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Success and Failure in Doctrinal Innovation A Comparison of the U.S. Army Medical Department and Logistics Branch, 1990 2010



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THESIS

**SUCCESS AND FAILURE IN DOCTRINAL INNOVATION:
A COMPARISON OF THE U.S. ARMY MEDICAL
DEPARTMENT AND LOGISTICS BRANCH, 1990–2010**

by

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March 2012

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OF THE U.S. ARMY MEDICAL DEPARTMENT AND LOGISTICS BRANCH,
1990–2010**

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ABSTRACT

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Several authors propose that units learn and innovate primarily during wartime or peacetime, and they do so from either a top-down or bottom-up methodology. Yet, such methods of learning do not adequately explain variations between respective levels of innovation in which logistics forces within combat brigades have seemingly adapted more rapidly than their medical counterparts. This thesis suggests that another factor, organizational complexity, explains why the brigade support medical company has not adapted as rapidly as its logistics counterparts within the support battalion (BSB) structure.

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LIST OF ACRONYMS AND ABBREVIATIONS

4GW	Fourth Generation Warfare
AAR	After Action Review
AHS	Army Health Services
AMEDD	Army Medical Department
AMTV	Armored Medical Treatment Vehicle
ARFORGEN	Army Force
AR	Army Regulation
ARTEP	Army
AXP	Ambulance Exchange Point
BCT	Brigade Combat Team
BDE	Brigade
BFV	Bradley Fighting Vehicle
BSB	Brigade Support Battalion
BSMC	Brigade Support Medical Company
C2	Command and Control
C4ISR	Communication, Computers, Intelligence, Surveillance, Reconnaissance
CAC	Combined Arms Center
CASCOM	Combined Arms Support Command
CAT	Combat Application Tourniquet
CBRNE	Chemical, Biological, Radiological, Nuclear, E
CCMRF	CBRNE Consequence Management Reaction Force
CMTC	Combat Maneuver Training Center
COIN	Counter Insurgency
DART	Document Assistance Review Team
DCDD	Directorate of Combat and Doctrine Development
DVH	Double “V” Hull

DoD	Department of Defense
FBCB2	Force XXI Battle Command Brigade and Below
FCS	Future Combat Systems
FLA	Four Litter Ambulance/Front Line Ambulance
FM	Field Manual
FMTV	Family of Medium Tactical Vehicles
FOB	Forward Operating Base
FORSCOM	Forces Command
FSB	Forward Support Battalion
GAO	Government Accounting Office
GC	Geneva Convention
GCV	Ground Combat Vehicle
GWOT	Global War On Terror
HBCT	Heavy Brigade Combat Team
HEMTT	Heavy Expanded Mobility Tactical Truck
HIC	High intensity conflict
HLZ	Helicopter Landing Zone
HMMWV	High Mobility Multipurpose Wheeled Vehicle
HSS	Health Service Support
IBCT	Interim brigade combat team
ICRC	International Red Cross
ICV	Infantry Carr
IED	Improvised Explosive Device
IHL	International Humanitarian Law
IPT	Integrated Product Team
JCAHO	Joint Commission on Accreditation Healthcare
JRTC	Joint Readiness Training Center
LSAC	Low Signature Armored Cab
LZ	Landing Zone

M113	(vehicle nomenclature) Tracked Evacuation Ambulance
M577	(vehicle nomenclature) Tracked Treatment Platform
MC4	Medical Communications for Combat Casualty Care
MCSC	Marine Corps Systems Command
MEV	Medical Evacuation Variant
MLRS	Multiple Rocket Launcher System
MRAP	Mine Resistant Ambush Protected
MTOE	Modified Table of Organization and Equipment
NTC	National Training Center
ONS	Operational Needs Statement
OTSG	Office of the Surgeon General
PLS	Palletized Loading System
PROFIS	Professional Filler System
RFI	Rapid Fielding Initiative
TDDD	Training and Doctrine of Development Directorate
TJC	The Joint Commission
TRADOC	Training and Doctrine Command
TTP	Tactics Techniques and Procedures
USAMMDA	U.S. Army Medical Materiel Activity

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I. INTRODUCTION

A. OVERVIEW

What explains military adaptation to the complexities of non-linear warfare? Such a question has been addressed by an assortment of authors and practitioners who have contributed numerous works, particularly in the past decade, in which the United States has been engaged in conflict under a variety of demanding conditions in Iraq and Afghanistan. However, the vast majority of such literature has been applied to specifically address the portions of the U.S. Army, commonly referred to as maneuver units, tasked in the destruction of enemy forces.¹

This work focuses on the organizations which directly support and sustain such efforts, particularly medical units and logistics units within combat brigades, from 1992 to 2010, providing variation in terms of the intensity of combat: the 1992–2002 period was one of relative peace, in which the U.S. Army took part in limited stability or humanitarian relief operations. In contrast, the period from 2003 to 2010 represents an extended period in which the Army participated in complex asymmetric warfare.

The thesis seeks to explain why the U.S. Army Medical Department (AMEDD) differs from both its logistics counterpart, and the larger Army function of Sustainment, which includes the medical, logistics, and personnel services sub-functions, and the larger Army in innovation.² In particular, the thesis focuses on why medical units have failed to adapt to combat needs, which has adversely affected their performance both in modern linear combat (i.e., generally combat between two or more national militaries), and in contemporary counterinsurgency warfare or what the military establishment refers to as

¹ A search revealed that while there are academic works that specifically address innovation at the combat brigade level, very few specifically address logistics. The only works with regard to medical innovation at the brigade level are found within periodicals.

² Headquarters, Department of the Army, *Field Manual 4.0, Sustainment* (Department of the Army: Washington, DC, April 30, 2009), iv.

“COIN.”³ In contrast to the army medical community, the logistics branch and the army at large have effectively adapted to combat realities and needs in terms of their vehicles and formal doctrine. The AMEDD-logistics variation is particularly striking, given that at the combat brigade and battalion levels, both organizations are similar in size, organizational structure, and functional support mission.⁴

The analysis will address the technological and doctrinal aspects of medical care at the lowest respective units of measure in which both medical and logistics organizations can be found, specifically within the combat brigade. This level is the only place one may find medical, logistics, and combat arms personnel operating within the same environment and experiencing the same set of collective demands, constraints, and tactical concerns.

In current conflicts, such as those in Iraq and Afghanistan, where support personnel and infantry units are closely intermingled within the areas of combat, we find the medical company simultaneously operating in multiple capacities. They provide medical support to their brigade as their doctrinal mission dictates. Additionally, they provide support to large numbers of military personnel and civilian contractors without their own medical units, and treating military personnel and civilians from other nations. In order to facilitate such care, these medical companies are routinely called upon to conduct operations in multiple locations simultaneously, commonly referred to as “split-based operations.” This task is a significant challenge for such medical companies, as they are not allocated adequate manpower or medical equipment levels to enable such

³ Committee on Armed Services. House of Representatives, “Report to the Chairman, Subcommittee on Military Personnel and Compensations, Operation Desert Storm: Full Army Medical Capability Not Achieved,” Washington, DC: U.S. General Accounting Office, August 1992; Ralph W. Nazzaro, “Redefining the role of the BSMC in Operation Iraqi Freedom: brigade support Medical Companies Find Themselves Sideline From Their Doctrinal Roles. What New Roles Can They Adopt To Better Support Their BCTs?” *Army Logistician* 38, no. 2 (April 2006): 19–23.

⁴ For the purposes of this study the terms “support battalion” will refer to both the older (legacy) Forward Support Battalions (FSB) and modernized Brigade Support Battalions (BSB) found within the new modular brigades. Similarly the term medical company will refer to Role II medical units (usually C Company, C Med, or BSMC) found within either respective parent organization.

efforts.⁵ Rather, such brigade support medical companies (BSMCs) continue to be manned, equipped, and armed as though they were to provide support from a single location, in relatively secure areas, and to the rear of combat operations.

We find leadership routinely attempting to address such capabilities shortfalls through innovation by various means in combat. While it seems that medical units do learn in the field, the lessons are seemingly not being adequately captured into formal doctrine at the institutional levels within the AMEDD. Rather one finds the most valuable information composed of informal doctrine scattered throughout a large body of periodicals, within online forums, and in informational briefings that are given directly by members of outgoing medical units to personnel in the incoming medical units during combat rotations.

Aside from AMEDD's doctrinal shortcomings, we also note difficulties regarding efforts to develop and introduce new equipment. There have been significant challenges with regard to larger efforts by coordination through army entities outside of AMEDD, such as Army Acquisitions, to update the Army's aging fleet of both wheeled and tracked ambulances. It has only been within the last five years of a decade-long counterinsurgency conflict, that have we seen the development of wheeled mine-resistant ambush-protected (MRAP) vehicles which have been modified for interim use in a medical evacuation capacity, and only more recently since 2006, have those vehicles for such a purpose been fielded in appreciably large numbers.

In contrast to the BSMC case, we find the U.S. Army logistics community better suited to its combat mission based on current manpower allocations, and more suitable types and amounts of equipment. Such adaptation has allowed logistics units to more effectively provide split-based operations in support of combat operations, a task also routinely required of this type of unit during deployments. Comparably, logistics units which operate at the same levels on the battlefield have seen advances in manning, organizational structure, and equipment, thus allowing such units to support combat

⁵ As early as 1994, the surgeon general specifically identified shortfalls in 2001 in the ability to conduct either 24-hour or "split-based" operations. Office of the Surgeon General, U.S. Army, briefing, "Medical Reengineering Initiative: Combat Health Support of Force XXI," April 14, 1999.

forces more effectively in multiple locations. Vehicles used by logistics units, while also somewhat old, are also routinely armored, thus allowing such units to transport supplies and repair parts in-between forward operating bases in combat zones. In addition, many such innovations can be found in the most recent versions of formal doctrine publications pertaining to logistics. In contrast to the AMEDD at this same level, the logistics community seems able to effect change more rapidly both in terms of its equipment and its doctrine. Why has the AMEDD failed to adapt to full-spectrum conflict at the same rate as a similar functional organization, their logistics counterparts?

The comparison challenges the literature on military innovation, which centers in important ways on two debates: first, whether militaries innovate primarily from a top-down or bottom-up dynamic; and second, whether peacetime or wartime is more conducive to military innovation. This study finds that, across the same period of shifts between peacetime and wartime, Logistics has primarily “learned” through both bottom-up mechanisms during wartime, using its doctrine as a baseline from which it can modify as needed. In contrast, the AMEDD has seemingly not captured learned lessons from the bottom-up into its formal doctrine, and such innovation is being transferred informally between units during wartime. These observations push us to move beyond existing approaches to military innovation.

B. IMPORTANCE: INCREASING ROLE AND EXPECTATIONS

Strategy is to war what the plot is to the play; Tactics is represented by the role of the players; Logistics furnishes the stage management, accessories, and maintenance. The audience, thrilled by the action of the play and the art of the performers, overlooks all of the cleverly hidden details of stage management.

—Lt. Col George C. Thorpe: *Pure Logistics* (1917)⁶

A study on adaptation—and the failure of—within AMEDD is timely, given radical shifts in combat needs and therefore in the need for the AMEDD to adapt. Following Operation Desert Storm, and the end of the Cold War, the armed forces of the United States found itself drawn into a broad array of smaller regional crises such as

⁶ George C. Thorpe, Lt. Col: *Pure Logistics: The Science of War Preparation* (Washington, DC: U.S. Government Printing Office, 1917), 4.

Somalia, Bosnia, and Kosovo, in part due to bipolar destabilization, in which deployments for medical personnel increased by 60 percent between the final year of the Cold War and 1998.⁷ In addition to more frequent deployments, such intrastate conflicts produced their own implicit suggestions for adaptation, in part by the blurring of what was war and what was “something else.” Such new efforts suggested a wider variety of skills were required in conducting humanitarian relief missions, and other complexities associated with failed states and ungoverned spaces.

Following the tragic attacks on the World Trade Center on September 11, 2001, scholars have continued to provide copious literature amounts of analysis on the topic of innovations associated with the complexities of application of ground forces in information age warfare. Such missions necessitated that the Army as a whole become proficient in less traditional roles in which they provided relief supplies, assisted with reestablishment of institutions and infrastructure, and provided medical care to indigenous civilians. These efforts were required in addition to more traditional logistical and medical support requirements, an increased workload which further stretched support resources.

Accordingly, there has been a renaissance in publications in both scholarly texts as well as by practitioners within periodicals. Such introspection is of particular relevance given the current convergences associated with the uncertainties of the world as noted by the most recent 2010 *Quadrennial Defense Review*, the 2010 *National Security Strategy*, and the 2011 *Army Posture Statement*.⁸ Each of these documents stresses the critical need for the military to be able to respond to a broad array of environments. Such a gradient of environments is known as a “full-spectrum” of threats. At one end of such a spectrum we find conventional or “linear” combat, which may be conceptualized as traditional interstate conflict. At the opposite end of the spectrum there is asymmetric, or

⁷ General Accounting Office, *Military Personnel: Perspectives of Surveyed Servicemembers in Retention of Critical Specialties*, report to congressional requesters, GAO/NSAID-99-197BR (Washington, D.C: GAO, August 1999).

⁸ 2010 *Quadrennial Defense Review*, February 2010. 5; 2010 *National Security Strategy* May 2010; The Honorable John M. McHugh and General George Casey, Jr., *A Statement on the Posture of the United States Army 2011*, submitted to the Committees and Subcommittees of the United States Senate and the House of Representatives, 1st Session, 112th Congress, March 2011, respectively.

non-linear warfare, in which an enemy may not wear a uniform, and uses counterinsurgency or asymmetric warfare to sidestep the advanced firepower and technologies of the United States.

If indeed the AMEDD has not been able to challenge its own paradigms or facilitate innovation through the larger Army or Department of Defense (DoD), this raises some troubling issues, as the result may be that the lives of injured or sick soldiers and civilians may be jeopardized. The role of the medical personnel in combat is such that there is little margin for error, perhaps even more so than in peacetime, when medical procedures are largely planned events rather than crisis management in the midst of hostilities. Only by understanding three interrelated questions can one then address such concerns: How the AMEDD is equipped, manned, and trained; what is the nature of such shortfalls if found; and what is the causal nature of such deficiencies? Only then would it be possible for the AMEDD to better support a broader variation of combat operations, and ultimately saving more lives in the process.

C. ORGANIZATIONAL COMPLEXITY

This thesis argues that in order to explain the disparity in innovation levels between the AMEDD and its logistics counterparts within the context of the larger U.S. Army organization over the last two decades, in addition to examining how the organization learns, we should also focus on the exceptionally complex nature of the AMEDD as an organization. In addition to its expanding wartime roles, the Army Medical Department is still responsible for its much larger and sometime disparate role of maintaining a large fixed-facility healthcare system for members of the military, their families, in addition to a growing population of retirees. This healthcare system is spread across the globe, with major facilities throughout the United States, as well as in Europe and Asia. In its providing of medical care it falls under the same purview as its civilian

counterparts to include a three-year validation cycle by civilian agencies such as The Joint Commission (TJC), formerly known as the Joint Commission on Accreditation of Healthcare Organizations (JCAHO).⁹

In particular, the analysis focuses on how organizational complexity has led to a high degree of separateness or relative autonomy from the larger Army organization. In addition, being a less-complex organization, leadership in the logistics branch can focus centrally on the question of supplying combat personnel, both while training and, when those personnel go overseas, in real combat situations.

The complexity of the AMEDD has meant that the area of focus of this study, that of providing medical support at the brigade combat team is only a small portion of the overall Army Health Support (AHS) mission and respective focus. In addition, limited numbers of personnel in comparison to the larger AMEDD spend time within combat brigades, and for a relatively limited portion of their careers. This limited experience, in turn, has implications for AMEDD's learning and adaptation process. First, areas in which doctrine is produced within the AMEDD are somewhat separate from the larger Army-wide doctrinal institutions and are manned by individuals with no experience in combat brigades. In addition, bottom-up innovation is limited not only by the fact that there are few AMEDD personnel in the field to express their needs through the appropriate chains of command, but also that that very chain of command is interrupted: at the battalion levels medical personnel respond to a logistics commanding officer. In this context, "lessons learned" by medical personnel tend to be transferred informally between medical leaders as their units are replaced in combat, and are published in journals read by the logistics community, rather than the AMEDD.

D. METHODOLOGY

1. Level of Analysis: Combat Brigade Support Units

This study focuses specifically on organizational innovation and the transfer of such knowledge within self-contained functional medical and logistics support

⁹ Tricare Media Center, "The Joint Commission Confirms Your Health Care Is Top-Notch," http://www.tricare.mil/pressroom/doctor_is_in.aspx?fid=48 (accessed February 22, 2012).

organizations at the lowest level on the battlefield, or what is referred to within military as the “company” level within the formalized Army hierarchical structure. These companies are nested within their parent BSB, which provides a variety of logistical support, or what is referred to as multifunctional logistics, to the combat brigade it routinely sustains on the battlefield.¹⁰ It is only at this level within the U.S. Army hierarchy that we find both such functional support units, the medical and logistics companies operating within the same tactical environment, and with the respective tasks of supporting the larger combat brigade either medically or logistically under conditions identical to combat forces.

A comparison between civilian medical organizations, or medical units of other branches of service such as Air Force or Navy medical units would seemingly present a cogent study of interest. However, such a correlation was examined and ruled out as being too dissimilar for two reasons. First, Army medical units within combat brigades routinely support complex ground operations, requiring their personnel to be incorporated into the overall tactical plan of ground combat operations on the battlefield. Conversely, Navy and Air Force medical units at this same level do not typically require such competencies, and are routinely implemented in support of a larger strategic goal and operate from static locations. Equally, the operating environments of the civilian medical community are normatively very different. Organizationally their structure is less rigidly hierarchical, and civilian medical personnel do not require armored ambulances used under the duress of combat in the direct role of supporting the overarching mission of destruction of an enemy force.

2. Time Period

This study was deliberate in selecting a two-decade period from 1990 to 2010. This period contains alternating periods of both peace (1991–2000) and war (2001–2010), allowing careful analysis of which period medical personnel to do the majority of their doctrinal learning. In looking to the past, such a timeframe also represents the end of

¹⁰ This study will refer to identified organizations in their respective generic terms rather than parsing them into older forward support battalions (FSB) within heavy brigades, or the newer and more robust brigade support battalion (BSB) found within the new modular brigade combat team (BCT).

Cold War stasis and subsequent global destabilization. Such geopolitical change precipitated a period of deployments within failed or failing states, such as Bosnia, Kosovo, and Somalia. The middle of this timeframe presents an abrupt transition from emphasis on large-scale mechanized warfare (conceptualized in Operation Desert Storm), to an ambiguous post-September 11, 2001, “war on terror.” Such a change was exemplified by adversaries who were able to rapidly exploit the tenets of asymmetric warfare to offset the technological overmatch and firepower of U.S ground forces. In echoing the recent 2011 Army Posture Statement, this two-decade period implies a strategy of risk mitigation by the ability to operate across the full-spectrum operations (FSO).¹¹ Full spectrum operations according to the latest version of *Army Field Manual 3-0, Operations*, are defined as “the range of operations Army forces conduct in war and military operations other than war.”¹²

3. Propositions

In order to develop a common conceptual framework, there are three interrelated propositions to be used in the analysis which follows in this research study:

Proposition #1. The current environment of low-level conflict is likely to persist for the foreseeable future. In addition, medical companies have been directed to operate in a variety of future environments across a “full-spectrum of conflicts.” Accordingly, medical personnel must be able to perform a wider variety of tasks and have greater capabilities than previously required.

Proposition #2. There are a number of inherent conditions within the AMEDD which do not exist within other Army organizations. These conditions can be conceptualized as complexity. Such forms of complexity include the

¹¹ Department of the Army, *Army Posture Statement 2011* (Washington, DC: Department of Defense, 2010).

¹² United States Army, *Operations*, Field Manual (FM) 3-0 (Washington, DC: Department of the Army, February 2008), viii.

broad mission scope of the AMEDD in relation to its size, its broad array of highly technically-oriented subspecialties, and its separateness from the larger Army.

Proposition #3. Institutions over the last two decades have identifies shortfalls within the AMEDD in terms of adequate battlefield capabilities (the ability to mirror the maneuverability and survivability of supported combat forces). Over a decade of efforts to rectify these issues only interim solutions when assisted by outside agencies such as the larger Army.

4. Methodology

The thesis engages research on military innovation, which generally discusses methods of institutional learning by two methods, either “top-down,” or “bottom-up.” This comparative analysis will do so from both of these perspectives. First, to understand how doctrinal innovation has occurred from the top down in Logistics but not in AMEDD, the thesis will examine AMEDD and Logistics doctrinal development at the highest levels.

This study will then isolate and examine both AMEDD and logistics in addition to Sustainment doctrine, from a “bottom-up” perspective. It will examine current publications, at lower levels such as periodicals published by the AMEDD and the logistics communities. It will suggest that the majority of information which is detailed enough for the purposes of planning medical operations is primarily found within in logistics journals, and will suggest a causal relationship regarding disparity of lessons-learned ultimately being codified within respective formal doctrines.

Lastly, this thesis will isolate the study’s key variable, organizational complexity. Specifically, it will address mission scope as well as the highly technical nature of AMEDD’s missions. It will also trace the implications of that complexity, focusing on the distribution of AMEDD personnel across different functions, AMEDD’s separateness

when compared the larger Army, and how the AMEDD's organizational complexity has influenced the command and communication structures at the combat brigade and battalion levels.

E. ORGANIZATION

Chapter II provides a review of the literature on military innovation. In particular, it addresses different ways to measure military innovation and analyzes two central debates: whether military learning occurs in a bottom-up versus top-down manner, and whether peacetime or wartime is more conducive to learning. The chapter also introduces the importance of organizational complexity for understanding military innovation, focusing on one piece of scholarship that grounds the thesis' causal argument: Chris Demchak's (1991) *Military Organizations, Complex Machines: Modernization in the U.S. Armed Services*.

Chapter III serves as a detailed presentation of the varied outcomes—i.e., AMEDD's failure to innovate in contrast to substantial innovation in the logistics branch. Chapter IV, the core of the thesis, explains the variation between AMEDD and logistics, within the context of the larger U.S. Army organization, focusing on the exceptional complexity of the AMEDD relative to the logistics branch. In closing, Chapter V highlights the future implications with regard to the AMEDD as a complex and technically-oriented organization, and the prognosis for its efforts if it is to innovate battlefield medical care.

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II. LITERATURE REVIEW

A. OVERVIEW

Very little scholarship examines innovation of the U.S. army medical community, in general and more specifically within the support battalion which provides sustainment to its larger combat brigade. Similarly, at this level, logistics units also receive highly limited attention. Instead, analysis of innovation within the United States Army and more broadly the Department of Defense almost exclusively deals units specifically tasked with destruction of the enemy's forces, rather than the forces designed to facilitate or sustain the ability to conduct such operations.

Strategic level documents addressing transformation within the U.S. Army illustrate this apparent marginalization of the medical community when compared to its logistics counterpart. If one examines *Elements of Transformation 2004*, Fire, Maneuver, Protection, Communications (C4ISR), and Logistics are all separately addressed in detail, yet medical transformation is not even addressed as a sub-category of either logistics, or sustainment as it is referred to at higher levels.¹³ The trend continues within a Congressional Budget Office Study, *An Analysis of the Army's Transformation Programs and Alternatives 2009*, only specifically addresses medical transformation in passing by a mere mentioning of a cancelled ambulance design.¹⁴ Earlier reports have noted the lack of an Army-wide, armored vehicle for medical evacuation, yet such a deficiency continues to be postponed.¹⁵

Beyond these strategy documents, the little work that has addressed battlefield logistics and medicine can be parsed into three categories. First we find that of general historical narrative in relation to a larger conflict, such as the strategic levels of logistics

¹³ Office of Force Transformation, *Elements of Defense Transformation* (Washington, DC: Office of the Secretary of Defense, October 2004), 12–13.

¹⁴ United States Congress. *A CBO Study: Army's Transformation Programs and Possible Alternatives, June 2009* (Congressional Budget Office, Publication 3193. 2009), xv, 13.

¹⁵ Office of the Deputy Chief of Staff, U.S. *2004 Army Transformation Roadmap, July 2004* (Washington, DC: Army Operations, Army Transformation Office, 2004), 5–11.

during the Korean War or medical planning during World War II.¹⁶ In addition, we also find discourse relating to either the purely technical aspects of logistics, or similarly a discussion of the clinical medical skills of the era.¹⁷ Finally, a third category provides limited writings evaluating logistics and army medical efforts either from external organizations such as the RAND Corporation or assessments by government organizations.¹⁸

Examples of historical works reflecting the work of practitioners at the strategic level is that of Lieutenant General Frank F. Ledford, Jr. His article in *Journal of the Army Medical Department*, titled “Medical Support for Operation Desert Storm,” provides a narrative from the perspective of the Surgeon General’s Office, of the pre-war buildup of medical forces who supported the short duration conflict which followed.¹⁹ Such contemporary works at combat brigade levels or lower are mirrored in the 2010 article by Lieutenant Colonels’ Matthew Rice and Omar Jones in *Medical Operations in Counterinsurgency Warfare: Desired Effects and Unintended Consequences*.²⁰

The body of information which addresses operations at the brigade level consists of formally published military doctrine to be found in Army Field Manuals (FMs); articles within periodicals authored by junior military leadership; and finally a broad array of multimedia presentations by practitioners posted within web-based forums

¹⁶ An example of such historical logistics work at the strategic level is by Gouge, Terrence J. *U.S. Army Mobilization and Logistics During the Korean War, A Research Approach*. Center of Military History, United States Army: Washington D.C: 1987; Similarly, strategic level medical concerns are addressed by Wolfe, Edwin P. Colonel, *Medical Department of the United States Army in the World War Volume III, Finance and Supply* (U.S. Government Printing Office Washington, DC, 1928).

¹⁷ Andre J. Onibene, Brigadier General, and O’Neill Barrett, Jr., Colonel, USA (Ret.) eds. *Internal Medicine in Vietnam, Army Medical Department, Volume II: General Medicine and Infectious Diseases* Office of the Surgeon General and the Center of Military History (Washington, D.C: 1982), available at <http://history.amedd.army.mil/booksdocs/vietnam/GenMedVN/default.html>.

¹⁸ Gary Cecchine and David Johnson et al., *Army Medical Strategy: Issues for the Future* (RAND: Santa Monica CA, 2000).

¹⁹ Frank F. Ledford Jr., Lieutenant General, and Matthew W. Lewis, et al., “From The Surgeon General of the Army: Medical Support for Operation Desert Storm.” *The Journal of the U.S. Army Medical Department* (January-February 1992): 3.

²⁰ Rice, Matthew S., and Omar J. Jones. “Medical Operations In Counterinsurgency Warfare: Desired Effects and Unintended Consequences.” *Military Review* (June 2010): 47–57.

formally created within the last five years.²¹ The omission of medical operations at the combat brigade level in literature is disconcerting, especially given that in the last two decades the U.S. army has been heavily engaged in combat, in non-linear warfare: the brigade combat team is the building block level of the Army, and the brigade relies heavily upon responsive support from both the logistics and the medical communities during conflict.

This chapter will now examine each respective area of prurient interest to this study. First it will begin by providing the framework in discussing the role of innovation and doctrine in the Army. A portion of this focus on doctrine will address where the Army sees itself in the future in its examination of strategic level documents which guide its transformation efforts and ultimately its doctrine. Next, it will examine works produced by the practitioner within both the Army medical and logistics communities. Finally, it will examine the works of the larger body of authors who provide analysis on the topic of innovation itself.

B. DOCTRINAL AND TECHNOLOGICAL INNOVATION

What is the role of innovation within the context of military organizations? Professor Rosabeth Kanter advocates that rather than being solitary event, innovation is a complex and disruptive process within organizations which involves resources from outside agencies in the form of time, funding and manpower. Such a process ultimately demands the innovator to cross organizational boundaries in order to be successful.²² In order to evaluate innovation within this military context, this thesis will provide clear metrics to facilitate such a task. Appropriate metrics are derived from Andrew W. Marshall director of the United States Department of Defense's Office of Net Assessment, who suggests there are subcomponents to innovation, to include the simplest

²¹ SustainNet, and Medical Warfighter Army Medical Warfighter Forum (MedWfF) forums. <https://www.us.army.mil/suite/page/131414>. accessed October 18, 2011.

²² Rosabeth Moss Kanter, "The Middle Manager as Innovator," *Harvard Business Review* 82 (July-August 2004): 153.

form, *technological* in addition to *doctrinal* innovation.²³ These facets of innovation may be considered complimentary, building upon one other and overlapping in varying levels.

Doctrine may be conceptualized as both the culmination and continuation of an organization's current body of knowledge. For purposes of this research, we can look to the latest edition of the Army's *Field Manual (FM) 3-0, Operations*, for a definition of doctrine: "Army Doctrine is a body of thought on how Army forces intend to operate as an integral part of joint force."²⁴ Doctrine establishes how the Army views the nature of its own operations and should ultimately affect the training, manning, and equipping of medical personnel during peacetime as well as during combat. Mirroring higher U.S. Army doctrine, logistics and medical support doctrinal innovation must experiment with the best applications of incorporating new technologies such as vehicles and equipment into military operations to exploit new capabilities and to adapt to changes on the battlefield. It does so through the lenses of its historical past, its current body of theory, and the most importantly, best assumptions about potential future operating environments. Doctrine should constitute guiding principles, creating the necessary conditions within an organization from which leaders can engage in innovative thinking in order to solve problems.²⁵

Barry Posen provides a great deal of valuable insight in his analysis of military doctrine and ultimately proposes two central questions with regard to doctrine, *what* will be employed and *how* exactly is it to be employed?²⁶ Such insight regarding doctrine is equally perceptive with regard its interrelated nature with innovation. Posen advocates that both doctrinal and technological innovation impose costs in the form of time and disruption to an organization. In some cases, he suggests units may choose to change

²³ William S. Lind, et al., "The Changing Face of War: Unto the Fourth Generation," *Military Review* (October 1989) : 2–11.

²⁴ U.S. Department of the Army, *Change 1 (Feb 2011) to Field Manual M 3–0 Operations* (Washington, DC: Department of the Army, February 2008), D-1.

²⁵ Ibid.

²⁶ Barry Posen, 1984. *The Sources of Military Doctrine: France, Britain, and Germany Between the World Wars* (Ithaca, NY: Cornell University Press, 1984), 13.

their doctrine during peacetime in an attempt to minimize such disruption.²⁷ However, such a statement can be problematic during a time of persistent conflict in which we find added complexity in battlefield conditions that has increased the tasks U.S. Army forces must be adept at, thus implicitly suggesting the need for both combat and support forces to innovate their formal doctrine within a relatively short period in order to ensure success.

Time plays a critical role when evaluating innovation. Innovation should be a continuous and cyclical process in which new technologies are developed, efforts are determined as to how best utilize the capability, and in which the enemy is continuously adapting, thus necessitating further adaptation.²⁸ Both technological and doctrinal innovation must all occur in the proper levels and at the proper rate in order to exploit their effectiveness within an organization. In addition, such change must also be intentionally synchronized in order to minimize disruption and to facilitate purposeful organizational adaptation, as rapid implementation may be seen as disruptive or intrusive, especially if directed externally.²⁹

However, military leadership may become frustrated by such continuous needs. As suggested by Thomas K. Adams in *The Army After Next*, “the real world seldom accommodates itself to doctrine.” Such a poignant portrayal of such a frustration is the large-scale armored combat of World War II which was codified into doctrine, and the neither of the subsequent conflicts of Korea nor Vietnam required the use of such doctrine. Finally, the anomaly of Desert Storm seemingly vindicated such a concept and suggested the “right” way to fight once again, albeit with information warfare technology and providing an ill-defined “new way” of fighting wars, or what is commonly referred to as a revolution in military affairs (RMA) by suggesting technology married with 3rd

²⁷ Posen, *The Sources of Military Doctrine*, 30.

²⁸ Derrick Neal, Henrick Friman, Ralph Doughty, and Linton Wells, *Crosscutting Issues in International Transformation: Interactions and Innovations among People, Organizations, Processes and Technology* (Washington, D.C: National Defense University) edited by Derrick Neal, Henrick Friman, Ralph Doughty, and Linton Wells II. 2009), 16.

²⁹ James R. Fitzsimonds and Jan M. Van Tol, “Revolutions In Military Affairs,” *Joint Forces Quarterly*, (Spring 1994): 25–26.

generation industrial age formations constituted an RMA.³⁰ It is this continuous cycle of innovation which prompts some military scholars to question whether the United States repeatedly fights using the doctrinal tenets learned and internalized from the last war.³¹

C. THE FOUR QUADRANTS OF INNOVATION

What Drives Innovation? Some authors suggest external factors may constrain innovation efforts, such as peacetime reductions in manpower, the pace of wartime operations, as well as funding allocations for new equipment.³² In addition, some may advocate that innovation may be hindered internally in which organizational learning and adaptation may be constrained by units themselves, specifically due to the methods in which they learn and transfer information into military doctrine, or formal institutional knowledge.

In order to provide adequate framework, one must first choose how to parse the disparate findings found within relevant scholarly works on how innovation takes place. Clearly, such study may be examined from a variety of historical contexts and perspectives. For the purposes of this study such analysis as will address drivers of innovation as represented by the four such quadrants in Figure 1.

³⁰ Douglas A. Macgregor, *Breaking the Phalanx: A New Design for Landpower in the 21st Century* (Westport, CT: Praeger, 1997), 230–231.

³¹ Stephen P. Rosen, *Winning the Next War: Innovation and the Modern Military* (New York: Cornell University Press, 1991), 1.

³² Stephen P. Rosen, “New Ways of War: Understanding Military Innovation,” *International Security*, vol 13, no.1 (Summer, 1988): 167.

Top-down	Stephen Rosen, "Winning the Next War," 1991 and Paul Hebert "Deciding What Has to Be Done., 1988."	General David Petraeus (COIN) and Dr. Kilcullen ,"28 Articles," 2006.
Internally/ Externally Driven	Douglas MacGregor "Breaking the Phalanx," 1997.	James A. Russell, "Innovation, Transformation and War," 2011
Bottom-up	Peace	Peacetime/Wartime
		War

Figure 1. Innovation Axes

Advocates of varying perspectives of institutional learning can be identified by the method in its proponents ultimately propose that military organizations learn and innovate. Some suggest senior leadership or external organizations direct adaptation to affect change to subordinate organizations, or what shall be called the “top-down” method. Conversely, we find proponents of the “bottom-up” method, who advocate military units learn lessons at the user level, with adaptation beginning there in attempts to overcome battlefield challenges. Advocates of this methodology suggest lessons are captured at the user level and transferred to the institution, and subsequently incorporated into formal doctrine. In addition, we find a second axis to differentiate between schools of thought who also propose that combat units adapt primarily during either wartime or peacetime. As there is little academic treatment with regard to either logistics or medical care on the battlefield, such treatment will include non-academic sources in the analysis from the perspective of the Army leader as the practitioner, specifically within the bottom-up camp. The discussion will show how none of the perspectives in the literature can fully explain the variation between AMEDD, which consistently across peace- and wartime from the early 1990s to 2010 has failed to innovate, and the army logistics branch, which across the same period has succeeded in innovating, both through top-

down and bottom-up mechanisms. As a preliminary note, although the present study seeks to measure innovation in terms of technological and doctrinal changes, as will be demonstrated below, some authors have measured innovation by other means—e.g., in terms of temporary adjustments to optimize success of in the field during wartime. Proponents of such a perspective suggest that formal doctrine plays a lesser role in providing a toolbox of sorts from which to use if needed.³³

1. Top-Down Innovation, Peacetime

According to the top-down model of military innovation, one would expect to find major innovations emanating from the upper levels of leadership within the Army, to include leadership within the AMEDD and the logistics communities. Stephen Rosen takes a top-down perspective to doctrinal innovation in *Winning the Next War* in his addressing his three types of innovation: peacetime, wartime, and technological innovation.³⁴ As to the origins of doctrine, Rosen takes the position that units do not normally make large changes in doctrine other than in peacetime, and that when they do make doctrinal changes under combat conditions, those shifts are incremental.³⁵ Of relevance to this study is Rosen’s suggestion that the most successful innovations have resulted from calculated attempts to manage risk itself. While Rosen suggests that organizations are capable of adapting during both wartime and peacetime, he suggests that successful innovation during wartime is more inconsistent, varying in units depending on the competence of individual leaders. Conversely, he suggests that during peacetime, the military as an organization creates optimal solutions when it has adequate time to do so.³⁶

Major Paul Herbert’s article “Deciding What Has to Be Done,” provides additional insight in his focuses on formal doctrine created by army leaders as a critical instrument of change within the Army bureaucratic structure. In doing so, Hebert

³³ Russell, *Innovation, Transformation, and War*, 33.

³⁴ Rosen, “New Ways of War,” 143.

³⁵ Rosen, *Winning the Next War*, 52.

³⁶ *Ibid.*, 253.

provides a narrative of the peacetime process in which General William DePuy personally developed the new U.S. Army Field Manual 100–5: Operations, and how such an effort was certainly a *top-down* effort upon taking over Army Training and Doctrine Command (TRADOC) in 1973.³⁷ Neither Rosen nor Herbert explain why, across peace- and wartime in the 1990s and 2000s the U.S. army in general and logistics have innovated substantially during this period, whereas AMEDD has to a much lesser extent.

2. Top Down, Wartime

Since military operations commenced in Afghanistan and Iraq, there have been internal and external expectations for a paradigm shift within the military as a whole, as echoed in the previous administration’s issuing *Department of Defense Directive 3000.05* in November of 2005, which placed nation-building on the same priority as combat operations.³⁸ In echoing such a paradigm shift, in his quintessential work on *27 Points*, David Kilcullen addresses the tenet of logistics or sustainment and stresses its criticality in its contribution to the overall fight within counterinsurgency operations. Kilcullen also advocates that support forces such as logistics and medical personnel may be required to fight more than their counterparts due to the frequent and sometimes regularity of supply convoys. While anecdotal, this claim can be supported by the author after experiencing two rotations in Iraq.³⁹ He also suggests that such forces must be much more responsive than in linear combat operations, noting the enemy may perceive logistics convoys as soft targets when compared to their combat arms counterparts. Kilcullen offers evidence to

³⁷ Paul A. Herbert, “Deciding What Has to be Done: General William E., DePuy and the 1976 Edition of FM 100–5,” *Leavenworth Papers, No. 16* (Leavenworth, KS: Army Command and General Staff College), 58.

³⁸ Center for Strategic and International Studies, “DoD Directive 3000.05, One Year Later,” December 11, 2006, <http://csis.org/event/dod-directive-300005-mdash-one-year-later> (accessed June 7, 2011).

³⁹ Authors personal experiences from Iraq rotations in 2003 and 2006–07 as a support battalion medical company commander within 2nd Brigade 1AD, and 3rd Brigade 2ID, respectively.

support such claims in that, during a one-year period, most attacks when parsed from larger combat operations were against either logistics personnel or bases.⁴⁰

While both authors provide insight into institutional learning, these two top-down approaches to military learning cannot account for the variation across the logistics and medical communities in their capacity to innovate. In the case of the logistics community it has seemingly appeared to follow the lead of the “top”—i.e., the larger army—in that it has innovated, whereas the AMEDD has not innovated as well.

3. Bottom-Up Innovation, Peacetime

In the words of Colonel Douglas MacGregor’s 1997 work, *Breaking the Phalanx*, we see yet another peacetime perspective with regard to military innovation in terms of doctrine. MacGregor is a rare example of a military author who provided candid insight on the need for reforms while serving on active duty. His work provides prescriptive treatment in addressing top-down shortcomings in his analysis of current unit structures. His is perhaps the most authoritative analysis in practical attempts to address a failure to innovate within current Army hierarchical structure. He suggests that Desert Storm created an overemphasis among senior leadership on technology, without addressing the archaic organizational makeup of the military, to include its logistics forces which he suggests contributed more to decisive strategic victories in the last hundred years than tactical competence.⁴¹ MacGregor’s work, too, does not offer insight into the variation in innovation when contrasting AMEDD to logistics or the U.S. army at large.

4. Bottom-Up Innovation, Wartime

James A. Russell also proposes a bottom-up model of military innovation, but amid conflict. His *Innovation, Transformation, and War* presents a “bottom-up” analysis of the U.S. combat unit as a learning organization, suggesting that while doctrine created by military leadership does play a part in organizational innovation, it is not necessarily

⁴⁰ David Kilcullen *Twenty-Eight Articles: Fundamentals of Company-level Counterinsurgency* Edition 1 (Washington, D.C: Written from field notes compiled in Baghdad, Taji and Kuwait City, March 2006).

⁴¹ Mac Macgregor, *Breaking the Phalanx*, 230.

the primary driver of change.⁴² He illustrates this using a detailed case study of the technologically advanced 172nd Stryker Brigade Combat Team (SBCT) operations in Mosul, Iraq, between 2005 and 2006.⁴³ Russell notes such bottom-up changes are complex, involving both vertical and horizontal communication among individuals seeking optimal, rather than merely tolerable, solutions.⁴⁴ Though Russell focuses almost entirely on wartime innovation within the combat forces of the U.S. Army and Marines in Iraq,⁴⁵ he does address the daily operations of the Brigade Support Battalion (BSB) and efforts to support the brigade during operations in Mosul.⁴⁶ In his analysis, he provides a detailed description of the BSB's ability to adapt by reconfiguring the brigade for combat, and the myriad of challenges the unit faced in providing support to a larger number of units over greater distances than doctrinally required.

Russell painstakingly explains the learning process through the synthesis of bottom-up innovations, capable leaders, and new adaptation of technology, and stresses how the unit examined decades-old logistics doctrine from the 1980s, to find optimal solutions to problems, and that lack of logistics doctrine specific to COIN did not prevent the unit from undergoing an evolutionary process to adapt to their complex environment and expanded mission parameters. Russell also provides insight on how such lessons learned may find their way into evolution of future doctrine: innovation is in part driven by an organization's ability to be introspective and judge as to what extent it is effective.⁴⁷

Russell also argues that logistics personnel learn their craft primarily during wartime rather than during training events. As during wartime, much of what the unit as

⁴² Russell, *Innovation, Transformation, and War*, 11.

⁴³ The author can authoritatively attest to Russell's claim, having relieved 172d SBCT at the end of 2006. Prior to their relief, weekly contacts were conducted over secure Internet protocol (SIPR) video teleconferencing prior to deployment. Exchange of information took place once in Iraq through information briefings, and exchange via removable hard drives. Additionally, following return to the United States, many of the leaders participated in videotaped interviews to document their combat experiences.

⁴⁴ Russell, *Innovation, Transformation, and War*, 52.

⁴⁵ *Ibid.*, 159–164.

⁴⁶ *Ibid.*

⁴⁷ *Ibid.*, 191.

collective team learns is non-doctrinal, thus requiring innovation.⁴⁸ While Russell does not address the topic of medical innovation, it could be implied that similar to logistics counterparts, such new non-doctrinal tenets of medical support are learned during combat and must adequately be captured into formal doctrine.

Consistent with Russell's analysis, this thesis finds that within combat brigades, medical companies have attempted to overcome shortcomings at the institutional levels of AMEDD found in doctrine and equipment shortfalls. Nonetheless, in spite of introspection within medical units at the combat brigade level—and even more recently by the new Surgeon General, very few lessons learned at the battalion or brigade levels have been channeled up in the chain of command to be implemented into doctrine.⁴⁹ In contrast, the logistics community has undergone considerable bottom-up learning to include both doctrinal and technical innovation. This research thus seeks to build on Russell's work by seeking to explain not only learning on the ground but how such learning results in doctrinal shifts.

Ultimately, this thesis finds that bottom-up learning has been crucial for Logistics and notably lacking for AMEDD. In order to understand AMEDD's failure to innovate from the bottom up, it is crucial to take into consideration the question of organizational complexity.

D. ORGANIZATIONAL COMPLEXITY

This thesis focuses centrally on the highly complex nature of AMEDD relative to the Logistics branch. The organizational complexity of AMEDD has implications for (1) how lessons are learned—or not learned—and lost *within* AMEDD and (2) communication between AMEDD and the larger army. Chris Demchak's *Military Organizations, Complex Machines* demonstrates that a complex and technically oriented organization will have significant challenges in its ability to adapt either rapidly or

⁴⁸ Ibid., 159–161.

⁴⁹ Even after nearly a decade of conflict, Stryker ambulances (MEVs) have yet to be placed in the medical company and many of the pervasive issues in manpower, structure and operational concepts identified by Gary Cecchine in *Army Medical Strategy: Issues for the Future* (Santa Monica, CA: RAND 2000), have yet to come to fruition.

effectively to new technologies adopted.⁵⁰ Additionally they may incur higher costs in their ability to effectively innovate both technologically and doctrinally.

⁵⁰ Chris C. Demchak, *Military Organizations, Complex Machines: Modernization in the U.S. Armed Services*, eds. Robert J. Art and Robert Jervis (NY: Cornell University Press), 40.

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III. AMEDD AND LOGISTICS BRANCH: DETAILED DESCRIPTION OF OUTCOMES

A. INTRODUCTION

This chapter describes in detail the substantial degree to which the AMEDD has failed to innovate for irregular warfare, both in terms of technology and doctrine, relative to the logistics branch and the U.S. Army's larger combat forces. The chapter provides a foundation for the analysis in Chapter IV, which will explain the causal nature of AMEDD's failures to innovate.

The first facet of innovation pertains to *technology*, and in particular this thesis will examine how such new vehicles are introduced within the medical and logistics communities. The second facet is innovation in formal *doctrine*, which, as the chapter will show, may come about both through both bottom-up and top-down processes. This analysis draws upon scholarly articles, in addition to writings in periodicals from AMEDD leadership found within combat brigades. In this portion of the analysis, a sampling of the amounts and type of articles published in both AMEDD and logistics periodicals, will then be compared to a review of respective formal publications in order to determine amounts of new doctrine being introduced into such respective formal doctrinal publications. I am focused wholly on the characteristics, practices, and doctrine of army organizations.

The following vignette facilitates the analysis to come:

We didn't have any armored ambulances in our medical company, so we carried him by his left leg, his only remaining leg, and wedged him on the air conditioner in the center of the guntruck.

—Major Doug Wekell, *Brigade Support Medical Company (Charlie Company) Commander, Baghdad, August 2007.*⁵¹

⁵¹ From author, relating ambush incident in which the 296 Brigade Support Battalion (BSB) headquarters company commander's (HHC) vehicle was penetrated by a dual-array explosively forced penetrator (EFP) improvised explosive device (IED), resulting in instantaneous traumatic right leg below-the-knee amputation.

Similar vignettes have transpired on numerous occasions throughout the last decade of asymmetric conflicts in both Iraq and Afghanistan in which there is no differentiation between a “front line” and the more secure areas to the rear of conflict. This particular experience illustrates the failure of the army medical community to adapt to irregular warfare, both doctrinally and technologically.

B. TECHNOLOGY

The aforementioned vignette illustrates the lack of innovation in BSMCs in terms of technology. For asymmetric warfare, the most effective evacuation vehicle for wounded people is an armored ambulance. The use of such armor is necessitated for two reasons. First, in this type of warfare insurgents use unconventional tactics to offset their own weakness in firepower. Such tactics may include the targeting of ambulances which are seen by the enemy as less risky than attacking a tank or similar vehicle. However, for much of the past 20 years the medical community mainly has primarily relied on unarmored ambulances, which cannot be safely used in the unpredictably violent context of asymmetric warfare. Instead, medical personnel frequently have relied on improvised solutions, such as the use of the HMMWV guntruck.

In addition to such on-the-ground improvisation, the Army has relied upon interim or rapid “fielding” solutions (RFI), which issues equipment to units in a much shorter timeframe than the slower conventional equipment development and implementation (or fielding) cycle which is based on rigid timelines and more applicable to peacetime. These wartime solutions do not represent true innovation for AMEDD, but rather the larger Army who requested such vehicles, outside the traditional methods, to be used as a multipurpose vehicle rather than explicitly as an ambulance.

One such success in short-term interim methods has been that the Army began issuing the majority of ground forces MRAP ambulances which due to their “V-shaped” floor are more resilient to improvised explosives (IED) attacks than flat-bottomed vehicles. However, even within this success there have been shortcomings. Such vehicles were issued nearly five years after the September 11, 2001 attacks. In addition, MRAPs are only issued to units once they arrive in the area of combat operations. Prior to

deployment, they generally receive training on the limited numbers of MRAP vehicles allocated for training purposes at their home stations.

A second interim vehicle production method has been demonstrated within the interim Stryker brigade combat teams (SBCT). These units developed by General Eric Shinseki in 2000 were designed to fill a critical gap between lighter infantry forces which were rapidly deployable, and heavily armored brigades with more firepower. This concept which utilized a combination of lighter armor and allowed for more rapid deployment filled the gap in modern counterinsurgency warfare. The first such brigade deployed to Iraq in 2003, and utilized an ambulance variant of the Stryker vehicle (medical evacuation variants of the Stryker, or MEVs). These ambulances exist only within those nine specialized brigades found within the Army. Furthermore, though MEVs are used by medics within each maneuver (or combat unit) at lower levels, the next level of medical care, the medical company found within the Stryker combat brigade still has access only to “soft skinned” (i.e., non-armored) M997 ambulances. Such vehicles have limited use in current conflicts due to the vulnerability of the ambulance crew in addition to any patients which precludes their use off the confines of the forward operating bases where units in Iraq and Afghanistan stage operations from. The lack of medical companies’ access to MEVs has continued despite efforts by both medical and infantry leadership to grant them such vehicles at this level. Both medical leadership at the medical company and leadership within the combat brigade have made written requests to agencies such as the Director of Force Design at Fort Leavenworth Kansas, in order to attempt to change allocations of MEVs over the last six years.⁵²

C. DOCTRINE

The mission of the brigade support medical company (BSMC) is to orchestrate battlefield medical stabilization care and evacuation to larger fixed facilities, if necessary. At the lowest levels, we find medics assigned directly to combat (maneuver) units of

⁵² The latest such concern was voiced by Command Sergeant Major Bjerke during “2010 Arrowhead Operations Warfighter Summary,” forum, <http://www.dtic.mil/ndia/2010combatvehicle/8WarFighterPanelCSMAAlanBjerkeUSA.pdf> (accessed February 12, 2012).

battalion size which provide initial lifesaving measures and stabilization. This level of care is referred to as Role I care. At the next level, or Role II, we find the first company-sized, or self-contained functional medical unit, the BSMC. This battlefield medical unit is located within the support battalion, and manned by approximately 70 soldiers. These personnel provide more definitive medical provide care to the approximately 4,500 soldiers within their assigned combat brigade, and also doctrinally provide reinforcements as needed to the Role I levels found within the maneuver units.

Even in cases in which the larger Army has provided interim solutions such as MRAP ambulances to compensate for AMEDD's stalled efforts to facilitate armored ambulance production, doctrine to support such technology remains incomplete. In the case of the Stryker brigade, in 2007, while the newer MRAP ambulances were being distributed to medical units in theater, Stryker brigades were omitted as they already possessed the M1133 MEV. The rationale for such an omission was that, in the aggregate, such Stryker brigades already possessed sixteen total armored MEV ambulances, all of which are assigned to medics within the maneuver, or combat battalions. However, the BSMC within the support battalion was not authorized these armored ambulances. Instead the BSMC was still allocated the older thin-skinned ambulances as part of its official Modified Table of Organization and Equipment (MTOE). This document is generated by the Army in conjunction with the AMEDD, and which officially allocates respective amounts of equipment and numbers of personnel to each Army organization.

The flaw in doctrinal innovation is illustrated by the fact that after a decade of conflict and multiple deployments by Stryker brigades, every BSMC with no exception upon deployment, has formally identified the lack of armored ambulances, through multiple venues to include what is known as an Operational Needs Statement (ONS) through documentation assistance review team (DART) beginning in fiscal year 2004. However, in spite of such repeated requests, such a shortfall has yet to be filled other than

in an interim and inconsistent fashion through MRAP ambulance production.⁵³ Hence, in the instance, the combat brigade in the aggregate possessed armored ambulances, as well as Stryker MEVs, thereby being technologically sound, but doctrinally flawed in that its next level of medical care, the BSMC did not.

D. TECHNOLOGICAL INNOVATION AND DOCTRINE

This analysis will now begin by examining the simplest and most tangible form of innovation, that of technological adaptation. In doing so, it will first propose that such innovation is inextricably connected to the other form of innovation, doctrinal innovation, which serves as the focus of the final section of the chapter.

The modern U.S. Army must be able to mitigate risk and anticipate the requirements of the future battlefield, and then determine how it will best provide medical and logistical support to combat forces within such parameters, performing under a spectrum of battlefield conditions both in linear and in the complex asymmetric battlefield of counterinsurgency operations. In order to facilitate such efforts, U.S. Army combat forces must possess a combination of both heavy tracked and wheeled ambulances for use within Heavy Brigades, which consist of tanks and other heavily armored weapons, and similarly robust firepower. In addition, ground forces must possess a compliment of more rapid, lighter wheeled vehicles to operate within its light and interim (Stryker) combat forces, or to operate in rear areas of the conventional battlefield where there is less likelihood of being fired upon by the enemy.

Such dual capabilities requirements must then drive the development of new vehicles to parallel the pace of combat vehicle development in terms of speed, agility, and survivability. Currently, the Army has relied primarily on incrementally upgraded Desert Storm-era ambulances which compose the bulk of wartime medical support. In

⁵³ MEVs were requested by 172d, 3-2, and 1/25 Stryker Brigade Combat Teams based on requirements in Army doctrine found in Field Manual 4-02.6 *The Medical Company*, which requires the BSMC to provide reconstitution and reinforcement for medical assets organic to the maneuver battalions and to provide evacuation from Echelon I to Echelon II medical units (medical company in a support battalion). Without armored assets, the BSMC is not able to accomplish its mission. Such lessons have been informally transferred from each brigade's previous Operation Iraqi Freedom rotation. Currently, Stryker MEVs are the only ground MEDEVAC vehicle used for patient evacuation outside of FOBs besides MRAP ambulances.

the last few decades the U.S. Army and the civilian defense industry, in conjunction with input from pertinent internal agencies of the Army Medical Department (AMEDD), have attempted several very costly aborted efforts to create modern armored medical vehicles for the last two decades. Yet, none of these attempts have been successful in replacing its Vietnam-era fleet of tracked M113 and M577 armored personnel carriers retrofitted to be utilized as medical evacuation and treatment platforms on the forward areas of the linear battlefield.

Additional attempts at replacements for the fleet of M996 and M997 wheeled ambulances have also been met with mixed success. While there have been several false starts, and there have also been some successes. Most notably within the last decade we are seeing more innovative, yet still interim designs to support the current asymmetric fight in the form of the Stryker and MRAP ambulances. However, such innovation has been both inconsistent and problematic, hampered by a series of cost overruns and cancellations. Efforts to find an adequate solution to address such capabilities gaps in medical support of ground forces have resulted in technological success stories such as the MRAP ambulance and Stryker MEV development programs, but even though such technology exists and there is still a shortage of such vehicles.

We find multiple approaches in efforts to innovate with regard to battlefield capabilities of medical evacuation vehicles within the Army. First, we find legacy or heavy brigades which use vehicles such as tanks and which are optimally designed for large-scale interstate conflicts undergoing incremental, rather than revolutionary changes in vehicle design to address issues of command and control (C2), survivability, and maneuverability. These incremental may consist of minor adaptations retrofitted to existing ambulances, rather than entirely new vehicle designs. Examples of such incremental changes have included upgraded communications or “C4ISR” systems, such as Force XXI Battle Command Brigade and Below (FBCB2), bolt on “up-armor” kits for vehicles with design specifications which did account for such added weight requirements, and which also require larger engines to compensate for the added armor.

A second form of innovation has the more revolutionary designs manifested in the aforementioned creation of MRAP ambulance variants to be used as medical evacuation vehicles. These vehicles are then distributed or “fielded” to a wide variety of units within the Army and Marines, to then be used in interim efforts to bridge capabilities gaps on the battlefield. Finally, we see revolutionary, albeit interim changes in the medical system brought on by changes within the larger Army organization itself. We see Stryker ambulances solely internal to specialized Stryker Brigades, with digital net-centric warfare. Ultimately however, in each of these cases we find partial solutions in which technology is implemented without proper analysis of doctrine, or in which the right numbers of such vehicles are not distributed to the respective units.

This section will examine ambulance development efforts over the last two decades to support conflict across the spectrum of modern warfare. It will demonstrate that attempts at innovation have taken place during both peacetime and wartime. However, when such technological innovation does take place, two outcomes are demonstrated. First, this analysis suggests that such efforts are the result of unconventional innovation processes, rather than traditional institutional methods of development and implementation. Second, it suggests that when ambulances are successfully produced, they are a byproduct of a larger innovation process to develop new combat vehicles to support doctrine, rather than a directed effort to specifically produce new ambulances.

Such observations will demonstrate that in accordance with the James Russell, who in Chapter II suggests that for logistics forces innovation happens from the bottom-up, during peacetime.” While medical units are not addressed in scholarly texts, such an observation is evidenced within periodicals, in which medical personnel provide wartime insights from new doctrine learned on the battlefield. Yet as evidenced here, in the case of the AMEDD, new ambulances only came to fruition as an afterthought when new multipurpose vehicles were introduced. Conversely, when peacetime programs were

implemented to specifically design ambulances, such efforts resulted in cancellation due to lack of funding and emphasis by the DoD.

1. Pre-Global War on Terrorism (GWOT) Tracked Ambulances (Top-Down/Peacetime)

This time period examines efforts at ambulance production during the time period prior to the “global war on terror,” or the period following Desert Storm until the 2003 invasion of Iraq in which medical personnel did not necessarily require the same levels of survivability as in currently produced ambulances, and in which combat operations were still defined as primarily linear in nature. This effort to design new ambulances was not a new issue and not isolated to later periods of asymmetric warfare. Specific concerns of medical evacuation were noted following Desert Storm in a Government Accounting Office (GAO) report in 1996, emphasizing that efforts must be addressed at higher levels, and not simply within the medical sphere of influence. Additionally, the report noted that lack of funding was also seen as hampering modernization efforts, specifically noting the lack of funding allocated to the shortcomings.⁵⁴

The challenge of creating wheeled ambulances using a modified HMMWV has not been the only attempt at innovation in the medical community. Additionally, the creation of a replacement ambulance which could operate on the front lines of the battlefield was an ongoing effort beginning shortly after Desert Storm. Such a vehicle design specifications required armor and tank-like tracks to allow its crew to operate in parity in terms of mobility and survivability with tanks and other similar combat vehicles engaged in armored combat. Such a goal of creating a modern tracked and armored ambulance had been initiated well prior to the current focus of contemporary counterinsurgency operations. Tracked ambulances, such as the venerable retrofitted

⁵⁴ General Accounting Office, *Wartime Medical Care DoD is Addressing Shortfalls, but Challenges Remain* (Washington, DC: U.S. General Accounting Office, September, 1996), 8.

M113 armored personnel carrier, still currently in use, and first fielded in 1962, were to provide evacuation capabilities from forward areas on the battlefield to an ambulance exchange point, where casualties could either be loaded into a wheeled M997 ambulance, or be transferred to a larger M577 treatment vehicle, which is similar to a M113 evacuation vehicle, albeit with a raised rear ceiling, where physicians assistants can more easily work to further stabilize patients prior to evacuation further to areas to the rear.

Following Operation Desert Storm, the Army began experimenting with attempts to find a replacement specifically for their venerable fleet of M113 tracked ambulances. In the decades following there have been several additional attempts to modernize armored evacuation capabilities on the battlefield using the conventional and perhaps outdated spiral design acquisition program. In both cases funding was allocated, and test mockups were designed, but neither ever were mass-produced both due to lack of funding and emphasis by the DoD.

a. AMEV (Armored Medical Evacuation Vehicle)

The AMEV (M113A4) was perhaps the earliest attempt to design a new evacuation vehicle using an elongated version of the same M113 ambulance already in use. The AMEV mission needs statement was approved by the Army Deputy Chief of Staff of Operations in 1995 as well as U.S. Army Training and Doctrine Command (TRADOC), the agency responsible for synchronizing equipment, doctrine and training throughout the Army. The following year the program was allocated funding. It was hoped such a newer design would capitalize on speed, as the M113 was often too slow to keep up with supported units. In addition, the newer design used modern communications using the Medical Communications for Combat Casualty Care (MC4) system. With this system, personnel shared and transmitted patient data to the aid station

as the patient was being evacuated off the battlefield.⁵⁵ The new design was also meant to rectify the cramped interior space for patient care en route, and for additional storage of medical supplies. In 1997, efforts were made to include a similar test vehicle in the Army Warfighting Experiment to further define capabilities requirements. However, the program was cancelled and no more funding was allocated, in spite of the fact that the rest of the heavy brigade combat vehicles went through a modernization program, with newer versions of Abrams tanks and Bradley fighting vehicles (BFV), which further exacerbated the already slow Vietnam-era medical assets currently in use. Due to this imbalance, the efficacy of medical support being able to maintain momentum in battle remains questionable at best as noted even as early as 1995 in the DoD “*Medical Readiness Strategic Plan 1995–2001*” in describing deficiencies of evacuation assets used during the Desert Storm Campaign, and which are still in use today, albeit with incremental modifications.⁵⁶

b. AMTV (Army Medical Treatment Vehicle)

The AMTV represents yet another failed attempt to create an armored and tracked ambulance using conventional Army procurement methods. Prior to General Dynamics being awarded the contract for the Stryker in 2000, the U.S. Army Medical Materiel Activity (USAMMDA) was again working in conjunction with DoD agencies on yet another revision of the cancelled AMEV design based on the BFV. The Army began investigating the need for a newer ambulance, and began work on a modified multiple launch rocket system (MLRS) M270 tracked vehicle, which was in turn a modification of the BFV chassis. The Armored Medical Treatment Vehicle (AMTV) was considerably larger than either the M113 or the AMEV, with almost an identical silhouette to the MLRS. The design had considerably much more room than either of the aforementioned systems allowing much more invasive patient care enroute, unlike the M577, of which requires setup of a tent-like structure off the rear section,

⁵⁵ Elizabeth T. Beckley, “Cyber Medics: Dependable IT at the point of care proves to be a critical component of health service on the battlefield.” *FedTech Magazine* (May 2009): 1.

⁵⁶ Stephen C. Joseph., Assistant Secretary of Defense, *Medical Readiness Strategic Plan* (Washington, D.C: Department of Defense, 1995–2001), iii.

rendering it capable of true patient care only when stationary. Internally, it also allowed for current Command, Control, Communications, Computers, Intelligence, Surveillance and Reconnaissance systems (C4ISR) with supported units, and medical specific command and control (C2) to include telemedicine interface, such as Medical Communications for Combat Casualty Care (MC4). Like both versions of the AMEV, the AMTV was also cancelled prior to entering production, as once General Dynamics was awarded the contract for the Stryker wheeled vehicle, USAMMDA's Integrated Product Team (IPT) who was in coordinated efforts with Directorate of Combat and Doctrine Development (DCDD) was told to cease work on the Bradley chassis based ambulance.⁵⁷

2. Pre-GWOT Wheeled Ambulances (Top-Down/Peacetime)

In the case of finding an adequate solution to the wheeled M977 and M996 unarmored ambulances, efforts instead focused on retrofit rather than replacement programs to address the lack of armor for these ambulances originally designed for rear area use on the contemporary linear battlefield where there is less likelihood of being engaged by enemy forces. While this limitation was of relatively minor concern to medical personnel during the Cold War, in which such ambulances were anticipated to operate behind areas of such danger, this capabilities gap has been exacerbated early on in both current theaters of conflict in the Middle East. These current conflicts suggest that a combination of armor and wheels are optimal for use in counterinsurgency as it allows for both speed and protection while evacuating patients.

There have been limited attempts at retrofitting armor to the older wheeled M997 ambulances. Such experimental modifications addressed both the crew area and the raised compartment in the ambulance for patients. However, these efforts were discontinued due to weight and center of gravity issues, and a lesser requirement for armored assets in such units, which even on the contemporary asymmetric battlefield, traditionally do not leave confines of the forward operating base (FOB) where they

⁵⁷ Steve W. Reichard, Project Manager, MEDEVAC MEP, USAMMA, telephone interview, February 11, 2011.

routinely operate aid stations. Understandably, since 2003, the entire M997 fleet which makes up the majority of evacuation assets in the Army, has been strictly regulated to patient transport duties inside such FOBs. Even so, we still find ongoing efforts to modify such a limited use vehicle specifically for Stability and Support Operations (SASO) missions, such as the M997A3, with modifications to its frame which allow for added weight from added armor. However, such ambulances are still unable to be retrofitted with critical patient compartment armor.⁵⁸

3. Post-GWOT Attempts at Innovation

In order to conduct an analysis of more modern design programs we will use the comparative method to examine three methods of acquisition and their outcomes throughout the last decade since the Bush Administration's initiating the Global War on Terror. The definition of the term Global War on Terror can be somewhat vague and problematic. However, in the larger context it refers to the more narrow definition of a period in which the Army addressed the threat of global terrorism through armed conflict. In addition, it specifically refers to the expectation of the Army to be able to medically and logistically support such conflict on a non-linear battlefield.

First, we will examine "top-down" Stryker innovation, and the implementation of its medical evacuation variant. Second, we will examine "bottom-up" MRAP development and development programs. Finally, we will examine programs within the conventional acquisition program, as typified by ongoing tracked ambulance development. If evidence suggests the need for more intensive examination, perhaps more detailed statistical analysis would be the next logical step to validate concerns with regard to current acquisitions programs, and the external variables which potentially affect medical transformation efforts.

a. Stryker MEV (Top-Down/ Peacetime)

The Stryker was the Army's first new vehicle since the implementation of the Bradley Fighting Vehicle 15 years earlier. The Stryker itself was not a new type of

⁵⁸ Scott R. Gourley, "Soldier Armed Tactical Medevac Ambulances: New Capabilities for New Battlefields." *Army Magazine* (May 2010): 70.

vehicle altogether, as it was a variation of the Canadian Light Armored Vehicle (LAV) which had been in use for a few years already. It also resembled the numbered series of similarly designed Soviet vehicles had been in use in decades prior to the modernized Canadian LAV. However, the new vehicle, combined with its enhanced digital capability made it somewhat revolutionary, allowing it to get inside the enemy planning cycle.⁵⁹ Such thinking parallels to German use of the tank following World War I, as the tank itself was neither developed by the Germans, nor was the initial doctrine to employ such a platform credited to Germany. Doctrinal development took advantage of a series of Stryker forums, to share information, and such additional forums were continued during deployments to share innovations which developed out of combat. Part of this ongoing synergy to develop doctrine on the fly actively included members of the medical community at the brigade combat team level both prior to, and during deployments.

The Program Executive Office (PEO) Stryker program has demonstrated one of the most critical tenets of transformation, that as an ongoing evaluation process. Since its implementation the program has conducted multiple refit and add-on programs, with the most recent being the development of the Stryker double-V Hull or DVH Stryker in an effort to provide more comprehensive underbelly protection from increasingly sophisticated improvised explosive devices (IED)s used in Afghanistan.⁶⁰ Yet another modification includes the addition of side skirts made of ballistic paneling, a response to the field-expedient HESCO barrier wire and Kevlar side skirts soldiers fashioned in Iraq.

The success of the Stryker is counterbalanced by two unresolved issues: First, there are currently a total of 73 (45 active and 28 reserve) combat brigades within the U.S. Army inventory, and only a total of seven Stryker Brigade Combat Teams, of which six are active and one Reserve Component. However, the current Quadrennial

⁵⁹ Daniel Gonzales et al., *Network-Centric Operations Case Study: The Stryker Brigade Combat Team* (Santa Monica, CA: RAND corporation) 2005, xxii.

⁶⁰ "PEO Ground Combat Systems," *Soldiers Magazine*, January 1, 2011, 13.

Defense Review proposes nearly doubling that number to a total of 13.⁶¹ Accordingly, the majority of Army forces rely on either the older ambulances or interim solutions such as MRAPs.

Implementation of this new interim brigade built around the Stryker vehicle featured an ambulance version, the M1133 MEV. Both the Stryker program and the ambulance variant were successful in terms of technological innovation. However, in the case of the MEV the doctrinal limitations to the program include two fundamental and as yet unresolved issues. The MEV variant is currently only distributed by the Army to Role I care within the combat units of the brigade, Role I care consists of first aid and immediate lifesaving measures. The BSMC level (Role II) care at still possesses the soft skinned M997s as the only means of evacuation., and retrofitted M113 tracked ambulances for medical companies in heavy brigade combat teams.⁶² Neither type of vehicle allows for rapid doctrinal reinforcement of evacuation assets from the medical company in modern urban combat. While only recently the Army has authorizations to provide MEVs to Role II care at the BSMC, were approved, currently constrained funding prohibits such efforts from coming to fruition any time in the near future.

b. MRAP Ambulances (Bottom-Up/Wartime)

Additionally, we have seen recent advances in MRAP vehicles designed for medical evacuation and in support of asymmetric warfare resulting from spin-out technology from the defunct FCS Program. In 2004, due to an increase in incidences of IED attacks, the United States Marine Corps Systems Command (MCSC) submitted a critical needs request, which resulted in a series rapidly manufactured vehicles resistant to such attacks. Unlike the cancelled tracked ambulance prototypes, the MRAP program in general has been more successful in providing an interim capability ambulance based on current needs, due to two outstanding factors. First, and perhaps the most obvious factor, there is a current capabilities requirement for a future armored wheeled vehicle

⁶¹ Department of Defense, *Quadrennial Defense Review Report* (Department of Defense, 2010), xvi.

⁶² The current terminology for levels of medical care is found within the *NATO Logistics Handbook, October 1997*, Found online at <http://www.nato.int/docu/logi-en/1997/lo-1610.htm> (accessed March 4, 2012).

which takes precedence over the future need for a much heavier (and much slower) tracked vehicle for high-intensity conflict of the future. Second, the implementation did not take the same path as the failed tracked ambulance prototypes, using an unconventional and accelerated development program. Accordingly, there has been a rapid emphasis and evolution of wheeled vehicles beginning with the M1114 Up-Armored HMMWV and the Cougar ambulance. Both of these vehicles were early attempts specifically designed to fill gaps in capabilities with later improvements in design, to include the current Oshkosh M-ATV Ambulance and BAE Caiman Ambulances.⁶³ Both of these vehicles provide rapid power evacuation capability from point of injury, especially when the risk is too high or weather does not permit use of air MEDEVAC assets. The further evolution of the now-familiar V-shaped hull continues to provide superior blast deflection to occupants of such vehicles as do evolutions in ballistic glass and electronic warfare countermeasures.

MRAP vehicle implementation represents a similar success outside the traditional acquisitions timelines of DoD programs in which the “bottom-up” method of innovation was used by both the United States Army and Marines in their successful requests for interim solutions. Requests for the MRAP were initiated by officers at lower levels through reports which suggested a critical need for a vehicle capable of resisting mines and IED threats. The MRAP was then developed, tested and issued to units on a much shorter timeline than if it were developed from the top-down through conventional methods. Shortly thereafter the vehicle was then further modified for other specialized functions, of which have included several variants were specifically designed to be used as medical treatment and evacuation vehicles to address the current critical needs of asymmetric warfare. Unlike the Stryker MEV which is unit-specific, these vehicles were designed to fill the role of evacuation throughout multiple types of units, from Special Operations Forces (SOF), to conventional brigade combat teams.

⁶³ Kris Osborn, “New MRAP Ambulance Prototypes: Many Improvements,” *Army News Service*, November 18, 2010.

c. Post-GWOT Conventional Methods (Top-Down/Wartime)

This section will demonstrate that in parallel to bottom-up efforts to develop wheeled armored ambulances, the Army as part of a joint effort across the services, intends to redesign its larger fleet of multipurpose HMMWV and transition to a vehicle which has broader applications in both armored and unarmored versions. As this next section will again demonstrate, ongoing issues persist with regard to innovation for asymmetric warfare. Not only has innovation of these ambulances been slow, but the JLTV project itself has been backward with regard to medical innovation. Specifically its focus on any kind of unarmored ambulance in the current battlefield environment represents a failure to adapt.

Wheeled ambulance evolution using conventional methods continues to repeat similar design shortfalls regardless of a decade long conflict of lessons in non-linear combat. The current Joint Light Tactical Vehicle (JLTV) program is an effort to replace the ubiquitous High Mobility, Multi-Wheeled Vehicle (HMMWV) across the military services. However, the program repeats such capabilities shortfalls found in the current M997 ambulance in that the new ambulance variant of the vehicle is once again unarmored. In addition, in an all-too familiar turn of events, the entire JLTV program is now threatened by cancellation due to cost overruns in addition to weight concerns.⁶⁴

Over the last few decades, the use of the tracked BFV chassis as an potential candidate for a future ambulance has been the focus of subsequent attempts to re-initiate production efforts, as a functional variant within the now defunct Future Combat Systems, and finally the latest attempt being the BAE Medical Variant of the Ground Combat Vehicle program, both of which have yet to produce an armored tracked ambulance capable of survivability in countering potential future threats on the high-intensity conflict battlefield. The GCV is at risk of yet another cancellation due to budget limitations.⁶⁵

⁶⁴ Andrew Feickert, *Joint Light Tactical Vehicle (JLTV): Background and Issues for Congress* (Washington, DC: Congressional Research Service, January 3, 2012).

⁶⁵ Kate Brannen, "Budget Limits Efforts to Add, Upgrade Vehicles," *Army Times* (January 2011): 2.

The Ground Combat Vehicle (GCV) Program once again revived the cancelled Future Combat Systems (FCS) Program as a nearly identical program, using nearly the same government defense contractors, under a different acronym, in the attempt to provide a modernized tracked medical variant for heavy brigade use in high intensity conflict.

However, an examination of the current prototype reveals some repetition of mistakes of previous modernization efforts as illustrated by Chris Demchak in an allegory using the new M1 Abrams tank program in the early 1980s. When compared to its less complicated predecessors, the design, initial testing and issuing process was accomplished by civilians, and Army was not nearly as involved with the intricacies of the design of the tank itself, but rather the monitoring of the program and final testing.⁶⁶ Such an allegory can be made with modern attempts in developing a new tracked ambulance through recent defense contracts. According to BAE's publicly released specifications, the top speed of the tenuous future evacuation vehicle is still only 40 miles per hour;⁶⁷ such a capability of a cutting edge ambulance is actually slower than the current maximum speed of the M113A3, an incrementally upgraded vehicle designed prior to the Vietnam War. Additionally, modification requests by medical personnel with combat experience have not been met. Such additions have included mounts for defensive small arms and air guard hatches for security. In particular, the latter two programs were an effort to address known threats and limitations and were requested by brigade level medical personnel.

4. Technological Intersection and Disparity (Medical and Logistics Companies)

The majority of analysis thus far has been focused on medical vehicles. However, both the medical community and the logistics communities at the brigade combat team share similar missions in that they are both required to operate and survive under a variety of conditions like their combat arms counterparts, whether it be an asymmetric

⁶⁶ Demchak, *Military Organizations, Complex Machines*, 48–49.

⁶⁷ BAE Systems, *Ground Combat Vehicle Medical Variant Technical sheet*, BAE Systems, 2009.

battlefield, a more linear high intensity conflict, or stability operations during a low intensity conflict. In doing so, both units have the challenge of conducting either logistics missions or medical support with limited firepower and in which they must perform skilled tasks such as repairing or recovering damaged vehicles, or stabilizing an injured patient for transport to definitive medical care. In order to be able to accomplish this mission they must first survive uncertainties on the battlefield itself.

However, there is a telling disparity with regard to the nature of survivability requirements in the comparison between the medical company and the other two respective logistics companies in the support battalion. Unlike the medical community, logistics companies within the support battalion man a wider variety of vehicles and such tasks, while demanding, have much different requirements than the transport of wounded human beings.

For the purposes of simplification, logistics units provide sustainment, or critical life support needs on the modern battlefield using two methods. They distribute various classes of supplies to include fuel, water, and repair parts, and other consumable goods in order to sustain troops, their equipment and the vehicles they use in combat. In addition, logistics units organize routine convoys which provide maintenance and vehicle recovery teams both on major forward operating bases, in order to repair and maintain vehicles.

This analysis will examine two logistics vehicles used by the support battalion, the Heavy Expanded Mobility Tactical Truck (HEMTT) series issued to Army units in 1982, and the Family of Medium Tactical Vehicles (FMTV) similarly distributed to Army units in the mid-1990s. Similar to the outdated M997 wheeled ambulance, both vehicles were designed and distributed to units prior to the Global War on Terror (GWOT). However, both the HEMTT and the smaller FMTV were designed prior to the GWOT, they still possess the required capabilities in their logistical support roles, to include the HEMTT's use as a Palletized Loading System (PLS) which delivers bulk supplies, a heavy wrecker, as well as a transporter of bulk fuel. The FMTV, also provides transport of supplies and can be armored for use in Iraq and Afghanistan. , its vehicles designed in the 1980s-90s were already largely sufficient for the asymmetric

context. However, this LSAC innovation was critical for the new context, and Logistics was able to innovate by doing the LSAC change.

Both medical and logistics vehicles share the need for armored crew areas, such as in the case of the modern FMTV which has recently seen modifications such as the Low Signature Armored Cab (LSAC) armor for its occupants beginning in 2004. How can such disparity exist between such logistics and medical evacuation vehicles exist, when given similar timelines and operating environments?

Key to such analysis are the additional requirements for Army ambulances when compared to vehicles used by logistics counterparts. Conversely, in the case of the ambulance there has been a less concentrated effort to produce similar retrofitted and modern armor. This is primarily due to the more difficult problem of regardless of whether the cab is upgraded with armor, the fact remains that the vehicle still cannot leave the confines of a FOB. Such a stipulation exists for one overarching reason, specifically, the requirement of armor for protection of the “cargo” or, in this case, the injured personnel who must be transported in the thin aluminum rear of the vehicle. However, such protection is not required for simply transporting logistics cargo, which has made the ability to retrofit such vehicles much easier. Consequently, due to such a lesser requirement in terms of technological complexity, the logistics community has done a better job of adapting to the new threat environment. In conclusion, it is apparent that the requirements for logistics contrast with the AMEDD in terms of technological innovation requirements.

E. OPERATIONAL INNOVATION AND DOCTRINE

1. Formal Doctrine

Once of the primary measures of adaptation that will be used in this research study is operational innovation consisting of formal doctrine. Within the AMEDD, doctrine should ultimately impact the execution of training of its medical personnel, how its subordinate organizations are manned and organized, and how it equips the organization, both in terms of equipment capabilities and in its numbers. As AMEDD is a support organization, it must be aware of how combat forces doctrine is continuously

evolving, and mirror its capabilities accordingly in order to properly support its combat forces counterparts. Such innovation may be measured in the development of the interrelated concepts of both training and doctrine of which exist as the formal written version. Formal doctrine can be conceptualized as both the culmination and continuation of the AMEDD's body of knowledge and from which leaders draw their knowledge base in the execution of their duties.

To facilitate such efforts throughout the organization there three layers of doctrine which are then used to synchronize the three layers of war, that of the tactical, operational, and strategic levels. Even with regard to the AMEDD as a support organization, such differentiation in levels of doctrine is critical, as the AMEDD must support such operations at each level. While this study suggests gaps in execution of doctrine at the tactical and operational levels, it also suggests a portion of the issues stem from failings at the strategic level. However, many of these concerns are outside the scope of even the AMEDD itself.

There are some external constraints both with regard to doctrine production within the AMEDD and its contribution to higher levels of doctrine outside the organization. Such comparison requires examination against two interrelated comparisons. First, when comparing the timeliness of AMEDD formal doctrine when compared to the larger Army organization, there is an inherent delay in AMEDD doctrine production, as it which must wait for the Army to create its own revised formal doctrine and then parallel such tenets. However, such delay still does not adequately explain the inherent disparities between the AMEDD its logistics counterparts.

Since military operations commenced in Afghanistan and Iraq, there have been internal and external expectations for a paradigm shift within the military as a whole, as echoed in the previous administration's issuing *Department of Defense Directive 3000.05* in November of 2005, which placed nation-building on the same priority as combat operations.⁶⁸ Implementation throughout a large bureaucracy takes considerable time

⁶⁸ Center for Strategic and International Studies, "DoD Directive 3000.05, One Year Later," December 11, 2006, <http://csis.org/event/dod-directive-300005-mdash-one-year-later> (accessed June 7, 2011).

within the context of the larger Army organization. This further complexity of requirements has increased the tasks all Army forces must be adept at, thus requiring combat forces to innovate and change their formal doctrine. This creates an additional lag, as once combat forces have codified their own doctrine, both medical and logistics organizations in supporting roles must now mirror how they will best support such newly codified efforts.

In previous chapters proponents of top-down doctrinal development have suggested that large changes to doctrine are primarily successful when implemented from senior leadership at institutional levels. An oft used example has been that of General De Puy who wrote the new *Army Operations Manual* after assuming command of TRADOC in 1976, yet such an example when given a second glance illustrates shortcomings in that the new doctrine when introduced addressed only one enemy, in one locale, Specifically that of the Soviets, during the Cold War.⁶⁹

a. AMEDD and Sustainment Doctrine (Top-Down Efforts)

The most current definition of Army health service support (AHS) in formal AMEDD doctrine, from Field Manual 4.0 *Sustainment*, is “all support and services performed, provided, and arranged by the AMEDD to promote, improve, conserve, or restore the mental and physical well being of personnel in the Army.”⁷⁰ Of critical importance in the most current version of the aforementioned text, is the relinquishment of the entire doctrinal development function to the separately managed organization. Sustainment as a military concept may be seen as the bridge between the larger joint or cross-services support of combat and Army logistics.

While both the logistics community and the AMEDD organizations may share information to a certain extent, the task of synchronizing healthcare under Sustainment can be problematic if the AMEDD is one the only function found under Sustainment which as organization is completely separate, not only in terms of doctrine production but the only Army agency geographically separated at Joint Base Sam

⁶⁹ Adams, *The Army After Next*, 16–18.

⁷⁰ Department of Defense, *Field Manual FM 4–0, Sustainment* (Washington, DC: Department of Defense, April 2009), 1–4.

Houston in San Antonio Texas. Published doctrine demonstrates such shortcomings in that if one examines publications from within Sustainment and the AMEDD, it is the latter which is lagging behind in medical doctrinal terms.⁷¹ When compared to the logistics community at these lower levels, one finds lessons learned in combat by the logistics community are being transferred into higher Army-wide institutional levels into formal doctrine. Modern logistics doctrine is even found in larger Army publications such as *FM 3–24, Counterinsurgency Operations*, and within documents which address Army-wide technological transformation efforts.⁷² Conversely, medical content within the manual is limited to its mention only, rather than the entire chapter dedicated to logistics. Stryker doctrine is now being transferred into formal doctrine, yet the latest version of the medical company field manual, Field Manual 4–02.6, 2002, reflects the outdated 1997 version with minor changes, such as the mention of employment within the Stryker brigades. In addition the BSB manual appears to be updated.

b. Medical and Logistics Formal Training as Doctrine Rehearsal (Top-Down)

There is evidence to suggest the way in which the Army trains for war or rehearses its own doctrine is perhaps even more important than its formal written doctrine. In the case of the AMEDD, its inherently complex nature as an organization may be inhibiting its personnel from being adequately incorporated into realistic large-scale training, and it may be challenged to adequately articulate such a shortfall. This may be problematic as such realistic training may in many cases be the decisive factor or tipping point between training and technology. Such a claim has been voiced by Thomas K. Adams that the United States only recently developed the capacity for large-scale realistic training and in many cases training, not technology has been the deciding factor

⁷¹ *Field Manual (FM) 4–02.6, The Medical Company*, published by the AMEDD refers to levels of medical care as the older Echelons I and II Combat Health Support (CHS), while *FM 4–90, Brigade Support Battalion, August 2010* which is instead published by the logistics proponent at Fort Lee refers to the same levels of care by their more current joint or NATO terminology, as Role 1 and 2 Army Health System (AHS) support.

⁷² U.S. Department of the Army, *Counterinsurgency Operations. Field Manual (FM) 3–24* (Washington, D.C: U.S. Department of the Army, December 2006); Examples of Army transformation efforts found in: U.S. Department of the Army. *The Army 2010 Tactical Wheeled Vehicle (TWV) Strategy* (Washington, DC: Department of the Army, 2011).

in winning on the modern battlefield.⁷³ In his latest work, he provides a poignant example of how Marines using obsolete M60 Vietnam-era tanks achieved the same kill ratio as American Army soldiers using M1 Abrams tanks during Operation Desert Storm to illustrate such a point.⁷⁴ Such a claim when combined with the inherent organizational separateness of the AMEDD, both with regard to doctrine production, and as this text will demonstrate its organizational dissimilarity makes synchronization of such medical units into larger training events extremely difficult. It is Adams claim that is at the core of the matter on the importance of training and lack of innovation.

While the AMEDD has developed elaborate simulations internal to its own organization, it remains challenged to incorporate such simulations into larger combat scenarios involving non-medical personnel and which avoid the reliance on outdated linear doctrine. Even as late as 2006, one finds such linear battlefield rules incorporated into the National Training Center at Fort Irwin, CA, in which “wounded” personnel had to travel to each echelon of care in sequence as though the organization were fighting on a linear battlefield.⁷⁵ It is acknowledged that it is no simple task to simulate such realistic training on a grand scale, and it is much more difficult to realistically combine such training into simulated asymmetric warfare. By inference then it is perhaps even more challenging than is to simulate medical training using obsolete vehicles in such a non-permissive environment.

The AMEDD is extremely adept at conducting training within a lab, or conducting a portion of a medical scenario within a larger event, but rarely do such exercises work well. With regard to the former, the RAND Corporation notes that when such event took place the medical unit did not participate in the simulation in the same capacity as the other forces. Instead the medical unit took part in a “tabletop” exercise and incorporated technologies of which had not been fielded yet, such as “bio-stasis

⁷³ Thomas K. Adams, *The Army After Next: The First Postindustrial Army* (CT: Praeger, 2006), 27–28.

⁷⁴ *Ibid.*, 28.

⁷⁵ Authors observations in which the 3–2 SBCT was assessed at the National Training Center prior to deploying to Iraq in 2006. National Training Center Fort Irwin, CA.

Pods” but were assumed to be available on the battlefield of the near future.⁷⁶ While such forward thinking is clearly admirable, it is apparent that the AMEDD in conjunction with personnel at RAND have focused efforts inordinately on the battlefield of the far, rather than the immediate future.

c. Logistics

In contrast to the medical community, as a branch Logistics has demonstrated an impressive capacity to adapt doctrinally to prepare for asymmetric warfare. In particular, we find evidence of such learning found within current doctrinal publications, in the use of armored logistical support vehicles, and in the techniques practiced during training exercises.

The tenets of logistics are more readily simulated into training events at the brigade combat team (BCT) level due to a variety of factors including the reality that logistical support based predominantly on forecasting rather than managing crisis. During routine training exercises tanks will continue to consume fuel, troops will need to be provided food and water, and vehicles will break. Such tasks will require that logistics units forecast and distribute such supplies within the combat brigade it supports. While such evidence clearly supports that the logistics community has succeeded in innovating doctrinally for asymmetric warfare much more than its medical counterpart AMEDD, there is an important caveat to be made. Replicating wartime scenarios for the medical units is much more challenging task. Innovation within AMEDD in terms of training, for the asymmetric reality, demands obvious, major challenges that logistics does not face. Due to the emergency nature of much of the work of medical units, it is also much more difficult to simulate medical support training than training for logistical support. Medical assets such as MEDEVAC helicopters at large training sites such as the National Training Center at Fort Irwin California are understandably hesitant to utilize MEDEVAC helicopters for training rather than maintain such aircraft on standby in the event they are required for transport of real rather than simulated patients. When such aircraft are used

⁷⁶ Gary Cecchine, David E. Johnson. *Conserving the Future Force Fighting Strength: Findings from the Army Medical Department Transformation Workshop 2002* (Santa Monica, CA: RAND Corporation, 2004), 34.

during such training it is on a limited basis for a number of reasons in addition to the limited flying hours. Evidence supports more instances of logistics personnel being fully incorporated into large training exercises. It is acknowledged that some of this is due to lesser degree of complexity in that such materials are generally less perishable in nature. For example, while transport of ammunition and foodstuffs must be accomplished under certain conditions, such supplies do not require the controlled conditions of medicines, whole blood, or live patients requiring care enroute.

F. CONCLUSION

This section has provided a number of negative outcomes which demonstrate the disparity in levels of adaptation between logistics and medical counterparts which support combat brigades. While this disparity remains evident in linear combat, conditions are exacerbated when laid against the broader range of requirements for asymmetric combat. Such disparity is evident in terms of its formal doctrine in which lessons learned by logistics leaders seem to be captured and incorporated within not only publication dedicated to such tenets, but also within larger Army publications.

In addition, we find while there are some notable exceptions within Stryker brigades and in use of MRAPs, that ambulances used by AMEDD personnel are decades behind in terms of battlefield capabilities when compared to logistics vehicles. In addition, it is ascertained that while both medical and logistics personnel learn new doctrine during wartime and that such learning occurs primarily from the bottom up and within combat brigades. While there is almost no academic literature on the subject of support forces at this level, the tenets used in the larger study of military innovation provide a rich source of theory to apply to this study. Accordingly, the subsequent chapter will conduct an analysis of learning as either taking place during wartime or peacetime and from either a top-down or bottom-up perspective. This study will also advocate that organizational complexity also plays a pivotal role in explaining such disparity, between the medical and logistics communities.

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IV. AMEDD AND LOGISTICS BRANCH: A THREE-PRONGED COMPARATIVE ANALYSIS

A. INTRODUCTION

This chapter shifts from describing the disparity between logistics and medical units within the support battalion in terms of adaptation to explaining that disparity.

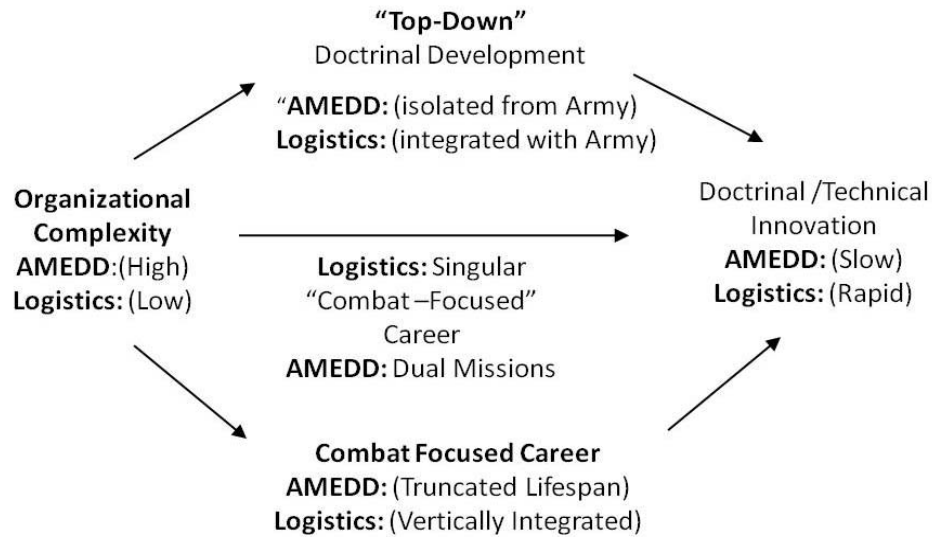


Figure 2. Theoretical Framing and Argument

The causal argument, summarized in Figure 1, draws on literature reviewed in Chapter II. In particular, the analysis applies general theories about military innovation and military organizational dynamics to medical and logistics units within combat brigades. The analysis rests on Chris Demchak’s insight that, while complexity itself creates an inherent learning burden upon an organization, such a phenomenon is seldom studied as an independent variable.⁷⁷

A first step in the causal story for why AMEDD has largely failed to innovate is to investigate AMEDD’s high level of internal complexity when compared to its logistics

⁷⁷ Chris Demchak, *Military Organizations*, 15–16.

counterpart. AMEDD's multi-function character has made innovation difficult both from the bottom up and from the top down. AMEDD's organizational complexity has substantially weakened its capacity to learn and adapt. AMEDD is responsible not only for moving people and medical equipment during wartime but also for treating those people and treating military personnel from all services, their families, and retired military personnel in large hospitals in the United States and abroad.

The complex nature of AMEDD has in part contributed to the isolated way in which AMEDD has examined its own doctrine, thereby slowing the top-down learning process. On the other hand, the fact that AMEDD is a complex organization has also prevented bottom-up capturing of lessons learned at the brigade level. Because AMEDD is responsible for many tasks other than staffing low level units during wartime, medical officers who gain field experience do so for only a short period of their career, as low-ranking officers who to a certain extent, have both little time and little sway in influencing doctrine or AMEDD practices. Furthermore, those junior level officers serve under a logistics commander, who diverts the lessons learned within the medical company into logistics publications, further stifling bottom-up learning. Though the focus of this analysis, and the broader thesis, is on AMEDD's failure to innovate, a final part of this analysis will highlight how the complexity of the AMEDD organization has not only interfered with AMEDD's innovation but that it has also impeded the training and performance in the field of BSMCs.

B. KEY INDEPENDENT VARIABLE: ORGANIZATIONAL COMPLEXITY

The fragmented mission of the AMEDD when compared to the logistics community is exemplified by its two dissimilar medical support missions. One of the primary missions of the AMEDD is its mission to provide medical care to the entire Army in addition to family members and retirees, a total of over three million beneficiaries both within the United States and abroad. In providing care it must adhere to the identical requirements of its civilian healthcare counterparts within the fixed medical treatment facilities it maintains both within the United States and abroad. It is this role which is the most complex and resource-intensive portion of its support role. In

order to execute such a support mission it manages and provides oversight to eight major hospitals and many smaller medical facilities within the United States. Comparably large medical facilities may also be found globally, wherever there are concentrations of military personnel and their families. When compared to its respective civilian counterparts, the AMEDD, is ranked as the fifth-largest healthcare system globally.⁷⁸ Yet its composition is such that 65% of its manpower is found in the Reserve Component of the Army, a fact which adds further complexity to the organization.⁷⁹

A disproportionate emphasis is not surprising these two nearly separate missions, and given the fact that its wartime mission of providing care to soldiers in combat, while also of importance, is comparatively less complex in terms of resources, people, and oversight than the operation of fixed facility hospitals. Consequently, such dual roles ultimately divide its manning, focus, and training in a variety of ways which are not applicable when compared to its logistics counterparts.⁸⁰ In addition to fixed medical facilities, it also provides medical care for deployed forces worldwide, both during peacetime and wartime. With regard to the latter, the AMEDD is specifically prohibited from degrading its fixed facility mission to support its wartime role.⁸¹

The AMEDD as an institution is one of the most complex organizations within all branches of the military, as exemplified by the fact that 31 out of 99 executive agencies found within the Army fall specifically under the purview of the AMEDD.⁸² Even its leadership is “dual-hatted,” with the Surgeon General of the Army responsible for two critical leadership roles, as the head of both the AMEDD and the MEDCOM. The

⁷⁸ U.S. Medicine: The Voice of Federal Medicine, February 28, 2012. <http://usmedicine.com/outlook/maintaining-troop-readiness-after-more-than-a-decade-of-war.html> (accessed February 29, 2012).

⁷⁹ Gary Cecchine et al., *Army Medical Strategy, Issues For The Future* (Santa Monica, CA: RAND Corporation, 2001), 21.

⁸⁰ The Military Health System Strategic Plan: A Roadmap for Medical Transformation <http://fhp.osd.mil/pdfs/MHS%20QDR%20Medical%20Transformation%20Roadmap.pdf> (accessed February 22, 2012).

⁸¹ Lois M. Davis et al., *Army Medical Support for Peace Operations and Humanitarian Assistance*, (Santa Monica, CA: RAND Corporation), MR-773-A, 1996. Online at http://www.rand.org/pubs/monograph_reports/MR773/index.html (as of July 2006).

⁸² Army Resources and Programs Agency, Office of the Administrative Assistant to the Secretary. 2004.

AMEDD has been given a wide scope of responsibilities given its size, and each mission is manpower intensive, broad in scope, and inherently technical in nature. The only other Army organization which provides such a large mission outside the confines of the military is the Army Corps of Engineers.⁸³

Exacerbating such broad mission scope is the somewhat small size of the AMEDD disproportionate to its counterparts. Given its the AMEDD, or those affiliated with the Army Medical Regiment is one of the smallest branches, when compared to the Logistics Branch as well as other branches of the Army. If reduces numbers to active duty personnel and examines aggregate numbers of personnel, the logistics branch contains over 149,188 total personnel compared to only 15, 315 within the active duty AMEDD.⁸⁴ This is due to its specialized nature, that of providing healthcare to military personnel, retirees, and family members of military personnel, which are known as dependents. Similarly, a 2011 demographic study provided by the Office of the Surgeon General (OTSG) compares the AMEDD division of labor and the results show that over 72% of its officers are found within the MEDCOM, and away from the battlefield level of focus. (see Figure 2). Such a figure is exacerbated considering that the majority of these officers are assigned in functional medical brigades rather than the current 45 active-duty combat brigades within the Army. In the case of the latter we find between 10–12 Medical Service Corps Officers per brigade ultimately responsible non-clinical medical functions such as medical planning and operations. This number would allow for between 320–450 Medical Service Corps officers conducting this function throughout the Army at a given time.

⁸³ Frank Camm, Cynthia R. Cook et al., *What the Army Needs to Know to Align Its Operational and Institutional Activities* (Santa Monica, CA: RAND Corporation, 2007), 248.

⁸⁴ Defense Manpower Data Center, Active Personnel Master Files, as of September 30, 2011 (provided October 31, 2011).

	MEDCOM	NON-MEDCOM	AMEDD (TOTAL)	MEDCOM %
OFFICERS	11,948	4,585	16,533	72.27%
ENLISTED	14,447	21,967	36,414	39.67%
CIVILIAN	41,790	1,223	43,013	97.16%
TOTALS	68,185	27,775	95,960	

Table 1. Division of Labor within AMEDD⁸⁵

C. SEPARATENESS AND TOP-DOWN DOCTRINAL DEVELOPMENT

The complex nature of AMEDD seems to have facilitated AMEDD’s marginalization in relation to the larger Army, which perceives many issues central to the AMEDD as simply “medical issues.” This perception of the AMEDD as somewhat extraneous is typified by the lack of effort by the DoD to facilitate new ambulance production, resulting in a half-dozen costly aborted attempts, spanning a 15-year period. Furthermore, and critically, AMEDD’s complexity seems to have been a barrier to integrating AMEDD’s top-down doctrinal development with the larger army, thereby contributing to AMEDD’s falling behind in doctrinal innovation in relation to the Army.

As evidence of the AMEDD’s separateness, the AMEDD is part of what consists of the three Professional Branches of the U.S. Army, the Judge Advocate General (JAG), which also consists of military legal professionals; and the Chaplain Corps. As part of the professional branches many AMEDD officers may receive what is known as a direct commission to become an officer, and additionally, they are promoted entirely within a parallel yet separate, Army non-competitive promotion structure. Such separateness is also noted in that the AMEDD is predominantly made up by MEDCOM units which manage all medical treatment facilities and, with the majority of the remaining smaller portion under field units under FORCES Command (FORSCOM).⁸⁶

⁸⁵ Data provided by Office of the Surgeon General, as of February 2, 2012.

⁸⁶ MEDCOM includes the vast majority of AMEDD units with the exception of field medical units, which includes the portions of medical personnel in brigade combat teams, which fall under U.S. Army Forces Command (FORSCOM).

In order to accomplish such a diverse mission, the AMEDD consists of six different corps to include the Medical Corps, Dental, Army Medical Specialist, Nurse, Medical Service, and Veterinary Corps. (compared to the three corps which in 2008 combined under the Logistics Branch) Additionally, within each of these Corps there are over 80 different subspecialties when only considering the officer corps. To further add to such complexity, we find the challenge of a non-linear rank structure when applied to the medical company. The Army, like its sister services is organized in a linear fashion, in which lower ranking units are commanded and consist of lower-ranking personnel. The brigade commander, or the pinnacle of leadership within the area of study, that of a brigade combat team has normally attained the rank of Colonel, and is in charge of the 4,500 soldiers under his command. His subordinates are of generally lesser ranks, with the exception of one company.

The medical company found within the brigade support battalion may have officers which are of equal rank to the brigade commander. In preparation for combat, one may find senior medical officers temporarily assigned to the medical company through the Professional Filler System (PROFIS) who have also attained the same rank as the commander of the brigade itself.⁸⁷ This system is used by the Army in order to cost manning costs, in addition to allowing medical personnel to maintain their skills by being assigned to a hospital until they are needed. This method of manning can be problematic if as Demchak suggests, a relationship between learning requirements, doctrinal development, and complexity within the current context of combat operations.⁸⁸ Demchak further posits, complexity imposes costs upon complex organizations, and such costs can be exacerbated when an organization is constrained.⁸⁹ This point is particularly poignant when examining the current status of the AMEDD in terms of manning, mission scope and complexity.

⁸⁷ U.S. Department of the Army. *Army Regulation 601-142 Personnel Procurement, Army Medical Department Professional Filler System (PROFIS)* (Washington, DC: Headquarters Department of the Army) April 9, 2007.

⁸⁸ Demchak. *Military Organizations*, 1991. 154.

⁸⁹ Demchak, *Military Organizations*, 1991. 163.

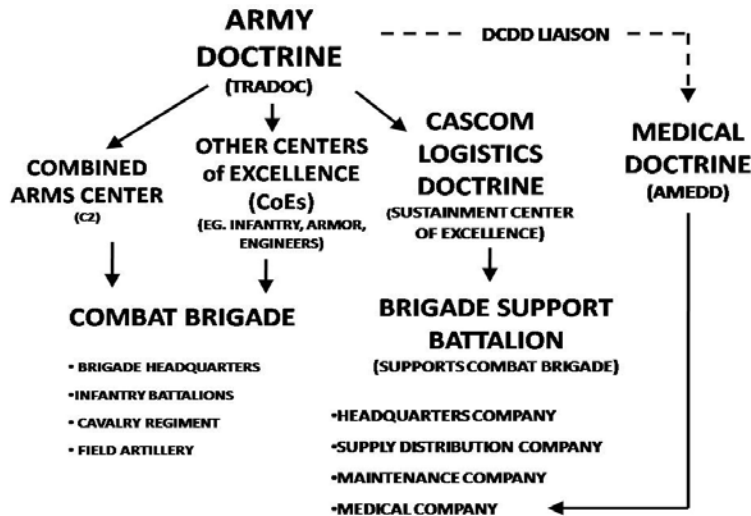


Figure 3. Top-Down Army Doctrinal Information Flow

This section analyzes top-down doctrinal development within the Army at large, AMEDD, and Logistics and shows how in the case of AMEDD doctrinal development takes place relatively autonomously. Figure 2 summarizes the organizational structure of top-down doctrinal development in the Army.

In doing so, it specifically addresses each respective agency responsible for producing doctrine, beginning with Training and Doctrine Command (TRADOC), the institution tasked with integrating doctrine throughout the Army (refer to Figure 3). Such analysis will continue in examining the respective doctrine producing agencies within the respective medical and the logistics communities, beginning with CASCOM, the respective doctrinal agency within logistics community. This portion will conclude by conducting an examination of DCDD and its subordinate organizations, which produce doctrine specifically for the AMEDD.

1. Army Doctrine

In the case of the Army, Training and Doctrine Command (TRADOC) is Army's lead agency responsible for the ensuring that soldiers, equipment and doctrine are synchronized in combat.⁹⁰ Its function was to standardize and synchronize training and

⁹⁰ Demchak, *Military Organizations*, 64.

doctrine throughout the Army. Accordingly TRADOC's mission is as follows: *Training and Doctrine Command develops, educates and trains Soldiers, civilians, and leaders; supports unit training; and designs, builds and integrates a versatile mix of capabilities, formations, and equipment to strengthen the U.S. Army as America's Force of Decisive Action.*⁹¹

Throughout the last few decades TRADOC has continued to streamline and integrate its efforts in order to better synchronize doctrine. In 1990 it created two subordinate organizations, the CAC (Combined Arms Center), which provides doctrine for command and control (C2), and the CASCOM (Combined Arms Support Command), which develops multifunctional logistics doctrine at its Sustainment Center of Excellence (CoE), to compliment the other CoEs under TRADOC which develop doctrine for each combat function.

However, there exist structural deficiencies manifested as bottlenecks in such complex processes. TRADOC has no similarly subordinate organization dedicated to medical standardization with the exception of a single individual liaison to integrate all of its medical doctrine.⁹² Similarly, a CASCOM information briefing denotes its integration responsibility to the AMEDD as a simple dotted line on an organizational chart.⁹³ The only other medical staff consists of a small surgeon's section whose role is as a medical advisory staff rather than a publisher of Army-wide medical doctrine.⁹⁴

2. Logistics Doctrine

Doctrine for the Logistics Branch is produced by Training and Doctrine Development Directorate (TDDD) which is a subordinate agency within CASCOM. TDDD is similar to its DCDD counterpart within the AMEDD, however it has combined

⁹¹ TRADOC Homepage, <http://www.tradoc.army.mil/About.asp#CommandMission> (accessed January 13, 2012). TRADOC was created in 1973, at Fort Monroe, Virginia, to address the poor performance associated with the Vietnam War.

⁹² AMEDD Combat Developer Staff Officer Duties and Responsibilities Briefing, Slide 12 (Medical Capabilities Integration Center) Joint Base Sam Houston. No date.

⁹³ CASCOM Command Overview Brief, dated 31 August 2011. <http://www.cascom.army.mil/documents/CurrentCommandOverview.pdf> (accessed March 11, 2012).

⁹⁴ TRADOC Organization, <http://www.tradoc.army.mil/images/pao/TRADOC%20organization.jpg> (accessed January 11, 2012).

its three functional areas (transportation, ordnance, and quartermaster) into a single multifunctional Logistics Branch since January 2008. It also maintains internal organizations with the responsibility of synchronizing the prurient interests of the respective subcategories of logistics doctrine such as supply distribution, and vehicle repair.

TDDD contributes both to the Army as well as to higher cross-service, or “joint” doctrinal publications.⁹⁵ However, there is no respective medical doctrine section. While such an omission is less troubling at levels where “pure” medical brigades exist, such disjointedness can be telling within a BSB where both medical and logistics units exist and for which multiple publications are pertinent. If one compares *FM 4–90, Brigade Support Battalion*, for which the proponent is CASCOM, the tenets of medical doctrine are more current both in terminology and content than respective AMEDD manuals which provide BSMC doctrine.⁹⁶

3. AMEDD Doctrine

Army medical doctrine is produced almost exclusively through the Directorate of Doctrine and Combat Development (DCDD) at Fort Sam Houston Texas, the location of the Headquarters of the AMEDD. It is where the vast majority of training takes place all officers and enlisted soldiers who are affiliated with the Army Medical Department as part of their functional area. The task of this organization is challenging given its separateness from the rest of the Army, and its current levels of manning. DCDD is directed by Army regulation to collect observations, insights, and lessons in addition to tactics, techniques and procedures (TTPs). It is also responsible for gathering After

⁹⁵ U.S. Department of the Army. *TRADOC Regulation 71–4. Force Development: Standard Scenarios for Capability Developments*. Headquarters, Fort Monroe, VA United States Army Training and Doctrine Command; CASCOM also incorporates input from the Army Medical Department Center and School (AMEDDC&S), The Judge Advocate General’s Legal Center and School, Soldier Support Institute, and their proponent schools. CASCOM, Planning Data Branch provides logistics planning data (classes of supply), per *Army Regulation (AR) 700–8*.

⁹⁶ Headquarters, Department of the Army, *FM 4–90, The Brigade Support Battalion*, August 2010. Conversely the most current (aside from a Draft 11 August 2008) *FM 4–02.21, Division and Brigade Medical Operations* is 15 November 2000. The most current version of *FM 4–02.6, The Medical Company* is August 2002.

Action Reviews (AARs), in order to effect change to manpower and equipment levels.⁹⁷ Problematic is the fact that while a nearly every civilian within DCDD has military experience, none of its veterans within the Doctrine Literature Division of the organization have ever served at the brigade combat brigade team level.⁹⁸ Such a factor is problematic when laid against Dr. Russell's previous claim that military units draw on a synergy of both formal and informal doctrine in wartime.

There are a number of AMEDD agencies which must coordinate with external agencies to facilitate new technologies in support of such new doctrine. In the case of ambulance development, TRADOC indirectly synchronizes efforts for the vehicle through DoD level programs such as the Ground Combat Vehicle (GCV) or Program Executive Office (PEO) Stryker develop the vehicle itself. The ambulance interior components are then synchronized through a number of DCDD agencies. The Medical Materiel Systems Division (MMSD) is responsible for the assisting in the development of a number of military ambulances such as the Stryker MEV, various MRAP ambulances, and the M113 tracked ambulance replacement, the Bradley Fighting Vehicle AMEV. It accomplishes such tasks in conjunction with other internal organizations such as the Medical Capabilities Integration Center (MCIC) whose function is to develop, coordinate and integrate force modernization processes within the AMEDD. In addition, it coordinates with TRADOC, the Headquarters, Department of the Army (HQDA), as well as its sister services. The Medical Materiel portion of DCDD and designs and test the interior medical portions of the vehicle.

Additional deficiencies are noted, as noted in *Field Manual 4-0, Sustainment*, which attempts to bridge Army logistics with joint Sustainment functions. Within the publication there are key discrepancies when compared to the narrower tenets of Army logistics. Army Health Support (AHS) is not considered a logistics function, yet at the higher level it becomes incorporated into the functional area of Sustainment. Compounding this is while AMEDD units actually execute medical support at both

⁹⁷ Headquarters, Department of the Army, *Army Regulation 11-33*, paragraph 3-1a.

⁹⁸ Cecily Price, Action Officer Slide Presentation, DCDD, Slide #6, Joint Base Sam Houston, San Antonio, Texas.

levels, such efforts at the brigade combat team are primarily orchestrated by leadership affiliated with the logistics branch with input by clinical medical leadership. The implication of these divided responsibilities and leadership affiliation is the potential for disjointed efforts, inherent tensions due to misunderstanding of medical operations, and possible medical support degradation.⁹⁹

An examination of AHS principles within doctrine reveals notable differences in tenets if compared with the previous logistics function. Specifically, if one examines the tenet of mobility as defined by the AMEDD within Table 2:

Tenet	Definition	Source
Mobility: (Sustainment Propensity)	The mobility <i>and survivability</i> of medical units and medical platforms must be equal to the forces supported.	FM 4-0 (April 2009)
Mobility: (AMEDD Propensity)	CHS units must have mobility comparable to that of the units they support. Mobility is measured by the extent to which a unit can move its personnel and equipment with organic transportation	FM 4-02.6 (August 2002)

Table 2. Comparison of Survivability and Mobility Definitions

Of critical importance, survivability is not even mentioned as fundamental in which the AMEDD is the proponent for specified manuals. This omission is particularly telling as we have previously noted in the analysis of the unarmored, unarmed, and slow ambulances currently found in current conventional Army inventories through conventional implementation methods, and compare them to their armored logical support counterparts. This issue is even more revealing when one examines potential ambulance prototypes currently in development to replace interim MRAP efforts. These

⁹⁹ U.S. Department of the Army, *Change 1 (Feb 2011) to Field Manual FM 3-0 Operations*, 1-1.

new vehicle designs repeat the mistakes of the past being either described as unarmored (JLTV ambulance) or just as slow as their Vietnam-era predecessors (BAE systems AMEV) as discussed in Chapter III.¹⁰⁰

As demonstrated, a potential reason for why medical doctrine (technological advancement in particular) has seemingly only progressed through outside agencies is that unlike logistics and other battlefield functions, the medical community's doctrine is developed in somewhat isolation from the larger army, as well as from its logistics counterparts. It is evident both of the latter organizations have taken major steps toward innovation for counterinsurgency in terms of doctrine as well as new technology to support such new doctrine. Demchak states a likely rationale for such sluggish adaptation: "For complex systems it takes more time to move significantly upward on the learning curve."¹⁰¹ While this separateness in doctrinal development explains a portion of sluggish adaptation, it does not fully account for deficiency as posited by Dr. Russell, who suggests that such top-down efforts are only a portion of the innovation process, and that leadership at the combat brigade level used an amalgam of formal doctrine, informal battlefield learning, and new mission requirements to create an appropriate set of procedures for combat conditions.¹⁰² Accordingly this study must delve further to find additional reasons for the causal nature of such a gap.

4. AMEDD: Lessons Learned, Lessons Lost (Bottom-Up)

In addition to the isolated way in which formal AMEDD doctrine from the top-down is hindered, a second factor explaining AMEDD's failure to innovate is found at the lower levels in Army hierarchy which affect whether or not bottom-up learning is captured in formal doctrine. As a foundation for this discussion, it is critical to establish how, due to AMEDD's complexity, few AMEDD personnel gain experience in combat settings, and those who do are not there for very long.

¹⁰⁰ Army-technology.com, Projects: JLTV, www.Army-technology.com/projects/jltv (accessed February 12, 2012).

¹⁰¹ Demchak, *Military Organizations*, 18.

¹⁰² Russell, *Innovation, Transformation, and War*, 53.

Career paths of AMEDD officers are truncated when compared to their logistics counterparts. This is due to the specialized nature of medical care in which there are very few assignments for AMEDD officers within combat brigades when compared to the aggregate number of positions found throughout the larger AMEDD institution. Such areas include positions within functional medical brigades, manning of hospitals and medical clinics, and in the large staffs assigned to Medical Commands or teaching centers. While there notable exceptions in which medical operations officers may be assigned to higher levels within the support battalion itself, to include commanding the BSB itself, the instances of AMEDD officers filling such positions is not the norm.¹⁰³

In isolating the BSMC, we find it is by far the smallest of the sub-organizations within the BSB, consisting of approximately 67 soldiers and being roughly a third of the size of its respective supply distribution and maintenance companies. BSMCs are organized to support their combat brigade consisting of approximately 4,500 soldiers, which are the modern building blocks of the U.S. Army's conventional force structure. In current conflicts, such as those in Iraq and Afghanistan, where support personnel and infantry units are closely intermingled within the areas of conflict, we find the medical company simultaneously operating in multiple capacities: providing medical support to their brigade, as their mission dictates, providing support to large numbers of other teams without their own medical units, treating military personnel and civilians from other nations, and treating U.S. civilian contractors. In addition, BSMCs are routinely called upon to conduct operations in multiple locations simultaneously ("split-based operations"). This task of dividing the company into two or more geographic locations is a significant challenge for such medical companies, as they do not have adequate manpower or equipment levels (such as duplicate pieces of specialized medical equipment) to enable such efforts. More generally, BSMCs continue to be manned, equipped, and trained as though they were to provide support from generally secure areas

¹⁰³ Comparatively few allocations exist for junior AMEDD officers to attend the 20 week Combined Logistics Captains Career Course (CLC3) at Fort Lee, VA. Respectively, few AMEDD officers may prolong their career path within combat brigades by filling logistics officer positions by virtue of a "hybrid" multifunctional logistician career path. There are mixed opinions within AMEDD senior leadership, some of which discourage officers from attending the course in lieu of the AMEDD Officers Advanced Course.

rather than many some instances when they even operated from Iraqi FOBs, providing their own security and far from U.S. forces.¹⁰⁴

Using currently available forecasts and publications to include the Quadrennial Review for 2010 and the 2011 Army Posture Statement establishes a baseline of the requirements of medical and logistics units at lower levels.¹⁰⁵ The current status of the AMEDD within the BSB can be evaluated using those guidelines. Once the degree of adaptation has been determined it will be possible to better quantify and articulate current shortfalls and project the future capabilities requirements to adapt to a broader range of battlefield conditions.

In some cases, such separateness not found in the Logistics Branch is due to external constraints of which the AMEDD has little control. A portion has its origins in centuries-old restrictions by medical personnel engaging in combat other than to defend patients. Such requirements have been codified under international humanitarian law (IHL) and the by the Geneva Convention, which identifies medical personnel, equipment and facilities as noncombatants and *hors de combat* or “outside the fight.”¹⁰⁶ Traditionally such differentiation was honored by Western armies during both World Wars. However, such a longstanding distinction has become somewhat irrelevant within current combat operations in which the enemy deliberately attacks medical personnel and their vehicles, even using the red crosses on ambulances as references for aiming points. Such violations create tension between medical personnel assigned to combat brigades who disproportionately become targets of insurgents, and the AMEDD which provides formal oversight of IHL and the Geneva Convention. Specifically, medical personnel are

¹⁰⁴ The author, in which his medical company split during combat operations in Baghdad in 2003 and Baqubah in July 2007, where a portion of the company provided medical support from an Iraqi FOB (FOB Gabe) in Diyalah Province, utilizing self-securing escort with M1114 guntrucks, .50 caliber M2 machineguns, AT4 antitank weapons, and other weapons which are not doctrinally used by medical personnel.

¹⁰⁵ Both nonacademic directives such as the current *Quadrennial Defense Review February 2010*, in addition to sources from the realm of the practitioner, such as General Eric Shinseki, suggest the need to operate under “full-spectrum” battlefield conditions. This broad range of capabilities includes both non-linear and linear combat operations, asymmetric warfare, and humanitarian relief operations that may be performed concurrent or consecutively.

¹⁰⁶ Convention (I) for the Amelioration of the Condition of the Wounded and Sick in Armed Forces in the Field. Geneva, Article 6 (August 22, 1864), 134.

still required to act according in adherence to international law, and may not use heavy or “crew-served” weapons, nor may they fire at the enemy except in self-defense. In practice, however, we find legal attempts to bypass such constraints, and in which medical personnel have successfully petitioned to mount small weapons to their ambulances for the purposes of simply providing for their own self-defense and that of their patients.¹⁰⁷

5. Logistics

Aside from the headquarters element, there are two other commensurate functional organizations which exist at the same level as the medical company within the support battalion. In contrast to the BSMC case, we find the U.S. Army logistics community better suited to its combat mission based on current manpower allocations, and more suitable types and amounts of equipment, both possible due to the central orientation of Logistics toward a single function: to provide supplies and maintenance to troops, mainly in training and combat situations. Such adaptation has allowed such units to more effectively provide split-based operations in support of combat operations, a task also routinely required of this type of unit during deployments. Comparably sized logistics units have seen advances in manning, modular organizational structure, and equipment, thus allowing such units to support combat forces more effectively in multiple locations. Russell provides a unique insight which sheds light on innovation within the BSB and de facto to the medical company. He suggests part of innovation is found in the combat brigade creating new missions and by the fusion of combat and support units into new missions not found during peacetime.¹⁰⁸ Such new missions were routinely the case in which the medical company, driven by its logistics leadership and

¹⁰⁷ Kevin C. Kiley, Lieutenant General, *Surgeon General of the Army Memo for Defense of Medical Units, Personnel and Patients Under Their Care Under the Provisions of the Geneva Convention*, Memorandum For U.S. Army Medical Center and School (Washington, D.C: Falls Church, VA, January 21, 2007).

¹⁰⁸ Russell, *Innovation, Transformation, and War*, 53.

participating in missions not routinely practiced prior to deployment such as the convoy security missions, detainee medical coverage, and attachment of female medics to infantry units for extended periods.¹⁰⁹

At the lowest level, an AMEDD affiliated officer commands the BSMC. In turn, the BSMC is nested within its higher BSB. Because of this command structure, we find that a large portion of lessons learned are published within journals regularly known to the logistics community. The vast majority of support battalions are commanded by officers trained as multifunctional logisticians who encourage their subordinate commanders to publish solely within logistics publications—such as *Army Sustainment Magazine*¹¹⁰—rather than journals regularly accessed by the AMEDD such as the *AMEDD Journal*. This in combination with the informal wartime transfer of non-doctrinal knowledge between BSMC leadership as they assume the wartime mission suggests lessons learned by BSMCs in the field do not trickle up to AMEDD institutions.

Evidence supports this inverse correlation between such topics being found in the non-medically oriented publication. A search of *Army Sustainment* magazine back issues dating to November-December 1996 (96 issues) reveals a total of 41 articles related to medical topics, particularly on medical logistics, with a secondary emphasis on medical operations within medical units, to include support battalions. Consequently, these lessons are unlikely to lead to high-level changes within the medical community, either doctrinally or in terms of technological innovation.

Similar to the logistics community, there exist magazines outside the sphere of control of either the AMEDD or logistics communities which publish medical articles and address concerns of a broader non-medical audience. An example includes the periodical *Joint Forces Quarterly* which published an article on the Golden Hour

¹⁰⁹ Authors experiences, while assigned as medical company commander in Baghdad and Baqubah, Iraq, 2006–2007.

¹¹⁰ *Army Sustainment Magazine*, is published bi-monthly at Army Combined Arms Support Command which is located at Fort Lee, Virginia, the home of the Logistics Corps. It was created in 1969 as the official magazine of Army Logistics. The magazine was formerly published under the name *Army Logistician* until 2009.

Standard of medical care in 2006.¹¹¹ *Military Review* also recently published an article applicable to practitioners of battlefield medical care, “Medical Operations in Counterinsurgency.”¹¹²

The AMEDD maintains its own periodicals that publish on a broad range of medical topics which reflect its diverse audience. While somewhat subjective in terms of analysis, these periodicals understandably possess a lesser degree of usefulness for AMEDD personnel assigned within combat brigades when compared to *Sustainment Magazine*. *The U.S. Army Medical Department Journal* provides a forum for the entire AMEDD, and accordingly its content ranges from articles on topics purely clinical in nature, to operational and deployment issues.¹¹³ A searchable database with archived articles from 1989 to the present date of publication reveals approximately 20 articles that deal with either Iraq or Afghanistan from the standpoint of information applicable to concrete planning and operations rather than from a clinician’s perspective. In addition, *The Mercury* provides similar information albeit from primarily clinical or historical perspectives. The content of articles found within both AMEDD periodicals are understandably both diluted in terms of content when compared to medical topics addressed within logistics publications as the articles within the AMEDD journal and the Mercury cover a much broader range of medically-oriented topics given the diversity of highly technically-oriented career fields within its ranks.

While the logistics community has also been challenged, it has managed to overcome such obstacles over the last decade. Conducting logistics operations on an asymmetric battlefield and ad-hoc procedures for mitigation of shortfalls in terms of manpower are routinely found in periodicals and occasionally within academic works. Dr. Russell notes in his case study of the 172d Stryker Brigade in Mosul, that such change can be a challenge for an institution when lessons learned are a departure from

¹¹¹ Guy S. Strauder, “The Golden Hour Standard,” *Joint Forces Quarterly*, 41, 2nd Quarter (2006): 60–67.

¹¹² Rice, Matthew S. Jones, Omar J. Jones. “Medical Operations In Counterinsurgency Warfare: Desired Effects and Unintended Consequences,” *Military Review* (June 2010): 47–57.

¹¹³ *The Army Medical Department Journal* is a quarterly publication and has been published since 1922 as the *Bulletin of the U.S. Army Medical Department*.

formal doctrine. However, in the limited portion of his study devoted to battlefield logistics, he notes that logistics personnel were able to react in combat by realigning its personnel and practices to complexities of the environment.¹¹⁴ This author agrees having replaced that same unit in the same location.

However, with logistics we find these adaptations previously found within periodicals are now codified within formal doctrine and outside the purview of the logistics community to address the complexities of providing logistical support within the context of current conflicts.¹¹⁵ However, such alignment of doctrine has been a challenge for the AMEDD in that much of its doctrinal focus is understandably oriented at echelons above the brigade combat team in their addressing adaptation.¹¹⁶

Such limited focus and expertise within higher levels of the AMEDD is exacerbated when medical leadership have a limited portion of their career within a combat brigade, leaving little time for such bottom-up lessons learned being captured. Demchak presents a similar allegory in her discussion of frequent enlisted personnel turnover enlisted and the issues in maintaining the M1A1 main battle tank.¹¹⁷ In the case of the AMEDD, the complexity of the new tank can be substituted by the complexities of associated with medical care, which are more complex than logistics. In addition, battlefield medical care must be provided within the same stringent parameters as within a fixed medical treatment facility regardless of conditions. This disparity in terms of complexity and acceptable parameters for accuracy in tasks once again suggests a larger knowledge burden on the part of the AMEDD. A variety of academics ultimately suggest that such complexity may have unintended results which manifest themselves in a variety of ways. This is particularly true in highly technically-oriented organizations, such as the AMEDD.¹¹⁸ This work demonstrates from the lens of theory in addition to its

¹¹⁴ James Russell, *Innovation, Transformation, and War*, 162.

¹¹⁵ Headquarters, Department of the Army, *Counterinsurgency, Field Manual 3-24* (Washington, DC: Department of the Army, December 2006), 8-1.

¹¹⁶ Academy of Health Sciences. U.S. Army. *Health Service Support Futures Medical Force 2000, White Paper*. Final Draft. (Fort Sam Houston, Texas: Academy of Health Sciences, March 1989).

¹¹⁷ Demchak, *Military Organizations*, 169.

¹¹⁸ *Ibid.*, 171.

reinforcement by practical anecdotal evidence there exists impediments associated with capturing bottom-up efforts in addition to already noted top-down issues.

D. CONCLUSION

This chapter has demonstrated both the inherent complexity of the AMEDD and how that complexity has affected its ability to innovate; both from the top down and from the bottom up. Several authors, including Chris Demchak and James Russell, provide insight into such phenomenon. Demchak hypothesizes that a complex organization must be able to both accurately identify a problem and provide a rapid response. However, she ultimately suggests that as the complexity of an organization increases the less likely it is to be able to provide either an accurate or timely solution.¹¹⁹ When such analysis is applied to the AMEDD many authors, including Demchak, suggest the organization will remain challenged at controlling its own innovation, suggesting instead it may better suited to simply manage itself.¹²⁰

¹¹⁹ Demchak, *Military Organizations*, 134.

¹²⁰ Martin Landau and Russell Stout Jr., "To Manage is Not to Control: The Folly of Type II Errors," *Public Administration Review* 39 (March–April, 1979): 148.

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V. CONCLUSION

A. SUMMARY

The last two decades of non-linear warfare have necessitated widespread demands for doctrinal innovation throughout the United States Army, to include medical and logistics units that support combat operations. Since Operation Desert Storm there have been several reports clearly identifying shortfalls within the AMEDD regarding its ability to support combat forces during combat operations. Such documents specifically addressed the need for the AMEDD to adapt technologically, both in terms of its survivability and agility in order to better support combat operations.¹²¹

At the practitioner level, the BSMC leadership within the support battalion has innovated to address shortfalls and such critical information is being routinely passed between the leadership of these units during wartime. Yet, such lessons are not being fully captured at the formal institutional levels within doctrine, to include technological adaptation. Stephen Rosen provides insight into this phenomenon in his differentiation between organizational innovation and organizational learning. In doing so, he suggests that while units may innovate during wartime to accomplish their missions, organizations must then internalize such changes and transfer these lessons into institutional knowledge. In order to accomplish this task, organizations must possess self-awareness and be introspection in determining if in fact they are accomplishing their mission.¹²²

The Army has been able to mitigate such ongoing capabilities shortfalls within the AMEDD through nontraditional procurement methods, with bottom-up efforts facilitating vehicles such as the newer MRAP vehicles and their ambulance variants. Top-down efforts have produced the Stryker MEV, which fills such capabilities gaps solely within

¹²¹ Studies by the RAND Corporation have included: Perry, Walter , Bruce Pirnie, and John Gordon IV. *The Future of Warfare Issues From The 1999 Army After Study Cycle*. Santa Monica CA: RAND Corporation, 2001; In addition, a Government Accounting Office report also provided detailed insight in which the AMEDD must adapt: General Accounting Office, *Wartime Medical Care DoD is Addressing Shortfalls, but Challenges Remain* (Washington, DC: U.S. General Accounting Office, September, 1996).

¹²² Rosen, *Winning the Next War*, 35.

Stryker brigades. In spite of these interim solutions, U.S. Army forces continue to maintain an unarmored wheeled ambulance (M997) and a lightly armored, yet slow Vietnam-era tracked ambulance both of which make up the bulk of its ambulance fleet.

This thesis has demonstrated that such technological failings at innovation are symptomatic rather than causal. Instead, such issues stem from the organizational complexity of AMEDD, part of which is manifested as isolation. Due to such disassociation from the larger Army, its shortfalls are perceived as simply “medical issues” while in fact many such issues fall clearly within the purview of the larger Army or the DoD who are ultimately responsible for producing new military vehicles using input from subject-matter experts within the AMEDD. However, even these vehicles which are technologically optimized for capabilities within contemporary conflict have not been synchronized with requisite innovation in the form of new medical support doctrine.

Recently, the new the new Surgeon General of the Army, as the head of the AMEDD, vocalized such a longstanding concern in her urging of AMEDD leadership to become more introspective with regard to innovation.¹²³ This thesis has echoed such concerns which have originate from both internal and external agencies. In doing so, it has provided several negative outcomes with regard to both doctrine and technology and demonstrated that such unfavorable outcomes with regard to innovation within the AMEDD stem from its nature as one of the most complex organizations throughout the United States Army.

The isolated nature of the AMEDD organization is multifaceted, existing structurally in its manning, to include the truncated life cycle of medical personnel within combat brigades. This inherent separateness is readily apparent in the AMEDD being organized under one of the three professional Branches of the Army, in which personnel are promoted and managed separately from the rest of the Army. The life cycle of both medical providers and medical operations officers is much different than that of their

¹²³ Patricia D Horoho, Lieutenant General, 43rd Surgeon General of the Army and the U.S. Army Medical Command. *Commander's Thoughts: On Leadership and Strategy* (Falls Church, VA: Office of the Surgeon General, January 30, 2012).

logistics counterparts. The majority of medical personnel are formally dedicated to manning fixed medical facilities rather than being assigned to roles within combat brigades where during peacetime or when not deployed there is a much lesser need for their skills. It is only when combat brigades are in the final preparation phases of deployment that physicians are removed from such fixed facilities to participate in such training. This dual mission is unavoidable however in that medical skills are extremely perishable and medical providers must operate in such a cycle to maintain medical credentials and requisite skill levels.

A similarly short assignment within combat brigades is also commonplace when one examines AMEDD leadership. When compared to their logistics counterparts there are only a small number of positions at senior levels for such officers and such positions represent a comparatively smaller time period in the officers life cycle. This narrower window in their life cycle allows for a lesser degree of input with regard to innovation before such officers move to higher levels in functional medical brigades.

It is perhaps this structure inherent within combat brigades that may hinder interactions with both the Logistics Branch and the larger U.S. Army. In contrast to the low level of technical innovation in the medical community, one finds that within its logistics counterparts there was effective technical innovation, due to its robust integration within the larger Army at all levels both internally within CASCOM, as well as in its structural integration to TRADOC. It is acknowledged that the AMEDD does facilitate integration into these organizations by maintaining a liaison at TRADOC, it is the only sustainment function which does not have requisite amounts of formal representation at the same levels to within either organization.

Not surprisingly, one finds that within the logistics community bottom-up efforts have been captured and transferred to its institutional levels. However, such disparity in terms of innovation both in terms of technology, and new doctrine stem from the nature of the AMEDD as an inherently complex organization and its more complex mission which requires the medical treatment and safe evacuation of wounded personnel off the battlefield.

B. IMPLICATIONS

This thesis provides discourse based on the study of complexity within military organizations. Its particular significance is in its bridging a body of literature which examines innovation almost exclusively within combat units and successfully applied such literature to units which support such operations. In doing so it provides new insight into such support organizations while simultaneously reinforcing existing literature on the subject in demonstrating its utility in other similar applications.

In addition to its contribution to complexity within military organizations in a theoretical sense, it also has the potential to be of significance in its more pressing, practical application given the tenuous situation of a nation decisively engaged with a clearly dedicated foe. If indeed the AMEDD has not been able to challenge its own doctrine, this raises some troubling issues, as it may jeopardize the lives of injured or sick soldiers and civilians. Only by learning how to change the way the Army Medical Department is equipped, manned, and trained, is it possible for the AMEDD to better support a broader variation of combat operations, and ultimately saving more lives in the process.

The thesis suggests that the organizational structure of the AMEDD in relation to its parent organization, the United States Army contrasts sharply when compared with its logistics counterpart. It is this organizational complexity which is the causal variable and which explains the pervasive issues regarding the AMEDD's efforts to effectively innovate its medical doctrine at the combat brigade level. It follows that in order to improve AMEDD's capacity to innovate it would be desirable to either reduce the organization's complexity or somehow change the working of the AMEDD organization in some other way to overcome the barriers posed by organizational complexity.

However, as a number of authors across a variety of disciplines suggest, organizational innovation is perhaps one of the most challenging types of innovation in which to effect change.¹²⁴

Organizational theory suggests that the AMEDD will be challenged in its efforts to affect change upon itself. In particular, its own complexity creates a large number of rogue sets, or unexpected outcomes as it effects change. A potential way to mitigate such risk, or to increase accuracy is to reduce complexity. With regard to the AMEDD there are a number of areas which are inherent conditions and others in which it can effect change. The AMEDD should examine areas in which to exploit control, such as integration into other agencies and developing methodologies for capturing lessons learned by practitioners. Conversely, it should avoid application of resources where structurally it cannot effect change and in which such efforts should be limited. Such an example is the numbers of medical leaders within combat brigades. The mission of combat brigades is such that the majority of its forces will continue to consist of tasks related to destruction of enemy forces. Similarly, the composition of such forces is such that medical personnel are highly specialized, thus requiring less medical personnel when compared to the number of logistics counterparts. This ratio will preclude long career life cycles by medical personnel at the combat brigade level. Consequently, resources should be directed to areas in which are not structurally inherent conditions and which are most likely to produce results with regard to innovation.

1. Facilitate Increased Integration with Logistics Counterparts

Clearly, the AMEDD is challenged with both resources and manpower and must prioritize and maximize both in order to facilitate innovation efforts. A methodology for achieving such goals could be its emphasis in two related areas. First, the AMEDD must facilitate better integration with its logistics counterpart within CASCOM, TDDD, and

¹²⁴ Amy Zegart, as one of proponents of New-Institutionalists theory, hypothesizes institutions will be difficult to change structurally once implemented, unless precipitated by drastic external events. James Russell addresses innovation and adaptation within ground forces, suggesting that while units use formal doctrine as a reference point they modify as needed to optimize operations in combat. Douglas MacGregor routinely writes on structural change in response to changes in combat conditions, but over the course of a decade has noted that such pervasive change is difficult.

the Sustainment Center of Excellence at Fort Lee. Second, it must better integrate within the larger Army institution. Such disparity is clearly evident when comparing its own published doctrine when compared to more current medical doctrine published by logistics counterparts, in addition to higher level sustainment doctrine. By articulating its shortfalls with an organization which is better integrated its doctrine into the combat arms community it can perhaps facilitate better synchronized efforts and create a louder voice with regard to its inability to support combat forces with more than either interim or risky solutions. From a practical standpoint the AMEDD must find ways to facilitate its formal integration into its logistics counterparts at and TRADOC and at CASCOM both of which are in Virginia. By changing organizationally the organization can through fusion of its logistics counterparts.

If one examines recent trends in the logistics community it appears that the organization is adopting such techniques to better facilitate use of its own resources and coordination efforts. In 2007, the leadership of two U.S. Transportation Command (TRANSCOM) and U.S. Joint Forces Command (JFCOM) formally announced the goal of combining their efforts in their signing of a joint vision statement to align their efforts.

In addition, Army-level publications addressing transformation efforts exclude any mention of medical transformation. If one examines the *Elements of Transformation 2004*, Fire, Maneuver, Protection, C2&C, ISR and Logistics are all separately addressed. Yet Medical transformation is not even addressed within a sub-category of logistics or sustainment within the publication.¹²⁵ Such omission occurs frequently with regard to medical transformation efforts, as it seemingly “falls between the seams” of logistics and larger Army-wide efforts. There is little to no focus on medical transformation found within other transformation documents suggesting that its own isolation has marginalized the organization.¹²⁶

¹²⁵ Director, Office of Force Transformation “Elements of Defense Transformation” (Office of the Secretary of Defense, October 2004), 12–13.

¹²⁶ Office of the Deputy Chief of Staff, *2004 United States Army Transformation Roadmap*, July 2004; and the *2010 Army Tactical Wheeled Vehicle Strategy*, 2010.

Perhaps the most difficult of tasks, the AMEDD, must also better differentiate between invention and innovation. As Klaus Knorr and Oskar Morgenstern suggest, invention can be seen as the creation of new systems and technologies and innovation as the decision on which of those inventions to implement.¹²⁷ In the case of the AMEDD, it must narrow the scope of development efforts if any of them are to come to fruition. While the AMEDD has been able to develop numerous concepts such as possible use of drone aircraft to evacuate patients, telemedicine or surgery using robotic arms over remotely over vast distances, yet it is unable to facilitate the development of a viable armored ambulance after a two decade period.

2. Prioritization of Ambulance Production

Only after addressing the aforementioned structural changes, in which it better integrates and prioritizes its efforts, can it then move forward to facilitate shortfalls in other areas. Integration will allow the AMEDD to better articulate its vehicle shortfalls which are desperately in need of modernization in order to adequately support operations across the full spectrum of conflict. In order to mitigate such risk, the AMEDD must develop requisite doctrine and vehicles designed for supporting both linear and non-linear combat. Its can then regulate its current unarmored ambulances to use in environments where it is less vulnerable, to include rear areas in linear conflict, inside forward operating bases in asymmetric warfare, or finally used solely within the confines of the United States in support of natural disasters.

Clearly, such a requirement has proven to be problematic as the AMEDD has been unable to facilitate production of such vehicles by the DoD, even after two decades of efforts. Such an external constraint was succinct in a 1996 GAO report, emphasizing that efforts must be addressed at higher levels, and not simply within the medical sphere of influence. Additionally, the report specifically noted funding allocation was also seen as hampering efforts to modernize, with none of the shortcomings being allocated extra

¹²⁷ Klaus Knorr, and Oskar Morgenstern, *Science and Defense: Some Critical Thoughts on Military Research and Development*, Policy Memorandum No. 32, Center of International Studies, Woodrow Wilson School of Public and International Affairs, Mimeo (New Jersey: Princeton University, 1965), 3–4.

funding for corrective action.¹²⁸ Ultimately, the AMEDD must better envision and articulate to the DoD its anticipated threat environment, and better articulate such requirements to the larger U.S. Army. Then, it must secure and allocate resources appropriately to correct current deficiencies in survivability and maneuverability in order to adequately mirror combat forces, rather than allowing the anticipated production of yet another unarmored ambulance in the JLTV program and a future slow tracked ambulance which is a modified thirty year old modified Bradley Fighting Vehicle (BFV).¹²⁹ Such vehicles are expensive and offer little in the way of new capabilities.

In addition, this study suggests there are externally driven problems within current acquisition methods for producing ambulances. These problems originated well prior to either the Stryker MEV, or the even MRAP evacuation vehicle. While the Stryker program was a top-down effort, it was clearly unconventional, taking place at both an accelerated pace at each step, and it also bypassed several roadblocks in efforts to produce the vehicle currently used by the Stryker Brigade combat Team, and which continues to undergo subsequent transformations to counter the increasingly complex IED threat environment.

3. A Case of Viable Alternatives (Air MEDEVAC)

Another doctrinal impediment to BSMC adaptation is perhaps the uncontested use of rotary-wing medical evacuation over the last two decades. The use of such aircraft is clearly advantageous, both in terms of speed and risk when compared to ground evacuation, as helicopters may bypass rough terrain features as well as enemy forces on the ground. However, it can be argued due to such longstanding reliance on air MEDEVAC assets have been at the expense of ground evacuation modernization. It also perpetuates the erroneous assumption that in future conflicts the United States will always maintain overwhelming air dominance, or at least air superiority, thus allowing unconstrained air MEDEVAC use. Rotary wing aircraft are subject to a secure

¹²⁸ “Wartime Medical Care DoD is Addressing Shortfalls, But Challenges Remain,” Washington, DC: United States General Accounting Office, 1996), 8.

¹²⁹ Andrew Feickert, *Joint Light Tactical Vehicle (JLTV): Background and Issues for Congress* Congressional Research Service, January 3, 2012.

Helicopter Landing Zone (HLZ), which can be problematic in a three-dimensional urbanized environ. A case which suggests the nature of this problem is the well-publicized case operations in Somalia in which two MH-60 helicopters crashed after coming under RPG and small arms fire and in which no armored ambulances were readily available to evacuate wounded personnel.¹³⁰ In addition, they are subject to weather and reduced visibility to include, dust, and darkness which has precluded flights and forced the use of antiquated ambulances in medical support planning and caused fatal crashes of helicopters in reduced visibility.¹³¹ The AMEDD has placed considerable weight upon the ability of air evacuation, and is challenged to facilitate innovation of its ground ambulance capabilities. In order to mitigate such risk of a non-permissive environment in which the Army may not possess air dominance as it currently does, the DoD must develop and field the requisite numbers of armored ground ambulances. Contingency planning necessitates that in the event air assets are not available, ground assets should be able to perform such tasks, and this is not always the case, especially for units which do not possess Stryker MEVs or MRAP ambulances.

C. RECOMMENDATIONS FOR FUTURE RESEARCH

While modest in scope in terms of its focus on the lowest levels within the combat brigade, this exploration of the challenges in innovation within the AMEDD suggests the need for an analysis of a much larger in scope. While this study did elicit key data from a number of organizations, such as the AMEDD, the RAND Corporation, and several GAO reports, it did not gather the individual opinions of the leadership and practitioners within applicable Army organizations. A future study could include the opinions of medical, logistics, and combat arms personnel in order to determine additional shortfalls in support as well as perceptions, which could ultimately guide further efforts.

¹³⁰ Kenneth Allard, *Somalia Operations: Lessons Learned* (Washington, D.C: National Defense University Press, 1995).

¹³¹ Author, in which one of his medics Army Sergeant Steven P. Mennemeyer of Granite City, Illinois was killed when his UH-60 Blackhawk crashed into a lake in the vicinity of Korean Village in Rubtbah, Iraq on August 8, 2006, Steve Mennemeyer was assigned to the 82nd Medical Company (Air Ambulance), Fort Riley, Kansas.

It is clear there is still a critical need for modern doctrine and an armored ambulance in anticipation of potential future threats. Instead, we continue to see a failure for such a modernized vehicle come to fruition over the last two decades of energy and funding efforts, of which is in its second large-scale development cycle in the GCV and JLTV programs of which are both costly and offer little advantages in speed or armored capabilities, and of which are ultimately threatened by cancellation. Such a trend is problematic in that if the United States were to become embroiled in a high-intensity conflict necessitating use of heavy legacy forces, our medical evacuation support plan would be built upon a converted armored personnel carrier designed prior to the Vietnam War.

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