander to unrelated topics," (Suler, 2006).

5. *End the interview*. "Wind down" the interview by restating the main points and thanking the interviewee for participating (Suler, 2006).

6. *Take notes*. The researcher should immediately jot down notes from the interview.

7. *Integration.* The final step is to integrate the interview data into the final paper. There are several methods to use to meld the information gathered from the interviews into the paper.

   a. Summarize what was said, without using direct quotes.
   b. Use short quotes embedded within paragraphs.
   c. Use a separate indented block for long quotes that stand on their own.

Each of these methods can be integrated into the thesis (Suler, 2006).

**Process Mapping**

To assist in understanding the processes of the shipping and handling Class VIII materiel during OIF, process maps were either found or created from information taken from interviews and literature.

According to ToolPak Consulting, Process mapping is "one of the fastest ways to lower errors, increase productivity and effect customer service," (ToolPak, 2005). Quarterman Lee, the President of Strategos Consulting, states that mapping is "one of the oldest, simplest, and most valuable techniques for streamlining work" (Quarterman, 2006).

"A process map visually depicts a sequence of events to produce an outcome" (Quarterman, 2006). It can include details such as time frames, travel, decisions made, etc. Once it is complete, the map can also show where there is waste within the process (Smith, 2006). A process map is also an excellent tool for training new personnel. They can see each step and what each step encompasses, depending on how detailed the map was written.

How does a process map show problem areas or areas of waste? Once the map is complete, it can show where possible bottlenecks are occurring, where inefficient decisions are being made, if decisions are decisive or ambiguous, if there are duplicate or unnecessary steps occurring, and if errors are being reworked instead of prevented (Smith, 2006).

The following breaks down the steps of making a useful process map (Toolpack, 2005):

1. *Choose a process*: Choosing a process that is prone to error, time-consuming, and critical to success will build morale for future process mapping projects (Toolpack, 2005).

2. *Choose a team*: The team must include personnel that are intimately involved in the process being studied (Toolpack, 2005).

3. *Map out the way work is currently done*: Diagram each step and intermediate steps, such as travel, required contacts, time spent, and other important details to the process (Toolpack, 2005).

4. *Identify problem areas*: The team of experts should make note of the areas in the process that are problems. Use Pareto's 80/20 rule. Spend time fixing 20% of the areas that cause 80% of the problems (Toolpack, 2005).

5. *Brainstorm solutions*: Use the team to list solutions to each problem area to be worked on. Do not judge these solutions during this phase (Toolpack, 2005).

6. *Evaluate action steps*: The group the "final" action steps from the list created while brainstorming (Toolpack, 2005).

7. *Assign responsibilities*: Team members volunteer for each action step and sets timelines (Toolpack, 2005).

8. *Create a master plan*: Write down what steps will be taken, who how responsibility, and what timelines were created. Hand the plan out to the team members. Ensure everyone agrees with the plan and understands it (Toolpack, 2005).

9. *Follow through*: Meet every two weeks. Have another brainstorming session to evaluate how the plan is working and to make editions (Toolpack, 2005).

While accomplishing these steps, there are things to look out for that can sabotage successful mapping and interfere with utilizing the completed process map to its fullest. Michael Smith created a list of 21 BOLOs (Be On LookOut items). A few of Smith's BOLOs that relate to this study are:

*Assumptions*: Many processes exist because they have always been done that way; therefore, personnel assume that is the only correct way (Smith, 2006).

*Change*: While a mapping a process a way of looking for areas to change, the changes should occur only if they will make improvements. Change for the sake of change is not helpful (Smith, 2006).

*Resistance*: Team members or leadership can make it difficult to change processes because they refuse to believe the change will improve the process (Smith, 2006).

**Class VIIIA Study Approach**

When the transportation process does not consider special cargo requirements and the transportation personnel are not trained properly for handling the special cargo, the chance of that cargo arriving on time and within standards decreases significantly. It creates situations where items expire (i.e. pharmaceuticals, catheters, etc.), items are affected by environmental conditions (i.e. vaccines), or items are repacked improperly. The DLA-USTRANSCOM team's initial assessment identified the root causes for the Class VIIIA shipping problems as personnel training and process management, specifically at the air transshipment nodes (DLA-USTRANSCOM, 2006). This is why this research focuses on the aerial port personnel and the processes they follow at the air transshipment nodes for OIF.

This research was conducted as a single-case, explanatory/descriptive study. Unstructured interviews were used to reveal 1) why and how Class VIIIA materiel was mishandled at the OIF transshipment nodes, 2) any causal relationships between the quality of materiel handling at the nodes and the serviceability of the materiel arriving at the final destination, and 3) how the materiel handling processes at the nodes have been improved.

In order to create a legitimate study, validity needs to be ensured. As described previously, construct validity, internal and external validity, and reliability needs to be examined.

*Construct validity*: Due to funding limitations for this project, the only way to examine why the Class VIIIA materiel was sitting for extended periods of time at the transshipment nodes was to interview personnel that were involved in the handling and

shipping processes. Air Force aerial port personnel and trainers, and Air Force and Army medical logisticians were interviewed. The number of interviewees and how they were chosen is described later in this chapter. A mixture of personnel, including those who deployed to work at the transshipment nodes and those who worked headquarters positions related to the transshipment nodes, were interviewed.

*Internal validity*: Originally the researcher had thirty interviewees; however, one expert was unreachable at the time of the interview. Therefore, only twenty-nine experts were interviewed, which may infer weak internal validity. The researcher used the information from the interviews and the literature to draw conclusions about the validity of the answers. Considering the majority of the interviewees answered the interview questions similarly, the researcher determined there was enough information from the sources to show that the conclusions drawn are legitimate.

*External validity*: Pertaining to this study, can the same conclusions be reached for all transshipment nodes serving OIF, whether the study is completed for Al Udeid AB, Bahrain IAP, etc? The external validity questions to answer were: Does transportation occur using the same processes at each transshipment node for OIF? If so, can the causes found in this study be attributed to each of the locations?

### *Documents and Interviewees*

This study utilized documents and interviews. The documents specific to this case included official Air Force and Army instructions and directives, studies accomplished on similar Class VIIIA topics, and presentations given to identify problems and assist decision-making related to this specific topic. Many new documents emerged

from a number of the interviews. These will be discussed in the analysis since the researcher, without the assistance of the interviews, did not find them.

One of the main problems associated with the handling of Class VIIIA materiel during OIF was the lack of in-transit visibility (ITV). The lack of ITV made it difficult to keep metrics about the shipments for historical information. Due to this lack of metrics, the research consisted of the previously described conversational, or unstructured, interviews. Dr. Newbury states that the most difficult part of interviewing is finding the right people with the information that is needed (Newbury, 2004). The researcher conducted initial communication with many different personnel to locate the experts. The twenty-nine interviewees for this research were personnel who were intimately involved in the Class VIIIA materiel handling process during OIF and those who are currently involved in the process. The interviewees included personnel from all aspects of the process to gain understanding of the past and current processes within the OIF contingency area. Below is a description of the interviewee categories. Each of these categories offers slightly different views of the shipment process for Class VIIIA materiel.

The twenty Air Force personnel interviewed consisted of aerial port personnel, training managers, and medical logisticians. Seven aerial port personnel discussed the procedures for handling Class VIIIA materiel when it arrives at the transshipment nodes. They also discussed what on-the-job training is offered at the nodes, and what written instructions they receive there. Additionally, they discussed if there are location-specific processes for handling temperature or time sensitive Class VIII materiel. They also conveyed any improvements that have been made between OIF and the present. They

included civilian and military personnel, ranking from Master Sergeant to Chief Master Sergeant. Their experience ranges from being deployed multiple times to the air transshipment nodes, to working in positions of direct oversight of the nodes.

Training managers have an understanding of what specific training the aerial port personnel receive concerning the shipping and handling of Class VIIIA materiel. They also know if this training is completed in technical school, in the enlisted career development courses, or during on-the-job training. Four expert aerial port training managers were interviewed.

Eighteen medical logisticians discussed the process of shipping the Class VIIIA from their point of view. They know what problems (symptoms) have occurred and are still occurring at the OIF air transshipment nodes. Additionally, they know what improvements, if any, have been made since the initial stages of OIF. Nine Air Force medical logisticians, military and civilian, with experience in deployments to OIF, oversight positions, and distribution positions were interviewed. The personnel range from base level contractors to high-level medical positions. They all have lengthy and direct experience with the Class VIIIA materiel being shipped through the nodes.

The nine Army personnel interviewed included only Army medical logisticians. At the outset of this study the researcher believed that the Army's medical logisticians tracked the majority of Class VIIIA materiel in theater; therefore, the researcher thought they may have metrics related to the unserviceable shipments during OIF and the present. Also, the researcher was under the impression that Class VIIIA fell under the responsibility of the U.S. Army Medical Materiel Agency (USAMMA); therefore, the Army medical logisticians would be the most knowledgeable about the shipping

problems and improvements, transport innovations, and the entire process of shipping and handling of Class VIIIA materiel in general. Nine Army personnel were interviewed, military and civilian, ranging in rank from major to retired colonel. Their experiences ranged from working directly with Class VIIIA in the OIF deployed locations, to multiple years of work with the distribution processes.

Ten deployed personnel from the Army and Air Force, transporters and medical logisticians, have first hand knowledge of the processes, hurdles, and improvements. Whether they deployed during OIF or presently, their detailed accounts were helpful.

Fifteen interviewees working in oversight positions who deal with the tracking, ordering, shipping, etc. of Class VIIIA materiel have the overall big picture of the issue. On the other hand, the three base level interviewees understand the shipping process from the beginning. They discussed the general procedures for preparing cargo for deployment. Numerous interviewees have experience in all areas: deployments, oversight duties, and base level assignments.

### *Interview Approach*

As recommended by Newbury (2004), the initial contact was through introductory emails and phone calls. The initial email included an introduction of the researcher, description of the project, and definition of what was needed from the interviewee. The researcher introduced herself as a student at the Air Force Institute of Technology and described the study being conducted. Unless specifically asked, she did not give out her previous duty experience as an aerial port member. This technique ensured the interviewee did not leave out details due to assumptions about the researcher's

knowledge. Yin recommends this practice in order to "allow the respondent to provide a fresh commentary about (the subject)," (Yin, 2003, p. 91).

The questions used for the interviews were based on the duty experience of the personnel the researcher was speaking to and where their Class VIIIA handling experiences took place. For example, the questions asked of an aerial port person were different than the questions asked of the medical logistician. See Appendix B for a sampling of questions.

**Analysis: Answering the Research Questions**

The information gathered from the interviews was categorized to answer the six investigative questions:

1) What was the shipping and handling process of Class VIIIA materiel at the transshipment nodes during the initial stages of OIF?

2) What problems occurred during the initial stages of OIF concerning Class VIIIA materiel shipping and handling at the air transshipment nodes?

3) What improvements were made since the beginning of OIF to improve the shipping and handling of Class VIIIA materiel at the air transshipment nodes?

4) What is the current process of shipping and handling Class VIIIA materiel at the transshipment nodes?

5) What, if any, problems are still occurring, concerning Class VIIIA materiel shipping and handling at the air transshipment nodes?

6) What improvements still need to occur to improve the process?

The problems noted in the interviews were included in a chart to show if the problem occurred only at the initial stage of OIF, if it is occurring now, or both. It also shows how many of the interviewees per expertise saw it as a problem. See Appendix C for this chart.

Answers to process type questions were turned into process maps to show how, or if, the process had changed. Process maps were also used to keep the entire study organized for the researcher, see Appendix D. Additionally, the information was categorized as a medical area process/improvement or a transportation process/ improvement. These categories allowed the researcher to understand which personnel are already working to improve the processes and which personnel still need to understand the problems and make improvements within their respective processes. There are also trends, which are discussed in the analysis. The type of interviews used did not lend to constructing a quantitative analysis; however, conclusions can be drawn from analyzing the answers.

**Assumptions and Limitations**

The scope of this study was limited to analyzing the processes of air transshipment nodes only. It did not include information about the truck transfer points or the shipping ports. This was a study concerning air cargo operations in the OIF contingency areas. The nodes included Kuwait (KCIA and Ali Al Salem), Qatar (Al Udeid), and Iraq (BIAP). The time periods analyzed included the present back to the beginning of OIF, 2003.

Limitations concerning this study related mainly to documentation and data. An initial search and review of related literature revealed a very limited amount of literature related specifically to the study topic. No data or tracking metrics of any relevance were found. The desire was to find shipment information concerning Class VIIIA shipments into the OIF area of responsibility, such as the amount of shipment per month, amount of frustrated and lost shipments per month, etc.

Additionally, finding detailed accounts of the processes followed in 2003 was difficult. There was not sufficient information in lessons learned documents; therefore, research relied on expert interviews of personnel who were working those areas during the past four years. The assumption is that the experts were knowledgeable about the actual processes occurring at the time they were speaking of and the interviewees' memories were complete.

Considering time and budget restraints, it was not possible for the researcher to visit any of the nodes to see the shipping and handling processes in action. All information was gathered second hand through interviews. These limitations mean that generalizability may be weak. However, the offices receiving this information from the researcher may continue the study if they believe more improvements can be made to the Class VIIIA materiel handling processes in contingency areas.

**Summary**

This chapter discussed conducting case studies, interviews, and process maps. It also described how these methods were used during the study. The next chapter consolidates the information gathered from the interviews.

# IV. Analysis

## Introduction

The information gathered during the personal and telephone interviews is summarized in the following pages of this chapter. It is presented in a manner that will not compromise the interviewees' identity. The researcher found that the personnel recommended for interviews were willing to discuss the topic in length. They were also excited to discuss improvements. Historical information was more difficult to find since many of the experienced personnel from four years ago were unable to be found due to change of stations or retirements. Additionally, the interviews did not produce a process specific for Class VIIIA handling and shipping during the initial stages of OIF since it was basically handled as general cargo. Fortunately, many of the aerial port personnel and the medical logisticians, both Army and Air Force, had basic knowledge of how the processes occurred during the initial stages of OIF. There are some redundancies throughout the chapter as many of the issues overlap.

## Investigative Question #1. What was the shipping and handling processes of Class VIIIA materiel at the transshipment nodes during the initial stages of OIF?

The initial build-up of OIF was fast and brutal. The aerial port interviewees that had deployed agreed that the main goal for aerial ports during this time was to just get the cargo into theater. Aerial port personnel were deployed to accomplish their aerial port duties of cargo handling and shipping at air transshipment nodes in the OIF area of responsibility. The two major nodes used for Class VIIIA materiel were, and still are, Al Udeid and Ali Al Salem Air Bases. All seven aerial port interviewees verified that

personnel working while deployed to those nodes followed the same Air Force instructions used at non-deployed locations. These included instructions for materiel requiring either special handling or normal shipping and handling procedures. None of the interviewed aerial port personnel knew of specific processes for Class VIIIA materiel, other than the re-icing procedures described in AMCI 24-101. In the eyes of the aerial port personnel, their ways of handling and shipping cargo did not veer from the instructions in the AMCI 24-101 series.

The aerial port training managers interviewed confirmed that the AMCI 24-101 series is the basis of all the aerial port personnel's procedures. The four training experts explained that personnel are taught from this manual in their career field technical schools, in their continuing education courses, and in their career development courses. As for training on Class VIIIA materiel specifically, only the valuable items (high theft items) and temperature sensitive items are discussed in the instructions; however, only a small portion of the discussion specifically covers Class VIII materiel. According to three of the aerial port personnel, if there was anything new about the duties in the OIF nodes, it was learned by way of on-the-job training. The aerial port personnel arrived on station and started working immediately. There was no training period. One aerial port interviewee explained that while deployed they typically did not get turnover from their predecessors, and there were not many comprehensive continuity books created to record possible issues occurring at the particular nodes. "If there was a continuity book in the office, it was not read until a problem occurred."

According to a Class VIIIA shipping expert, aerial port personnel had more responsibility for temperature sensitive Class VIIIA materiel during the initial stages of

OIF than they do today. For example, AMCI 24-101 volume 11 instructs the aerial port personnel to re-ice (re-ice: replace the ice in the packaging to ensure the items stay cold) Class VIIIA materiel only if it was non-hazardous and non-infectious (HQ AMC/A4TC, 2006). The Class VIIIA shipping expert explained that if the items were hazardous or infectious, the aerial port personnel were required to contact the office listed on the cargo's documentation. The AMCI also discussed the required forms and documentation for the temperature sensitive cargo. One such form, the AMC Form 106: Biologicals/Reicing/Refrigeration Log is used to track the time, date, and amount of ice used for reicing actions during transportation (HQ AMC/A4TC, 2006). While the AMCI has not changed and many of the forms are still used, both medical and aerial port interviewees agreed that the amount of Class VIIIA materiel an aerial port person touches has reduced dramatically. The reasons will be discussed later in the chapter.

Both aerial port and medical logistician interviewees explained that once the cargo arrived at a transshipment node it either stayed at the node awaiting the next leg of airlift downrange, was trucked to a nearby distribution center, or was trucked downrange. This research focused on Class VIIIA cargo needing further airlift. Two of the aerial port personnel explained in similar detail how prioritization affected the length of time Class VIIIA cargo would have to wait for airlift at the transshipment nodes. If the cargo needed to be flown further downrange, it would have to wait in line for an available aircraft. The line included cargo previously downloaded from earlier aircraft and cargo brought in from units in the area. The wait could become longer if cargo with higher priority entered the node. Class VIIIA has always been priority-1 cargo; however, blood, liquid oxygen, and ammunition have always been higher priority-1 items; therefore, they

are transported before Class VIIIA. Four of the medical logisticians believed Class VIIIA did not have a high enough priority at the beginning of OIF.

Eight of the medical logistician interviewees confirmed that at the beginning of OIF there were either outdated instructions or no specific process instructions provided for handling the Class VIIIA materiel at the transshipment nodes. However, there were at times medical logisticians deployed to the transshipment nodes to ensure the proper handling of the Class VIIIA materiel (UTC FFLG1 discussed in Chapter Two). One medical logistician stated that he saw that the FFLG1 personnel were utilized at the beginning of OIF and they were extremely useful; however, he wasn't sure if they are still being deployed to the nodes today.

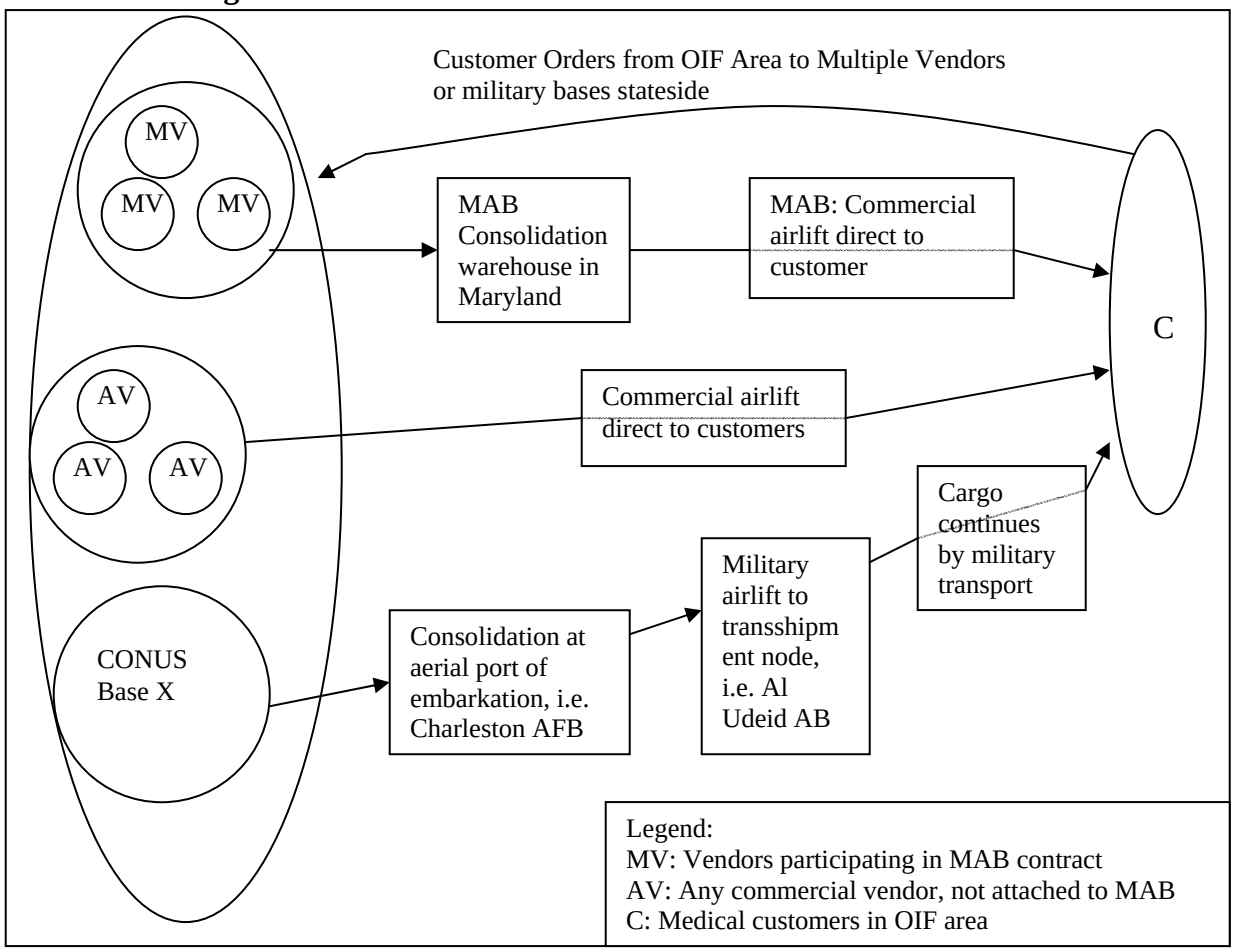
***Commercial Airlift (Medical Air Bridge & Other)***

Three medical logisticians that are experts in the area of commercial airlift of Class VIIIA explained the process to the researcher. Commercial airlift includes commercial air delivery companies, such as Fed Ex, DHL, and UPS shipping items ordered from Class VIIIA vendors at any time, and the Medical Air Bridge. The Medical Air Bridge utilizes one company to consolidate the small orders of Class VIIIA materiel from multiple vendors into one larg shipment for a commercial air delivery company to fly it directly to the customers in the OIF arena.

The Medical Air Bridge was started by DLA prior to OIF in 2003. The Medical Air Bridge "expedites the delivery of high-priority medical materiel to Warfighters overseas," (DMM online, 2006). One Medical Air Bridge expert explained that it was initiated by DLA because DLA's Class VIIIA overseas customers, such as USAMMA in Germany, complained that it was taking too long to receive their materiel by military

airlift. There was too much competition for military airlift to expect immediate deliveries. DLA worked with Air Mobility Command to tap into non-military airlift capabilities. They created contracts with commercial international air delivery companies to fly the Class VIIIA directly to the customers. Additionally, DLA's manufacturers and venders providing the materiel could ship the Class VIIIA directly to the delivery company's consolidation point in Maryland (DMM online, 2006). This process was significantly faster than military airlift. When OIF kicked off, the Medical Air Bridge contracts were revised to include the deployed locations within the OIF area of responsibility. However, it seems that the Medical Air Bridge was not fully utilized until a couple of years later. Figure 3 shows the multiple routes Class VIIIA materiel could take to arrive at the final customer during the initial stages of OIF. Interviewees stated that the commercial routes could take three to seven days to arrive at the final customer and the military route could take seven to fourteen days.

**Figure 3: Potential Class VIIIA Routes for OIF Customers**




Three of the medical logisticians interviewed are experts in the commercial airlift field. They believe that commercial airlift was not only faster than military airlift; it was also more efficient. One explained that there were fewer stops throughout the shipping process, which meant less risk of damage and loss to the materiel. Additionally, DLA's Class VIIIA responsible office, the Defense Supply Center-Philadelphia (DSCP), could use the commercial company's tracking system to watch the cargo from its arrival at the consolidation point to its arrival at the customer in the OIF arena (DMM online, 2006). Two of the three experts stated that the commercial in-transit visibility has proven to be

more convenient and more reliable than the military version. The processes of the commercial airlift companies are continuing to be improved, as discussed later in this chapter.

**Investigative Question #2. What problems occurred during the initial stages of OIF concerning Class VIIIA materiel shipping and handling at the air transshipment nodes?**

***Knowledge Base***

All of the aerial port personnel interviewed agreed that there was no Class VIIIA specific training offered to aerial port personnel. They follow the AMCI 24-101 as described above; however, implementing these instructions in a joint environment under contingency circumstances can be difficult. One aerial port interviewee that has deployed eight times over the last eight years described situations where the aerial port personnel would accomplish a duty using the AMCI 24-101; then, the Central Command (CENTCOM) owned aircrew would not agree with the performance. The CENTCOM aircrew typically overrode the aerial port personnel because the majority of leadership was CENTCOM and the aerial port personnel were AMC. Without transshipment node and Class VIIIA specific instructions, accomplishing duties was difficult. These types of situations were particularly difficult because many of the aerial port personnel deployed during the initial stages of the contingency had not deployed previously. Three of the aerial port interviewees mentioned the drastic change in workload at the transshipment nodes. The aerial port personnel had to adapt to their drastically different surroundings and their much faster paced duties immediately upon arriving at the node.

### *Workload*

Both the medical and aerial port interviewees discussed the extreme workload during the OIF build-up. The overwhelming belief was that there was too much cargo for the aerial port personnel to keep up with satisfactorily. Aerial port interviewees explained that cargo was unloaded from the aircraft and it would sit in the storage area until it was processed into the transportation system. While there were delays between offloading and processing, the delays were not typically extreme. Additionally, the aerial port personnel and medical logisticians noticed that airlift was a definite problem. Cargo sat for days waiting for transportation. During this waiting period, the aerial port personnel would take care of any special cargo per documentation that accompanied it, such as Class VIIIA materiel needing to be re-iced. The Class VIIIA cargo was marked with large Red Cross symbols for quick identification. If the pallet was not entirely Class VIIIA, the boxes that were medical were supposed to be placed on the outside edges of the pallet and marked with the Red Cross for easy identification. Some units used pink pallet covers as well. Unfortunately, the Red Cross markings were not always visible, as required. Two aerial port interviewees had noticed during the initial stage of OIF Class VIIIA items were sometimes hidden within pallets of mixed cargo. If that hidden Class VIIIA cargo was temperature sensitive, it would not be taken care of until the pallet was taken apart and the box was found.

Apart from the initial build-up, another time when cargo problems for Class VIIIA occurred was when CENTCOM closed Camp Snoopy, located at Qatar International Airport. This situation was described by an Army medical logistician. Camp Snoopy was a main hub for Army medical cargo entering the OIF area of

responsibility. After the closure, Al Udeid AB became the transshipment node for the Army cargo. The closure also increased the total amount of cargo flown into Al Udeid AB. Unfortunately, Camp Snoopy personnel did not move to Al Udeid AB as well. Camp Snoopy had an Army unit assigned specifically to take immediate responsibility for all Army cargo, including the Class VIIIA materiel. Al Udeid AB did not have a similar unit assigned. There was only a single medical logistician to take care of the Class VIIIA cargo arriving in Al Udeid AB.

***Prioritization***

Many of the medical personnel interviewed believe the Class VIIIA materiel was not prioritized correctly. They believe it should have a higher priority. It was noted by aerial port interviewees that at times, DLA will try to raise the awareness of their Class VIIIA materiel by calling it MICAP. Per Air Mobility Command, MICAP is an entirely different type of cargo and it is tracked precisely by Air Mobility Command. When DLA calls a transshipment node looking for their "MICAP," confusion sets in while the entire shop looks for what they believe is MICAP but is not. It is DLA Class VIIIA cargo that needs to be shipped immediately. This confusion takes personnel away from their duties and slows down all processes. Some medical personnel believe that because the Class VIIIA materiel was not of the highest priority, it was not being taken care of properly: being refrigerated or moved up in line to get on an aircraft during the waiting time. One aerial port member stated, "If everything is 999 (top priority), nothing is 999."

### *Airlift Availability*

Cargo priority relates to the problem of airlift availability. Many of the interviewees explained that the Air Force cargo aircraft were being flown to their maximum capacity. There were not enough aircraft to fly all of the missions required to ship all of the cargo where it needed to be, on time. The majority opinion of all the interviewees is that, during the initial stages of OIF there was too much cargo for the aircraft available and the aerial port personnel in theater to handle. "All Class VIIIA flown into the transshipment nodes risked being left in the storage area without being accounted for after it was downloaded from the aircraft." It would be considered "lost" and the items would have to be reordered and reshipped. Some time later, the cargo would be "found" in the storage area and either shipped on to its original destination or sent back to the originating station. As a side note, one aerial port interviewee explained that the ordering unit would often not know why their shipment had not yet arrived, so they reordered. This added more cargo into the already saturated transportation system. Airlift was a serious problem for Class VIIIA materiel that was critically needed in locations throughout the OIF area of responsibility.

Unfortunately, there were no metrics to show what percent of the Class VIIIA materiel was "lost" and how much was "found." This was a more severe problem for Class VIIIA materiel that was time or temperature sensitive. If the aerial port personnel did not account for the cargo immediately, it would sit out on the flight line and overheat. If the Class VIIIA materiel was "lost", the contents could expire before it was found. While a few of the interviewees, medical and aerial port, realized performance measures

could have helped with this problem by bringing attention to it, they did not know what kind of measures would have been useful.

***Re-icing Issues***

Seven of the medical logisticians explained that even if the Class VIIIA materiel was not lost on a normal day during the initial stages of OIF, it was still at risk of becoming unserviceable due to exceeding its temperature range. If the aerial port personnel either failed to re-ice the package or did not re-ice the package correctly, depending on how long it took to reach its final destination the materiel could become unserviceable. Higher outdoor temperatures and a lack of indoor storage with air conditioning made re-icing procedures very important.

The medical interviewees also explained the problems with using ice to cool the materiel. While re-icing was useful for some items, it was detrimental for others. As explained in the literature review, wet ice can cause the materiel to become too cold or freeze. This will ruin Class VIIIA materiel, such as vaccines, quicker than allowing them to reach warm temperatures.

***Non-Air Force Shipments***

Another difficulty for Class VIIIA materiel concerned the shipping of materiel that belonged to the other Services, typically the Army for Class VIIIA materiel. If Army personnel needed to ship materiel by way of Air Force aircraft, they were required to submit a Joint Movement Center Request. This request is turned in to the aerial port personnel at the node where the cargo is sitting. Once the request is approved and transportation has been assigned, the physical pallet must be approved for shipment by the aerial port personnel. This can be a problem when, for instance, the morning shift of

aerial port personnel approves the pallet for transport, and then the afternoon shift finds a problem and sends the pallet back to the Army. Apparently this occurred often enough to be a significant problem. The same type of problem could occur when the aircraft arrived. The aircraft crew has the final say as to whether or not cargo is prepared correctly for transport on their aircraft. One specific person manages this for the crew, the loadmaster. All loadmasters do not interpret the Air Force instructions the same, and some are stricter than others. This confuses the process, especially for non-Air Force personnel trying to transport their cargo, and this problem is still occurring.

***Deployment Rotation Cycles***

Army interviewees believed that the most significant problem relating to confusion between differing opinions occurred every time new Air Force personnel (especially the leadership) at the node swapped out. The Army personnel were deployed for longer time periods than the Air Force personnel; therefore, the same Army person worked with multiple Air Force aerial port leaders during his or her tenure in theater. The personnel would create a synchronous relationship, understanding requirements and missions. Then the Air Force personnel would be replaced with new Air Force people who did not understand the deployment processes and the Army's needs. The Army personnel would have to start over with the Air Force personnel and learn the new people's interpretations of the instructions being used at the node. Fortunately, the Army personnel interviewed have seen great improvement in this area of communication.

***Responsible Agencies/Providing Capabilities***

When complaints about expired Class VIIIA materiel started to filter up through the medical community during the initial stages of OIF, interviewees that held oversight

positions saw that leadership did not know which agency was ultimately responsible for the Class VIIIA specific capabilities at the air transshipment nodes. These capabilities include personnel training, equipment such as refrigerators, and handling materiel such as gel packs. One experienced Army medical logistician believes the root cause of this entire problem was that no one agency was willing to take complete responsibility of the Class VIIIA shipping processes. Two medical logisticians explained the following to the researcher. Multiple agencies were involved in the process; however, there was no one lead agency with defined responsibilities. For example, the Air Mobility Command is the Air Force lead for transportation and runs a few of the transshipment nodes, CENTCOM runs the operations occurring for OIF and thus runs the majority of transshipment nodes, USTRANSCOM is the distribution process owner for Class VIII, the Surgeon General is the medical lead, DLA is the executive agent for medical materiel, and the Army has assumed large roles since they were the largest shipper of Class VIII. All of these agencies had responsibilities in the OIF region during the initial stages of OIF; however, none knew who was supposed to take care of the Class VIII materiel handling problems at the lower levels. The personnel needed to know where to get resources and who to ask for money. Without this knowledge, they were not equipped for cold chain management items. Due to this lack of process control, medical interviewees believed that the Class VIIIA was at risk of being offloaded from the aircraft and not cared for properly.

The medical community realized that if an airport was going to be utilized for transporting Class VIIIA into the contingency area, it must have the correct capabilities. It came down to which of those above-mentioned agencies would take responsibility for purchasing the equipment. The answers given to the researcher have varied. Some said

that the node or its immediate headquarters should be responsible because the capabilities are part of the transportation process. Others stated that the medical community should be responsible because the medical field was creating the requirements and it was their special items creating the expense. Either way, personnel noted that during times of crisis, money would not likely be spent on refrigeration or storage warehouses. The money would be spent on items deemed necessary for direct mission accomplishment, such as aircraft parts and munitions.

While the shipping process involved many agencies, multiple services and headquarters also oversaw the activities at the transshipment nodes. Air Mobility Command, Central Command Air Forces (CENTAF), and the Navy managed a variety of the nodes, and still do. For example, the Navy managed Kuwait City International Airport because much of the cargo flying into Kuwait was destined for the Navy ships floating in the nearby port. When a deficiency at a node was found, the owning agency of the node would take care of the problem with their respective means. Therefore, there was no standardization between nodes. Some nodes would have refrigeration for temperature sensitive items and some nodes would not. Some had interior storage areas for cargo awaiting transport and others did not. These discrepancies meant that it did not matter if an aerial port person had deployed previously or not. If they were not deployed to the same node as before, they started over completely at the new node with no knowledge of the local working conditions, standards, and processes.

***Lack of Space***

Space was also an issue; space for the cargo awaiting transportation and space for the personnel working with the cargo. The medical logisticians stated that their FFLG1

personnel needed space to work, and the aerial port personnel stated they needed more space for the cargo. During the busier times the storage areas were packed full with pallets of cargo. Storage space did not necessarily mean covered warehouses. Much of the initial cargo entering the area sat outside in the elements because there was not enough indoor space. According to three medical logisticians, the cargo could wait on airlift for days.

Space also affected how efficiently the aerial port personnel could accomplish their duties. The medical interviewees sometimes discovered that their cargo had been "lost" in the storage area. The pallet could have arrived and been placed in the storage area before being checked-in by the aerial port personnel. The checking-in process is accomplished electronically in a specific aerial port computer system called Global Air Transportation Execution System (GATES). The interested parties watch their cargo's transportation progression in GATES in order to know when it arrives at each transshipment node and at the final destination. It also alerts the involved parties that the cargo has arrived at a particular node and is ready to continue its journey, perhaps by truck. The personnel watching GATES would know when to send the truck to the node to pick up the cargo to be transported down range. Using this example, if the cargo is not checked-in upon arrival to the node, the medical personnel watching GATES would not know it had arrived at that node and would not know to send the truck to pick it up; therefore, the cargo would sit in storage and possibly expire.

Personnel also need space. Air Force medical logisticians (such as the Air Force FFLG1 personnel) were deployed to the nodes to watch for their cargo. One Army medical interviewee explained that some deployed Army units also offset the risk of

unserviceable cargo by sending one or two of their medical logisticians to the node they were expecting their Class VIIIA cargo to arrive. The interviewee described how these Air Force and Army personnel walked through the cargo area looking for their Class VIIIA cargo. However, they were not given any space to work out of; therefore, their duties were difficult to accomplish. The idea was to consolidate the Class VIIIA cargo in one area of the storage location. Unfortunately, there was not enough space to do this. It was explained that the air transshipment node leadership would not give the space to these personnel. The aerial port personnel simply did not have the space to share.

***Commercial Airlift***

During the initial stages of OIF, commercial delivery companies that were not a part of the Medical Air Bridge were also used and they also had some problems. One aerial port expert described the following examples. The majority of DLA's Class VIIIA materiel flown commercially to the OIF area of responsibility was downloaded at Al Udeid AB. The DLA distribution center was, and still is, located near there. The commercial aircraft was downloaded and the Class VIIIA was put aside to await transportation to the distribution center. There were times when the continuing transportation would not arrive for a long period of time. Another possible problem was that cargo from the commercial aircraft was taken to the wrong location. For example, a box was downloaded from the commercial aircraft and it needed to stay at the transshipment node so it could be flown to its final destination; however, it was mistakenly put on the truck to be delivered to the distribution center.

### *Performance Measures*

None of the interviewees had knowledge of performance measures specific to the tracking of unserviceable Class VIIIA shipments. There were no performance measures in place for Class VIIIA materiel shipping into the OIF locations during the initial stages of OIF.

### *Knowing About the Problem*

One interesting point found by the researcher was that the problems associated with Class VIIIA shipping and handling at the initial OIF transshipment nodes are well known by the Army and Air Force medical logisticians; however, the problems are virtually unknown to the air transportation community. Only a couple of the aerial port personnel interviewed knew that Class VIIIA cargo had been singled out as a problem.

**Investigative Question #3. What improvements have been made since the beginning of OIF to improve the shipping and handling of Class VIIIA materiel at the air transshipment nodes?**

Since the initial build-up for OIF there have been many improvements to the Class VIIIA materiel handling processes. There have also been improvements to the written instructions relating to the handling of Class VIIIA materiel. The majority of improvement information gathered from the interviews related to medical logistic procedures. This made sense to the researcher considering many of the aerial port personnel interviewed did not realize that Class VIIIA had been singled out as a particular problem within the transportation realm.

***Medical Improvements in Packaging***

DoD's designated lead agent for medical materiel, USAMMA, has researched multiple commercial business practices and have implemented many improvements to the Class VIIIA shipping and handling processes over the past couple of years. An expert medical logistician explained that previous shipping problems USAMMA battled were improper temperature control (leading to warming, contamination, and freezing), and an overall lack of Cold Chain Management knowledge. The most visible improvements implemented are the packaging devices and processes for the Class VIIIA materiel.

The medical shipping expert explained that packaging items such as gel packs, temperature monitors, and specially designed coolers/boxes have replaced ice, simple in-transit visibility tags, and non-specific coolers/boxes. USAMMA created a Cold Chain Management training video, which the researcher received during this study, for their medical logisticians (discussed in the literature review), and they have transferred much of the re-icing responsibilities away from the aerial port personnel to the medical personnel. Figure 4 shows some of the innovative shipping equipment currently used to effectively ship Class VIIIA materiel.

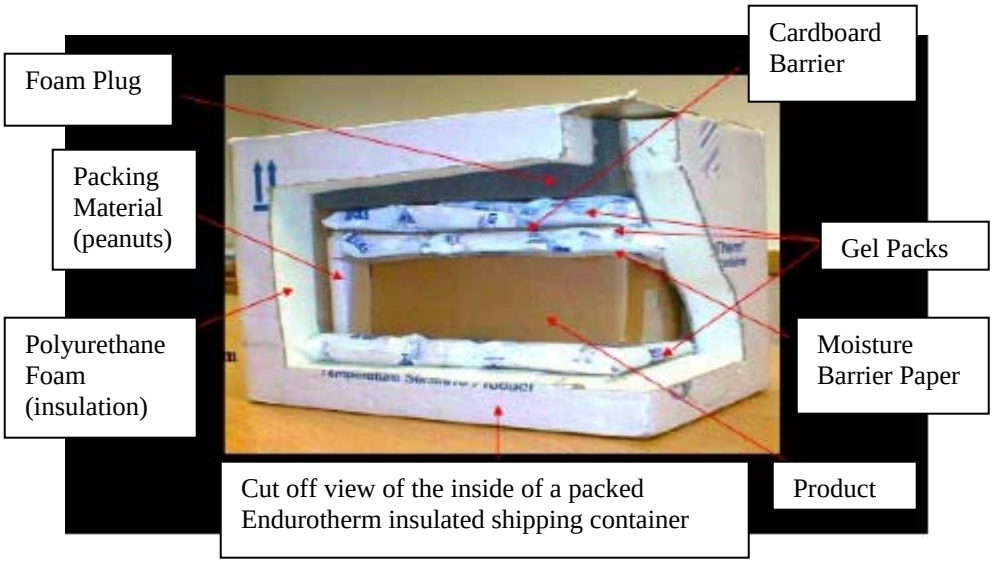
**Figure 4: Class VIIIA Shipping Equipment**

Small Endurotherm container, Foam, Packing Materials, TempTale, Gel packs


Temperature Monitor

Two Class VIIIA shipping experts clarified that gel packs replaced wet ice within the packaging because they are less apt to leak and they retain their cooling ability much longer than wet ice. They are reusable packets that must be frozen to -85° F for 24 hours before being used. Endurotherm boxes contain two inches of polyurethane foam within a mold thus providing three layers of protection (USAMMA Pharmacy Consultant, 2006). Figure 5 shows how an item is packed within the Endurotherm container. If the materiel is packed as shown in the Figure, the temperature will be sustained for five days.

**Figure 5: Endurotherm Container Packed for Shipment**




The medical expert also explained how to effectively use the temperature monitoring devices, TempTale. TempTales are the technology piece of the Cold Chain. The TempTale is placed in the package with the item and it tracks the temperature within the container every ten minutes for up to two weeks. Once the container reaches its destination, the medical logistician will plug the TempTale into the computer and download the datapoints to see if the item was out of its allowable temperature range

during transit. If the temperature range was breached the data is sent to a designated office that determines if the item is unserviceable or still able to be used.

The vast majority of the military inventory of these specialty-packing items resides with the medical logisticians who accomplish the packing of the Class VIIIA materiel. Transshipment nodes have not yet started storing them. It is possible that the nodes may store a box of gel packs (12 pack) and a few Endurotherm boxes. However, this won't occur until it is decided who will pay for the items and the refrigerators that will accommodate the temperature requirements for the gel packs. Fortunately, not many of these items need to be stored at each node because of the use of commercial airlift. It will be the exception that temperature sensitive items are transported within the military transportation system. The interviewees agree that since the inception of these new packaging tools, unserviceable Class VIIIA has decreased significantly.

***Commercial Airlift (Medical Air Bridge & Other)***

It is two medical logisticians opinions that the largest assistance to the transshipment nodes has been the maturation of the Medical Air Bridge and the process improvements of using non-Medical Air Bridge commercial air delivery companies. Taking the responsibility for time and temperature sensitive items away from the aerial ports and transshipment nodes has lessened the amount of strain on the military transportation system. Three medical logisticians stated that they utilize the Medical Air Bridge as much as possible. Two other medical experts believe that no matter what location the military deploys to, the commercial airlift will be able to reach them. The last leg may have to be on a military truck convoy because the closest airport is too far

away from the front lines. Even so, the supplies will still be delivered faster and tracked more effectively by our commercial partners.

***Aerial Port Improvements in Communication***

According to three Army and two Air Force interviewees the major improvement made within the transshipment nodes relates to communication. The interviewees recalled that during the initial stages of OIF, the Air Force aerial port personnel and the Army medical personnel were not always successful in combining their procedures to accomplish the same mission. Procedures were different, forms were different, and it was difficult to mesh all the requirements together successfully. After the first couple of rotations, and the ebbing of the mission pace, it became easier to work together. The USAMMA office in Camp As Sayliyah (USAMMSWA) started sending their Army medical logisticians to the transshipment nodes to train the aerial port personnel on identifying and handling Class VIIIA materiel. USAMMSWA's willingness to visit the nodes opened the doors of communication.

Another educational improvement is the CENTAF Aerial Port Conference hosted approximately 30-days after a new rotation of personnel arrives. Two knowledgeable aerial port interviewees that participated in these conferences briefly explained. Commanders, logistic readiness officers, chief master sergeants, and superintendents are required to attend and learn more about their location, missions, mission changes, and any special circumstances they needed to know about. The personnel could also bring up any issues they have thus far experienced during their deployment. This could include making additions or changes to the CENTCOM letters of instructions (LOIs). A relatively new procedure is the LOIs are electronically sent to deploying personnel before

they leave their home station. Personnel can read the LOIs and receive clarification prior to deploying. The LOIs address a number of issues that are specific to the deployment area and are not addressed in AFIs. The educational experiences prior to deploying and during the deployment assist the aerial port personnel with adjusting to their deployment so they can better accomplish their mission.

**Investigative Question #4. What is the current process of shipping and handling Class VIIIA materiel at the transshipment nodes?**

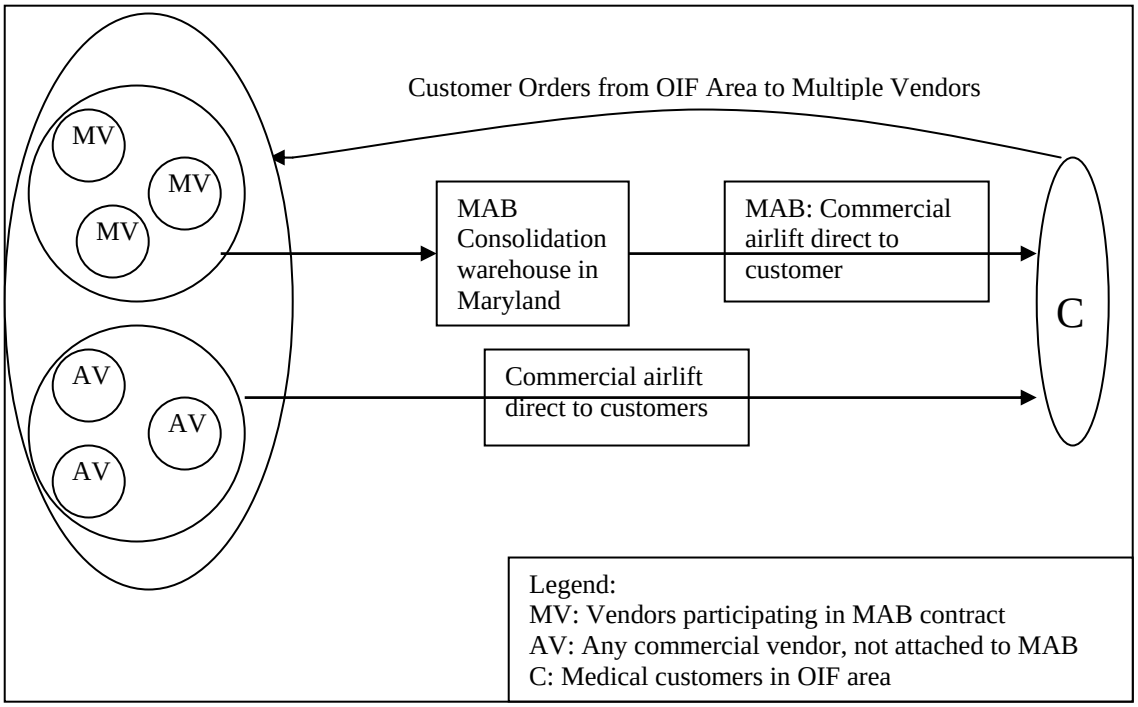
According to all of the interviewed aerial port experts the aerial port personnel are still using their transportation directives, AMCI 24-101. There is still no specific Class VIIIA materiel handling procedure for the transshipment nodes. The largest difference between the initial year of OIF and now is that the aerial port personnel currently do not handle much of the temperature sensitive Class VIIIA items because these items are being transported almost entirely by way of commercial airlift.

According to two of the medical logisticians recently deployed the FFLG1 personnel are still being utilized. For the non-time and temperature sensitive items that are sent through the air transshipment nodes, the FFLG1 personnel are still being used to ensure it is handled efficiently and correctly.

The military's commercial airlift partners continue to be lifesavers, for patients and for the aerial port. One medical expert noted that as of approximately one year ago, if transshipment nodes are still handling temperature sensitive Class VIIIA materiel, someone has "goofed. The materiel was sent incorrectly." Even though the official policy has not yet been published, it is well known that temperature sensitive items are

sent by commercial airlift only. Following this rule, and using commercial airlift for additional Class VIIIA materiel has decreased the amount of high visibility cargo transiting the nodes, which has decreased the workload for the aerial port personnel. Plus, utilizing commercial airlift has decreased the average wait time for Class VIIIA customers; medical staff deployed in Iraq and other OIF locations. The average time it takes for Class VIIIA to arrive at its destination by way of the commercial air once the order is placed is three days. Figure 6 shows a simplified map of the Medical Air Bridge, along with the similar potential non-Medical Air Bridge commercial airlift route.

**Figure 6: Commercial Airlift (Medical Air Bridge (MAB) and Other)**



**Investigative Question #5. What, if any, problems are still occurring, concerning Class VIIIA materiel shipping and handling at the air transshipment nodes?**

***Knowledge Base***

The knowledge of the aerial port personnel is still based on the AMCI 24-101 series. There are no current documents offering instructions for the aerial port handling of Class VIIIA materiel. While some medical logisticians discussed having gone to transshipment nodes to train aerial port personnel on the handling of Class VIIIA materiel, the aerial port personnel interviewed did not experience any such training at the nodes. Aerial port personnel continue to handle the cargo entering the transshipment nodes as they should, in accordance with Air Mobility Command instructions.

According to a medical logistician that also provides training, DLA is providing in-depth training at a few Aerial Port Squadrons and supply depots. This training educates the personnel on the packaging procedures using the Endurotherm boxes and gel packs, proper labeling, and other pertinent topics for personnel within the entire Class VIIIA supply chain. This training is based on a DLA regulation not yet updated, DLAR 4145.21 (discussed in the next section).

***Workload***

As explained by an expert medical logistician, until the updated DLAR 4145.21 is released, aerial port personnel are to have minimal responsibility for handling the temperature sensitive Class VIIIA materiel. Therefore, the outside of the Class VIIIA package is stickered with a large orange label listing all the contact information for the medical logistician point of contact and any other pertinent information, such as if the materiel will expire. The expert explained that when the materiel arrives at the

transshipment node, the aerial port personnel call the contact to handle any time or temperature sensitive materiel. The aerial port personnel do not have to handle it in any way other than their standard cargo handling for airlift.

Once the DLAR 4145.21 is updated and distributed, the aerial port personnel will be expected to properly handle any temperature sensitive Class VIIIA materiel that transits the transshipment node. However, according to the policy written in the DLAR 4145.21 that will be a rare occurrence due to the increased use of commercial airlift.

***Airlift Availability***

Aerial port and medical interviewees believe that airlift availability will continue to be a problem for any cargo (Class VIIIA or other) that is transported by way of military airlift. The need for all types of equipment to be transported across the globe quickly is taxing the military cargo aircraft and pilots to the maximum extent. Fortunately, the medical community has created excellent relationships with the commercial air delivery world. The majority of Class VIIIA materiel is transported via commercial airlift.

***Deployment Rotation Cycles***

One aerial port expert described the deployment cycle to the researcher. Three of the Army interviewees believe this is still a problem. Many of the interviewees mentioned the rotations as a cyclical problem that can't be avoided. This Air Force aerial port personnel working at the transshipment nodes typically deploy for 90 or 120-day rotations. This means that the entire Air Force staff that handles and ships the cargo to and from the transshipment nodes is new every 90 or 120 days. One interviewee noted that all of the Al Udeid AB aerial port personnel rotate over one time period. While this

is convenient for transporting the personnel back to their home stations, it is not convenient for the personnel replacing them or for the units working with the aerial port. There is a consistent lack of continuity at the transshipment nodes, in personnel and in local instructions. Some of the new personnel will have deployed to that node previously; however, this is rare. Some of these people have never deployed before, including leadership. All personnel bring new ideas and interpretations of the Air Force transportation instructions. According to both medical and aerial port interviewees, from the start of OIF to the present, every personnel rotation creates an increase in cargo delays and handling problems. After about two weeks these problems level off as personnel become accustomed to their working and living environment. Two weeks seemed to be the tolerable length of time for the interviewees.

***Commercial Airlift* (*Medical Air Bridge & Other)***

Similar to the military transportation system, the interviewees could also tell the researcher about problems with the Medical Air Bridge. Just as the aerial port personnel rotation creates an increase in delays, a change in contractors for the Medical Air Bridge also creates an increase in delays. The contract was changed in October 2006 and increases in delays within the Medical Air Bridge were noticed. The delays are expected to significantly decrease once the new contractor becomes accustomed to the processes. One interviewee stated that he chose not to use the Medical Air Bridge over other commercial airlift because the Medical Air Bridge was too expensive.

One concern for an aerial port interviewee with using commercial delivery companies for transporting military cargo within contingency areas is that the commercial aircraft and staff are not under control of the military. This means the

military must trust the company to accomplish aircraft security checks before flying to a military base and background checks of their staff flying with the military cargo. Without this trust there are numerous security risks for a base accepting these commercial aircraft.

***Performance Measures***

The researcher was able to find only one office that maintains metrics relating to Class VIIIA deliveries in the OIF area of responsibility; however, the metrics do not aply to the issue of unserviceable cargo. USAMMSWA tracks how many shipments are transported to each of the transshipment nodes, the weight of the shipments, the type of shipment (commercial or military airlift; loose or pure pallet), and the average wait time from order generation to delivery at the final destination. The information did not include whether or not the wait times were satisfactory, or if the items arrived in serviceable condition.

**Investigative Question #6. What improvements still need to occur for this process?**

***Education from the medical community***

Difficulties experienced during OIF spurred the medical community into action. Many of the improvements have been documented by way of internally utilized medical instructions, so the researcher did not find them during the literature review. The documents were passed to the researcher by the interviewees. A couple of the aerial port interviewees believe it would be useful to have access to these documents. The medical community has created concepts of operations that clearly define the responsibilities of the agencies involved with Class VIIIA materiel, including multiple Undersecretaries of

Defense, the Director of DLA, the Secretaries of the Military Departments, and the Commanders of the Combatant Commands (DoD, 2004). This undertaking has had a positive trickle down effect in the medical field. All the medical experts interviewed were extremely knowledgeable and excited about their initiatives.

The medical community, specifically DLA has become much more proactive working with Class VIIIA materiel. DLA is the leading edge of Class VIIIA shipping and handling procedures. However, within the interviews, there was only one document mentioned that is to be used by the aerial port personnel as well as the medical logisticians. Three of the medical experts explained that the DLAR 4145.21 (Preparation of Medical Materiel Requiring Freeze or Chill Environment for Shipment) is in the process of being approved for distribution. The latest version is dated April 1990. The draft version, as described by an interviewee, includes instructions for DLA's latest packaging requirements. For example, using gel packs instead of ice. This will assist the aerial port personnel when they do receive temperature sensitive Class VIIIA materiel. With this regulation, the aerial port personnel will know how to repackage the item in the rare event the gel packs need to be refreshed or damage has occurred to the outside container. This draft also includes the instruction "cold chain shipments must go commercial air direct (Fed-Ex/DHL)," (CCM DSCP training manual, 2006, p. F-1). However, the DLAR 4145.21 is still in draft form, not yet approved for distribution.

***Involving medical logisticians at the aerial port during contingency operations***

It was not clear to the researcher whether or not the UTC FFLG1 medical logisticians are still being deployed to transshipment nodes. Three of the medical logisticians confirmed that the FFLG1 personnel are still deployed to the nodes. The

aerial port personnel interviewed that had worked with the FFLG1 personnel in the past believed they were beneficial to the mission. Not only did the medical logisticians take responsibility for their Class VIIIA cargo, they also assisted with other general aerial port duties when they were not busy. A number of aerial port interviewees like the idea of having the FFLG1 personnel deployed at the nodes; however, the medical interviewees don't believe they are always needed for assistance at the nodes.

***Training for Aerial Port Personnel***

One suggestion was to create a Class VIIIA materiel shipping and handling course for aerial port personnel to be offered with the continuous distance learning courses (CDL courses) on-line. Aerial port personnel are already required to take some of these courses, such as the hazardous materiel refresher course. The Class VIIIA course could be required only for those personnel deploying to a transshipment node.

***Is there still a problem?***

Only one interviewee out of the twenty-nine believes there are no problems with shipping Class VIIIA materiel in today's supply chain. The interviewee noted that all Class VIIIA materiel is transported through commercial airlift, in accordance with regulations. The interviewee is aware of the past issues with the shipping of Class VIIIA through transshipment nodes; however, the interviewee was not aware of any current problems.

**Summary**

This chapter summarized all of the information gathered from the interviews to create the case. Starting from the problems during the first stages of OIF, continuing

through the years of improvements and process maturation, and ending with the current improvements being worked for the future. The next chapter will provide the research conclusion reached by the review of literature (Chapter Two) and the analysis of information (Chapter Four). It will conclude with suggestions for further research and the research summary.

# V. Conclusions and Recommendations

## Introduction

This final chapter includes the research conclusion deduced by way of the literature review and an analysis of interviews. This chapter also includes suggestions for further research and the research summary.

## Research Conclusion

At the inception of this study, the researcher believed there would be a great deal of blame surfacing in the interviews; however, this was not the case. The medical logisticians realized the strain transshipment node personnel and resources were subject to, so they took matters into their own hands. They transferred shipping of the majority of the most critical Class VIIIA cargo, the time and temperature sensitive items, to commercial airlift. Utilizing the military's commercial partners' resources relieved some pressure off of the transshipment nodes.

The medical logisticians have also diligently researched multiple specialty packaging items to better ensure temperature controls and again relieve the workload of personnel who would have had to reice the packages in the past. Currently, they are waiting for the updated version of DLAR 4145.21 to be published. While this regulation may require the use of commercial aircraft for all temperature sensitive items, it is realistic to prepare the air transshipment node personnel to receive an occasional box of this sensitive Class VIIIA materiel. Training the transshipment node personnel to the DLAR 4145.21 specifics will accomplish that preparation.

While the majority of the aerial port interviewees did not know of the specific Class VIIIA problem, they understood the criticality of the materiel and the required

handling of that materiel. Over the years, the working relationships between the transshipment node personnel and the medical logisticians have improved. The largest hurdle for the two specialties to overcome was becoming accustomed to the processes and requirements of their respective duties. This was particularly difficult when they were trying to mesh Air Force aerial port processes with Army medical processes. As seen in Appendix C, the Army interviewees' biggest complaint dealt with the expertise of the transshipment node personnel. This category included the general handling ability of the transshipment node personnel, as viewed by the interviewees and whether or not the transshipment node personnel had updated instructions to reference. The aerial port personnel and the Class VIIIA shipping experts in the medical field confirmed that the instructions that transshipment node personnel use for handling temperature sensitive items are outdated. Mitigating this lack of a current knowledge base for the air transshipment node personnel is the improvement in communications between the Air Force and Army personnel.

Communication has also improved between the air transshipment node personnel. The aerial port personnel deployed to the nodes have increased awareness of unique situations in the OIF area of responsibility because the deployed commanders, officers, chiefs, and superintendents are required to attend educational meetings at CENTAF. In addition to learning about their mission, attendees are able to share experiences and suggest information to add to the CENTAF letters of instructions. These letters are now sent to all deploying aerial port personnel prior to the deployment.

Communication leads to training. The medical logisticians have been proactive with creating training programs for their medical personnel packaging the Class VIIIA

materiel; however, the aerial port personnel have received minimal training. The aerial port personnel receive training on how to re-ice temperature sensitive items; however, with the new packaging being used, the re-ice training no longer applies to Class VIIIA cargo. Some aerial port personnel are receiving training based on the soon-to-be updated DLAR 4145.21; however, only a select few aerial port personnel in mostly stateside locations will benefit from this training. There are numerous aerial port training opportunities where Class VIIIA materiel training could be incorporated. One previously mentioned training capability was the on-line continuing distance learning courses website. Aerial port personnel already have several required annual refresher courses on this website, such as hazardous material courses. Adding a course that summarizes the aerial port personnel's responsibilities for Class VIIIA materiel, packaging requirements, interpretation the packing labels, and other pertinent topics would be beneficial to transshipment node staff.

Another training point is that while Army medical logisticians mentioned that they train personnel at the nodes, none of the aerial port interviewees recalled receiving such training. However, the aerial port personnel believe such training would have been helpful for those handling the Army Class VIIIA materiel.

Throughout the interviews, it became evident that the majority of experts, from both the medical and aerial port specialties, have drawn similar conclusions about Class VIIIA shipment problems at the OIF transshipment nodes. During the initial stages of OIF, and to a lesser degree now, there was too much cargo with not enough airlift and resources. As seen in Appendix C, workload and resources are a consistent complaint for the Air Force personnel. Unfortunately, this is not something that can be fixed anytime

soon; however, continuing to utilize commercial resources can mitigate it. Another recommendation for mitigating the risk to Class VIIIA materiel during a contingency build-up is to use dedicated airlift to transport the mass quantities of Class VIIIA materiel required for the initial stages of a contingency. Once the initial build-up is complete, commercial airlift could be utilized as it is now, for refreshing the Class VIIIA supplies during the contingency. Another recommendation to mitigate the risk of unserviceable Class VIIIA materiel is to utilize the FFLG1 personnel consistently. Of the aerial port interviewees, whom had deployed, they appreciated the presence of the medical logisticians (UTC: FFLG1) who were also deployed to the node.

Some interviewees also believe that not enough personnel are deployed to the transshipment nodes. On the other hand, other interviewees believe there are enough personnel assigned to the nodes. This is a difficult issue to tackle. It is an issue for the CENTAF logistics planners to rectify and it is out of this study's scope. As for needing an increase in other resources at the transshipment nodes such as refrigeration, gel packs, and other materiel handling equipment, the lead agencies are going to have to decide which agency or headquarter office will fund the items. If the Class VIIIA materiel continues to transit through the transshipment nodes without the nodes owning the necessary resources, the problems will continue.

Throughout the entire study, from the literature review to the analysis of interviews, the researcher noticed a complete lack of relevant performance measures. Performance measures gathered by an assigned office in DLA or USAMMA would ensure involved parties (medical and aerial port) stay educated on the success of Class VIIIA materiel shipping processes. Monthly metrics should track as a minimum how

many unserviceable Class VIIIA shipments were received per shipping method (Milair or commercial air) and per transshipment node. A customer that receives an unserviceable Class VIIIA shipment should document specific information to send to the assigned office. The information should include the vendor, shipping method, duration of shipment, and specific discrepancy. Compiling this data and presenting it monthly to involved parties will ensure visibility of the problems. Trends can be identified and bumped up against current activities in the area that may be affecting the shipping processes. Such performance measures utilized to their full extent lead to quick and effective solutions.

**Limitations**

The goal of this research was to produce answers to the research questions, which was accomplished, and also to create maps of the Class VIIIA materiel shipping and handling processes used within the transshipment nodes. Although the interviewees were extremely knowledgeable on all of the general processes since the onset of OIF, the information gathered from the interviews did not produce Class VIIIA-specific processes used at the transshipment nodes. There were no standard Class VIIIA-specific processes followed within the transshipment nodes. The Class VIIIA materiel followed the general flow of all cargo, by way of prioritizations and available airlift.

An additional limitation is that the researcher was not able to find and interview a medical logistician and aerial port person from each OIF transshipment node and each time frame. This decreased the generalizability of the findings; however, many of the interviewees had deployed to different locations and had experienced many of the same problems.

**Suggestions for Further Research**

Additional research could be conducted to venture down many different related paths. While the expert interviews were useful, visiting a transshipment node to view the shipping and handling processes in person would have created a more valid study. Discussing the processes as they were occurring and experiencing the unique situations within the OIF area that the aerial port personnel have to contend with would have added more credence to the processes and problems found by way of interviews.

Additionally, while participating agencies have made great strides in improving the shipping processes into the Middle East, it seems there have been no advancements in improving contingency plans. When asked the question, "how will the shipping processes be improved for the next contingency build-up the United States military accomplishes in a remote country?" none of the interviewees had an answer. There are no plans discussing how to keep the mass quantities of cargo from piling up again at the transshipment nodes. The interviewees are relying on the capabilities of the commercial air delivery companies to keep the Class VIIIA cargo from becoming backlogged at the nodes. They trust that the commercial companies will always have the ability to fly into any country with an airport. Considering the heavy reliance on commercial airlift, the realistic contingency capabilities of commercial air delivery companies need to be investigated. Also, contingency plans need to be created that include the use of the military transportation system.

Another path for research relates to the Medical Air Bridge. What is the cost difference between using the Medical Air Bridge and non-Medical Air Bridge contracted commercial airlift? What is the value added for using the Medical Air Bridge, if any? It

was mentioned that the Medical Air Bridge is more expensive than ordering from other vendors. Is it worth the cost?

**Research Summary**

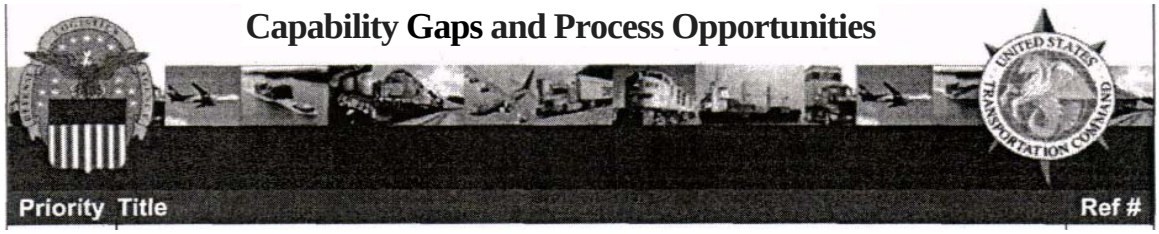
This thesis utilized the descriptive case study method with unstructured interviews to gather information to analyze one portion of the Class VIIIA shipping and handling processes and problems occurring at OIF air transshipment nodes. While specific Class VIIIA materiel processes were not found for the transshipment nodes, a great deal of information about the problems and possible improvements was documented. Unfortunately, the lack of detailed accounts of exact processes kept the researcher from being able to create valid process maps that thoroughly explained the process a piece of Class VIIIA cargo would travel through to the customer. Even so, the majority of interviewees agreed on what the overarching problems were: airlift availability, extreme workload, and communication problems. The information does lead to a causal relationship between the problems occurring at the nodes during the initial stages of OIF and the unserviceable condition of some Class VIIIA materiel. However, one can not place blame on the transshipment nodes considering the external forces straining their resources (i.e. airlift availability, prioritizations, rotation cycles). The interviewees also had a number of suggestions for continuing improvements: training for all personnel involved, continuing to use and grow commercial airlift partners, and utilize the medical logisticians at the transshipment nodes.

Shipping and handling Class VIIIA materiel in contingency areas will continue to improve as the agencies involved continue to research leading edge packaging and

processes. Remembering to keep all parties educated on those processes will be key to the success of future contingency situations.

## VII. Appendices

## Appendix A: Gap Analysis Document From Issue Originator

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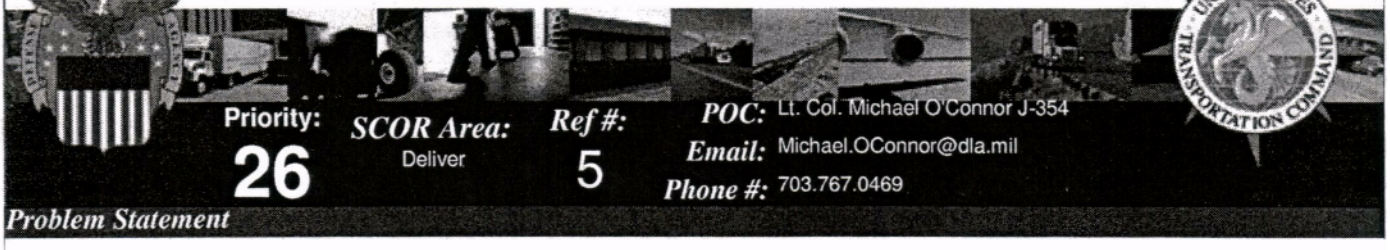
# Class VIII Materiel Handling



Priority: 26

SCOR Area: Deliver

Ref #: 5

POC: Lt. Col. Michael O'Connor J-354
Email: Michael.OConnor@dla.mil
Phone #: 703.767.0469

## Problem Statement

Personnel at intermediate distribution nodes frequently do not adhere to the special materiel requirements for proper processing, storing, and
forwarding of medical materiel.
Who: Personnel at intermediate Air Ports of Debarkation (APODs), Trailer Transfer Points (TTP), and other transshipment nodes including Kuwait
(KCIA), Qatar (Al Udied), and Iraq (BIAP), and other tactical nodes and transfer points.
What: Improper or inadequate special handling (e.g. cold chain management, temperature sensitive, hazardous materiel) requirements. Do not
process, store, and forward medical materiel adequately to ensure it is received by the customer in a timely manner and in serviceable condition.
When/Where: Multiple nodes throughout the supply chain shipping to and from the customer.
How: Inappropriate handling.
Why: Multiple reasons, including failure to comply with written guidance (e.g. some follow outdated Defense Logistics Agency (DLA) publication
versus latest United States Army Medical Materiel Agency (USAMMA) protocol), lack of trained personnel to manage & advocate for Class VIII, and
lack of urgency for Class VIII movement relative to other node priorities (First-in, First-out).

## Example/Lessons Learned

• In Operation Enduring Freedom (OEF)/Operation Iraqi Freedom (OIF), Central Command Air Forces (CENTAF) APODs (Aerial Ports of Debarkation) did not adhere to the unique handling and storage requirements, including consideration of repackaged items, which resulted in the removal of Radio Frequency (RF) tags. This included operations in Kuwait (KCIA), Qatar (Al Udeid), Iraq (BIAP), and other tactical nodes and transfer points (e.g. Theater & Corps, and Corps & Division). Source: DLA J-354 Class of Supply Analysis

## Operational Impact

Medical materiel received by the customer is not delivered in a timely manner or in a serviceable condition. The root cause for this activity was
identified to be a gap in the training and management of the personnel at the intermediate and transshipment nodes.
D1.10.7 - Intermediate distribution nodes do not adhere to medical materiel conveyance, temporary storage, and special handling requirements,
protecting from extreme environmental conditions (heat, cold, rain), which results in deteriorated materiel that could not be used.
D1.10.8 - Intermediate distribution nodes did not expeditiously forward medical materiel onward for delivery to customers, resulting in medical
materiel that was delayed or lost in transit.
D1.10.9 - ROOT CAUSE. There is conflicting or inconsistent guidance across all distribution nodes (e.g. approved USAMMA Cold Chain protocol,
outdated protocols, and other Service-specific guidance), lack of understanding by personnel, and failure to comply with written guidance.
DR1.4.6 - Intermediate distribution nodes do not adhere to medical materiel conveyance, temporary storage, and special handling requirements,
protecting from extreme environmental conditions (heat, cold, rain), which results in deteriorated materiel that could not be used.
DR1.4.7 - Intermediate distribution nodes did not expeditiously return medical materiel, resulting in medical materiel that was delayed or lost in
transit.
ED.3.0 - The removal of RF tags from pallets at intermediate nodes eliminates visibility of materiel intransit within the supply chain.

## Potential Opportunities

Establish an end-to-end distribution process where the requirements for Class VIII handling and movement are fully incorporated into operational and tactical management, and strictly adhered to. The process would include identification of non-compliant nodes, utilization of protected storage (e.g. Golden Hour Boxes), knowledge transfer, and Department of Defense (DoD) responsibility for training personnel in the handling and management requirements of medical materiel.

## *Initiatives Supporting*

DPfM Focus Area ( Theater Distribution Management - TC-AIMS / CMOS / DSS Integration )

DPfM Focus Area ( Support GTN/IDE Convergence Implementation )

DPfM Focus Area ( C2 Fusion Center Engineering (BRAC))

DPfM Focus Area ( Logistics (Distribution) COP with Standardized Tools for C2 Fusion Center, JDDOC, Ports, & JTF-PO )

DPfM Focus Area ( Netcentric Transaction Backbone for Ammo and E2E Distribution )

MTS (Minnesota Thermal Science) Box

## *IT Systems Supporting Process Architecture Change Impact*

D1.10.7, D1.10.8, D1.10.9, ED3.0, DR1.4.6, DR1.4.7

## *Affected Components*

Army G4 (Army Logistics)

Blood Program R&D (Research and Development) Office

Services

AMC (Air Mobility Command)

DLA (Defense Logistics Agency)

## *JL(D) JIC FAA Linkage*

JL(D) JIC 2.1 : Deliver supplies to the point of need JL(D) JIC 3.1.1.4.2 : Conduct JDDE terminal planning JL(D) JIC 3.1.1.4.3 : Conduct JDDE organization planning JL(D) JIC 3.1.2.4.2 : Control JDDE terminals JL(D) JIC 3.1.2.4.3 : Control JDDE organizations

## *CINC 129 Requirements Linkage*

CINC Requirement 35 : Provide the ability to identify shortfalls and limitations in infrastructure resources

CINC Requirement 43 : Provide timely and accurate information on the location and status of CLASS VIII: Medical Supplies/Blood

CINC Requirement 54 : Compare medical support requirements to available resources to determine shortfalls and constraints.

| CINC Requirement 91 : Determine requirements for materiel-related support resources such as storage and repair facilities, special equipment, j hazardous handling, dated material, and skilled manpower, (restated)

CINC Requirement 107 : Define alternative medical support networks consisting of transportation links between hospital nodes and compare their relative effectiveness.

## Appendix B: Sampling of Interview Questions

Shipping and Handling Process

- What part did you play in the process of shipping the Class VIIIA materiel through the transshipment nodes? When was this experience?

- What procedures/regulations were followed?

- Do you have any documents that assist with the shipping of the Class VIIIA materiel?

- What was the process for shipping and handling Class VIIIA that you experienced?

- What sort of problems or hiccups in the process did you notice?

- What caused the Class VIIIA to deteriorate, in your experience?

- Have there been any improvements accomplished between the start of OIF and now?

- How have the processes changed over the last three years?

- How have they improved?
    -- Were the processes changed/improved or did the workload decrease?

Location/Workload

- Is this a problem of over-saturation of cargo?
    -- If so, can a reorganization of the warehouse areas achieve better management?

- What missions get higher priority than Class VIIIA materiels?

- Is there a problem of having enough airlift?

Resources

- Do the nodes have adequate resources for handling Class VIIIA, such as temperature controlled storage area (refrigerators and freezers), and storage area out of the natural environmentally to protect the cargo from sand and dirt?

Personnel/Training

- Are the nodes manned by personnel from multiple Services or are they all USAF?
    -- If there are personnel from other Services, which process instructions rule?
    -- How are the personnel from different services trained in order to follow the same procedures and priority scales being followed at the nodes?

- Are the UTC FFLG1, medical logisticians being utilized?

- What requirements must personnel have before being assigned to duty at a node?

- How do the nodes ensure their personnel know how to take care of Class VIIIA?

- What is the training/refresher-training program at the nodes?

- How is DoD training personnel to handle Class VIIIA materiel at the nodes?

- What training do aerial porters receive specific to Class VIIIA materiel handling?

- Did aerial port personnel receive training for repacking cold storage items?

- Were there procedures in place at each of the nodes, specific to that node (relating to extreme heat, sand storms)?

- Where can the regulations, instructions, or letters of instruction for each node be found?

- Were there procedures in place for specific situations such as holding time or temp sensitive items for an extended time while awaiting airlift?

Metrics

- Has there been data collected on the amount of unserviceable shipments and why they are unserviceable? If so, what type of data?

- Are metrics being tracked now?

- Did CENTAF track problems with Class VIIIA cargo?

- What metrics need to be tracked to find positive or negative trends in the processes?

## Appendix C: Problems Noted By Interviewees

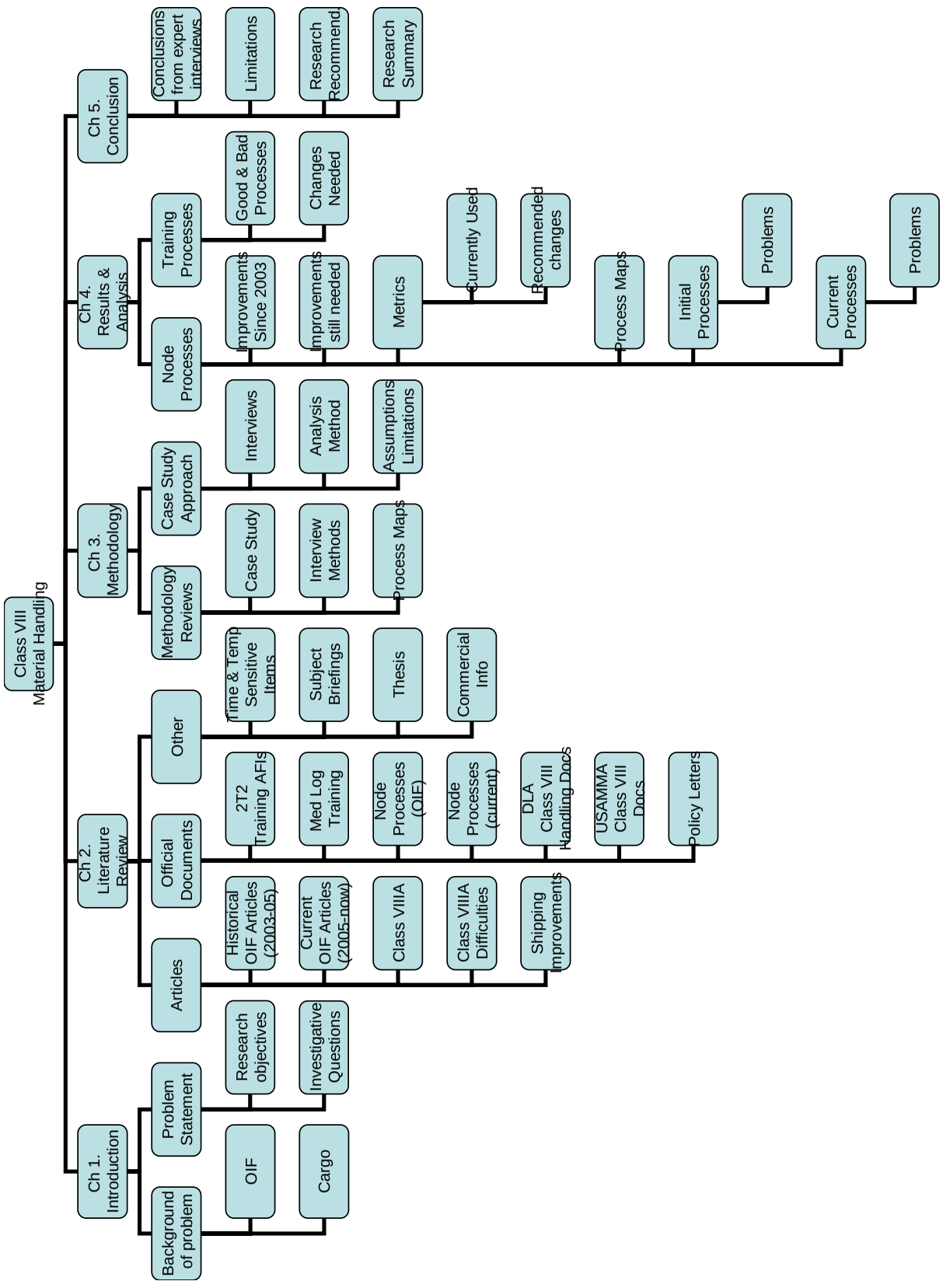
| | | # of Experts Agreed | | | # of Experts Agreed | |
|---|---|---|---|---|---|---|
| **Issue** | **Initial Stages of OIF** | **Medical vs Aerial Port** | **Air Force vs Army** | **Current OIF Ops** | **Medical vs Aerial Port** | **Air Force vs Army** |
| Aerial port training and instructions | | | | | | |
| Lack of Class VIIIA expertise | X | *9/13 M<br>2/6 AP | 5/11 AF<br>6/8 A | X | 7/13 M | 3/11 AF<br>4/8 A |
| Cargo shipping | | | | | | |
| Workload | X | 6/13 M<br>4/6 AP | 6/11 AF<br>4/8 A | | 2/6 AP | 2/11 AF |
| Prioritization | X | 4/13 M | 1/11 AF<br>3/8 A | | 2/13 M | 2/8 A |
| Airlift availability | X | 6/13 M<br>1/6 AP | 4/11 AF<br>3/8 A | X | 4/13 M<br>2/6 AP | 5/11 AF<br>1/8 A |
| Re-icing issues | X | 6/13 M<br>1/6 AP | 3/11 AF<br>4/8 A | | | |
| Non-AF shipment difficulties | X | 4/13 M<br>1/6 AP | 2/11 AF<br>3/8 A | | 2/13 M<br>1/6 AP | 2/11 AF<br>1/8 A |
| Deployment rotation cycles | X | 5/13 M<br>1/6 AP | 2/11 AF<br>4/8 A | X | 3/13 M<br>1/6 AP | 1/11 AF<br>3/8 A |
| Lack of resources | X | 7/13 M<br>3/6 AP | 6/11 AF<br>4/8 A | X | 2/13 M<br>2/6 AP | 3/11 AF<br>1/8 A |
| Commercial airlift difficulties | | | | | 2/6 AP | 2/11 AF |
| Lack of responsibility center | X | 7/13 M<br>3/6 AP | 5/11 AF<br>5/8 A | X | 3/13 M<br>1/6 AP | 2/11 AF<br>2/8 A |
| Performance measures | X | 13/13 M<br>5/6 AP | 10/11 AF<br>8/8 A | X | 12/13 M<br>5/6 AP | 10/11 AF<br>7/8 A |

***3rd and 5th column data read as: Nine out of thirteen medical logisticians mentioned the lack of Class VIIIA expertise at the air nodes to be a problem. One out of five aerial port personnel also mentioned this as a problem. Also, if at least 20% of the experts agreed it is a problem, it is marked as such.**

Note: Table includes problems noted be interviewees, what timeframe those problems were said to have occurred, and the percent of experts that agreed it was a problem during that time.

Note: While there were 29 interviewees, only 19 had specific information about problems as they have occurred. The other 10 interviewees were process and training informants. The information gained from these 10 interviews is intertwined throughout the analysis.

## Appendix D. Research Guide Process Map



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HQ DLA/MSC
Attn: Lt Col Michael O'Connor
8725 John J. Kingman Road
Fort Belvoir, VA 22060
Comm: 703-767-0469
e-mail: Michael.oconnor@dla.mil

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**14. ABSTRACT**

Medical cargo (Class VIIIA) is critical to the success of the United States military stationed across the globe; therefore, the military must successfully ship its Class VIIIA materiel to the Warfighter. The shipping and handling of the time and temperature sensitive Class VIIIA materiel is a complex process. Since the initial stages of Operation IRAQI FREEDOM (OIF) the medical field has complained about Class VIIIA materiel arriving unserviceable to the final destination. Unserviceable materiel includes items that expired over time and items that expired from exposure to temperatures outside of their allowable range. This thesis focused on one possible area of concern, the air transshipment nodes used for OIF. The researcher used interviews to accomplish a case study and answer the research questions. The interviews focused on the training of the personnel handling the materiel at the transshipment nodes and the amount of instruction relating to the materiel the personnel are given while deployed. The results of the interviews showed that training and instruction for handling the temperature sensitive materiel is not an issue. The contributing issues are the mass amount of cargo transiting the transshipment nodes, the lack of airlift, and the lack of storage space with proper capabilities.

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| U | U | U | UU | 98 | 19b. TELEPHONE NUMBER *(Include area code)* (937) 255-6565, ext 4703; e-mail: alan.johnson@afit.edu |

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