

Making History Rhyme: Defining Future AMEDD Tailored Advanced Services Through the Prism of Auxiliary Surgical Group (ASG) Support in the European Theater of Operations (ETO)

A Monograph

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Abstract

Making History Rhyme: Defining Future AMEDD Tailored Advanced Medical Services Through the Prism of Auxiliary Surgical Group (ASG) Support in the European Theater of Operations (ETO), by MAJ Jimmy Lewis McClain, Jr, US Army, 61 pages.

The potentially preventable death rate for Iraq and Afghanistan from 2001 until 2011 was determined to be up to 25.0%, with 87.0% dying before reaching surgical capabilities and 13.0% dying of shock because of a lack of aggressive prehospital resuscitation, by a multidisciplinary panel of physicians after their review of the autopsy and medical records of US combat deaths. Each preventable death “required immediate, on-the-spot access to the most advanced care...and...unavoidable delays because of ongoing combat operations.” Since Operation Desert Storm, the United States has enjoyed unparalleled freedom of maneuver in the air and land domains that has allowed for the employment of Army Medical Department (AMEDD) aeromedical assets for casualty evacuation. Over this time, potential adversaries have gained the ability to deny or disrupt capabilities or capacity of the Army to access these domains through integrated anti-access/area-denial capabilities (A2/AD). From 2015 to 2017, the Joint Staff received 14 emergent requests for 21 surgical teams but was unable to source three validated requests for forces (RFF). This study produced a DOTMLPF-P solution to mitigate the Army’s need for advanced tailored medical services that can support emergent requests and operations over the range of military operations against any adversary and decrease died of wounds and potentially preventable death rates.

Table of Contents

Abstract	iii
Acronyms	v
Illustrations	vii
Tables	vii
Introduction	1
Capability Overview.....	12
Methodology	27
“Forward Resuscitative Care” in WWII.....	30
Findings and Analysis	42
Conclusion.....	58
Bibliography	62

Acronyms

A2/AD	Anti-Access/Area Denial
AMEDD	Army Medical Department
AHS	Army Health System
AOC	Area Of Concentration
ARMEDCOM	Army Reserve Medical Command
ASG	Auxiliary Surgical Group
AUTL	Army Universal Task List
BCT	Brigade Combat Team
BSMC	Brigade Support Medical Company
CBA	Capabilities-Based Assessment
CCMD	Combatant Command
CSH	Combat Support Hospital
CTC	Combat Training Center
DATE	Decisive Action Training Environment
DHA	Defense Health Agency
DOTMLPF-P	Doctrine, Organization, Training, Materiel, Leadership and education, Personnel, Facilities, and Policy
DOW	Died Of Wounds
ERST	Expeditionary Resuscitative Surgical Team
ETO	European Theater Of Operations
FAA	Functional Area Analysis
FHP	Force Health Protection
FNA	Functional Needs Analysis
FRC	Forward Resuscitative Care
FRSS	Forward Resuscitative Surgical System
FSA	Functional Solution Analysis

FST	Forward Surgical Team
FY	Fiscal Year
GHOSTT	Golden Hour Offset Treatment Team
HSS	Health Service Support
KIA	Killed in Action
JCHS	Joint Concept for Health Services
JCIDS	Joint Capabilities Integration and Development System
JRTC	Joint Readiness Training Center
MAGTF	Marine Air Ground Task Force
MASH	Mobile Army Surgical Hospital
MDB	Multi-Domain Battle
MHS	Military Health System
MOS	Military Occupational Specialty
MTF	Military Treatment Facility
MTOE	Military Table of Organization and Equipment
NDAA	National Defense Authorization Act
NTC	National Training Center
PROFIS	Professional Filler System
RC	Required Capability
RFF	Request for Forces
RVU	Relative Value Unit
TAMS	Tailored Advanced Medical Services
TRADOC	US Army Training and Doctrine Command
UJTL	Universal Joint Task List
WIA	Wounded in Action

Illustrations

Figure 1. Evacuation Of Casualties In An Army Zone	13
Figure 2. Concepts.....	43
Figure 3. Tasks	44
Figure 4. Model Medical Unit.....	52
Figure 5. Medical Unit Alignment With Geographic Combatant Commands	53

Tables

Table 1. US Military Combat Casualty Care Statistics in Historical Conflicts.....	2
Table 2. Table of Organization of Auxiliary Surgical Group.....	15
Table 3. Comparison of Capabilities	25
Table 4. FNA Analysis of 3d ASG.....	46
Table 5. Summary of Force Levels Employed Against Adversaries.....	48
Table 6. Force Structure for Two Major Wars Force	49
Table 7. FMSWeb Authorized Personnel Totals by AOC	54
Table 8. FMSWeb Authorized Personnel Totals by MOS	55
Table 9. FMSWeb Authorized Personnel Totals versus Army TAMS Requirement Totals.....	56

Introduction

The blueprint for successful Armies beyond 2010 will be discovered through both analyses of military history and an organized experimentation effort that must be sustained over a period of many years.

—Major General Robert H. Scales, Jr.

We can't solve problems by using the same kind of thinking we used when we created them.

—attributed to Albert Einstein

It was H-3 hours on D-Day, 6 June 1944, when Major Albert J. Crandall, surgeon on Airborne Surgical Team No. 1 of the 3d Auxiliary Surgical Group, and the rest of his surgical group crashed into fields north and south of Hiesville (Manche), France. The surgical group's personnel, equipment, and supplies were dispersed over a wide area. Major Crandall and the group quickly gathered the supplies they needed and treated 127 casualties on the landing zones. The surgical team rapidly accomplished its first task—supporting glider operations of the 101st Airborne Division during Operation Neptune when they provided aid stations near the glider landing zones—and soon set about gathering the supplies and equipment and completed its remaining tasks—established an operational surgical location and functioned as the surgical team attachment to the 326th Airborne Medical Company. Because of their proximity, which reduced lag time, and their dedication, Major Crandall and the surgical team were able to treat over 627 non-transportable and transportable patients that presented with multiple wounds even though they were unable to move them to the established beachhead hospitals and medical battalions for almost seventy-two hours.

Since World War II, the Army Medical Department (AMEDD) has continued to react to changes in US Army doctrine because of an ever-changing environment and increased lethality of opposing force weapons. It has done so through changes in doctrine, organizational structure, military training, materiel, leadership and education, personnel, facilities, and/or policies (DOTMLPF-P) to conserve the fighting strength of the force. With the *Golden Hour Policy*—combat casualty from point of injury to definitive care, AMEDD innovations such as triage,

medical evacuation (ground and air), and forward surgical capabilities like Major Crandall's Airborne Surgical Team No. 1 have led to an increase in survival rates from 69.3% in WWII to over 90.0% in Iraq and Afghanistan.¹ However, the died of wounds (DOW)—casualty reaches an military treatment facility (MTF) alive and then dies—rate has also increased from 3.5% in WWII to 5.9% in Iraq and 4.3% in Afghanistan (Table 1).

Table 1. US Military Combat Casualty Care Statistics in Historical Conflicts

Combat Casualty Care Statistics	Afghanistan			Iraq	Vietnam	World War II
	Before Mandate	After Mandate	Total			
% RTD ^b	33.5	47.3 ^c	45.2	58.0	34.9	19.9
% KIA ^d	16.0	9.9 ^c	11.1	16.6	20.0	20.2
% DOW ^e	4.1	4.3	4.3	5.9	3.2	3.5
CFR ^f	13.7	7.6 ^c	8.6	10.0	15.8	19.1
WIA, No.						
RTD ≤72 h	1018	7905	8923	18 526	82 092	-150 000
Non-DOW + non-RTD	1942	8411	10 353	12 623	148 323	581 586
DOW	83	380	463	798	4983	20 810
Total WIA	3043	16 696	19 739	31 947	235 398	752 396
KIA, No.	386	964	1350	2676	38 281	152 359
WIA + KIA, No.	3429	17 660	21 089	34 623	273 679	904 755

Abbreviations: CFR, case fatality rate; DOW, died of wounds (died after arrival at treatment facility); KIA, killed in action (died before arrival at treatment facility); RTD, returned to duty; WIA, wounded in action (RTD + [non-DOW and non-RTD] + DOW).

^a Updated data for Iraq and Afghanistan (September 11, 2001, to March 31, 2014) were obtained from the Defense Casualty Analysis System.²⁸ Definitions and historic World War II and Vietnam data were obtained from Holcomb and colleagues.²⁹ A variance from Holcomb and colleagues is that we do not include Battalion Aid Station in the definition of *medical treatment facility* as it is a prehospital entity that lacks true major surgical capability.

^b Defines minor wounds and calculated as follows: % RTD = [(RTD/WIA) × 100]. The difference between Afghanistan values before vs after the mandate was significant ($\chi^2 = 80.822$; $P < .001$) and indicates more minor wounds after the mandate.

^c Comparison is significant before vs after the mandate ($P < .05$) using χ^2 with Yates correction.

^d Provides a potential measure of weapon lethality, effectiveness of prehospital medical care, and availability of prehospital transport and calculated as

follows: % KIA = {KIA/[KIA + (WIA - RTD)] × 100}. The total Afghanistan value appears lower compared with previous conflicts. The difference between Afghanistan values before vs after the mandate was significant ($\chi^2 = 56.481$; $P < .001$).

^e Provides a potential measure of the precision of initial prehospital triage and care, optimization of evacuation procedures, and application of a coordinated trauma system, as well as the effectiveness of medical treatment facility care and calculated as follows: % DOW = {[DOW/(WIA - RTD)] × 100}. The total Afghanistan value appears lower compared with the Iraq value, but higher than the Vietnam and World War II values. The difference between Afghanistan values before vs after the mandate was not significant ($\chi^2 = 0.136$; $P = .71$).

^f Provides a potential measure of overall battlefield lethality in a battle injury population and calculated as follows: CFR = [(KIA + DOW)/(KIA + WIA) × 100]. The total Afghanistan value appears lower compared with previous conflicts. The difference between Afghanistan values before vs after the mandate was significant ($\chi^2 = 108.465$; $P < .001$).

Source: Russ S. Kotwal, et al., “The Effect of a Golden Hour Policy on the Morbidity and Morality of Combat Casualties,” *JAMA Surgery* (January 2016): Table 1, accessed July 31, 2017, <http://jamanetwork.com/journals/jamasurgery/fullarticle/2446845?resultClick=1>.

¹ Russ S. Kotwal, et al., “The Effect of a Golden Hour Policy on the Morbidity and Morality of Combat Casualties,” *JAMA Surgery* (January 2016): 17, accessed July 31, 2017, <http://jamanetwork.com/journals/jamasurgery/fullarticle/2446845?resultClick=1>. Kotwal, et al, performed a study that met the US Army Institute of Surgical Research regulatory requirements utilizing a retrospective descriptive analysis of US military combat casualties in Afghanistan from September 11, 2001, to March 31, 2014. Conducted from September 1, 2014, to January 21, 2015, the study was performed as a quality improvement project. Non-US military personnel were excluded because data, especially for follow-up, were not available or reliable.

The DOW rate at the combat training centers (CTCs)—specifically, the Joint Readiness Training Center (JRTC) and the National Training Center (NTC)—has gotten worse since Army units have conducted 14-day Decisive Action Training Environment (DATE) rotations without medical evacuation.² During all rotations during fiscal year (FY) 2016 at JRTC, brigade combat teams (BCTs) sustained 1000 wounded in action (WIA) out of approximately of 3,500 Soldiers during a DATE rotation with a DOW rate of 30.0% through Role 2—MTF that provides greater resuscitative care.³ Over all rotations of FY17 and three rotations of FY18 at NTC, the BCTs sustained over 700 WIA with average DOW rates of 48.0% and 51.0% respectively. Because of delays in evacuation at both CTCs “there is very little a brigade support medical company (BSMC) can do for urgent or urgent surgical patients other than immediate lifesaving interventions to stabilize the patient and evacuate” even with imaging and blood products alone.⁴

Potentially preventable death rate—“deaths that could be avoided if optimal care could otherwise be delivered”—is another area of concern.⁵ The potentially preventable death rate in

² US Department of the Army, *Decisive Action Training Environment (DATE) Version 3.0* (Fort Leavenworth, KS: TRADOC G-2, 2017), 4. The DATE is constructed using real-world conditions to challenge unit training objectives but uses artificial data to provide a fictional setting that can be manipulated for suitability to any training event, to include decisive operations.

³ Miguel A. Cubano, “Chapter 2: Roles of Medical Care (United States),” *Emergency War Surgery*. 4th ed. (Washington, DC: Government Printing Office, 2014): 17-28, accessed April 21, 2018, <http://www.cs.amedd.army.mil/FileDownloadpublic.aspx?docid=1a73495d-1176-4638-9011-9e7f3c6017d8>. A basic characteristic of organizing modern health services support is the distribution of medical resources and capabilities to facilities at various levels of command, diverse locations, and progressive capabilities. This is referred to as the four roles of care (Roles 1–4). *Role 1* is point of injury care from first responder care or care by the combat medic trained in TCCC. *Role 2* includes basic primary care that may include optometry; combat and operational stress control and behavioral health; and dental, laboratory, radiographic, and surgical capabilities (when augmented). At *Role 3*, the patient is treated in a medical treatment facility staffed and equipped to provide care to all categories of patients, including resuscitation, initial wound surgery, damage control surgery, and postoperative treatment. This role of care expands the support provided at Role 2. *Role 4* medical care is found in CONUS-based hospitals and other safe havens.

⁴ Steven J. Rairdon II, “Saving 30% More: Lowering Died of Wound Rates in a Decisive Action Training Environment,” *News From the CTC*, Center for Army Lessons Learned, January 23, 2018: 3.

⁵ Robert L. Mabry, “Challenges to Improving Combat Casualty Survivability on the Battlefield,” *Joint Force Quarterly* 76 (1st Quarter, January 2015): 80, accessed January 1, 2018, http://ndupress.ndu.edu/Portals/68/Documents/jfq/jfq-76/jfq-75_78-84_Mabry.pdf.

Iraq and Afghanistan from 2001 until 2011 was determined to be up to 25.0% with 87.0% dying before reaching surgical capabilities and 13.0% dying of shock because of a lack of aggressive prehospital resuscitation. After a review of the autopsy and medical records of US combat deaths, it was determined that the wounded would have “required immediate, on-the-spot access to the most advanced care...and...unavoidable delays because of ongoing combat operations.”⁶

To provide on-the-spot advanced care in WWII, the AMEDD employed auxiliary surgical groups (ASG) to provide surgical care for combat wounded. The ASG provided tailorable, surgical care that was able to support direct combat operations or augment the surgical staffs of the field, evacuation, and base hospitals. From WWII to Operation Desert Storm, the AMEDD surgical capabilities went from 100.0% mobile and forward-deployed to immobile and further from the forward lines of troops. Seeing the loss of a strategically responsive, tailorable, and mobile surgical capability, the AMEDD developed the Medical Reengineering Initiative Force Design Update in 1996 based on lessons learned during Operation Desert Storm to provide support to the Joint Force.⁷

Since the Medical Reengineering Initiative, the AMEDD has had to develop “ad hoc, temporary solutions” such as the Golden Hour Offset Treatment Team (GHOTT) in Afghanistan and the Expeditionary Resuscitative Surgical Team (ERST) in Africa.⁸ These solutions achieved success but are not sustainable for long periods with so many requirements for surgical capabilities globally. Even with the development of ad-hoc solutions, the AMEDD has been unable to fulfill all the emergent requests for forces (RFFs) for surgical capabilities submitted by the Combatant Commands (CCMD). From 2015 to 2017, the Joint Staff received 14 emergent

⁶ Mabry, “Challenges to Improving Combat Casualty Survivability on the Battlefield.”

⁷ Corrine M. Ritter, “Transforming Health Service Capabilities in the Army Reserve,” Strategy Research Project (US Army War College, Carlisle Barracks, PA, 2005), 5.

⁸ US Department of Defense, US Joint Chiefs of Staff, *Joint Concept for Health Services (JCHS)* (Washington, DC: US Joint Chiefs of Staff, 2012), 1.

requests for 21 surgical teams but were unable to source three validated RFFs.⁹ The AMEDD lacks modular, readily-available, standardized medical capabilities that can provide tailored advanced medical services for a forward environment in support of commanders at all levels.¹⁰

Since Operation Desert Storm, the United States has enjoyed unparalleled freedom of maneuver in the air and land domains that has allowed for successful employment of AMEDD aeromedical assets for casualty evacuation, but potential adversaries have gained the ability to deny or disrupt capabilities or capacity of the Army to access these domains through integrated anti-access/area-denial capabilities (A2/AD). To mitigate the challenges posed by tomorrow's adversaries, the Army released the latest change to Field Manual 3-0, *Operations*, in October 2017 and drafted the *Multi-Domain Battle: The Evolution of Combined Arms for the 21st Century (2025-2040)* concept in December 2017. The ideas of the multi-domain battle (MDB) concept are “evolutionary and build upon relevant past and present doctrinal practices” aligning time, space, and purpose before, during, and after conflict.¹¹

The MDB concept presents three components to address these operational challenges: calibrate force posture, employ resilient formations, and converge capabilities. Calibration of the force “requires a dynamic mix of forward presence forces and capabilities, expeditionary forces

⁹ Cory Plowden, March 22, 2017, e-mail message to author.

¹⁰ US Department of Defense, *Forward Resuscitative Care (FRC) in Support of Dispersed Operations Capabilities-Based Assessment (CBA) Shortfalls Report*, (Washington, DC: Department of Defense, 2017), 3. Tailored Advanced Medical Services for a Forward Environment are defined as: those advanced emergency services that may include the surgical sub-specialty, post-surgical inpatient, and ancillary (pharmacy, laboratory, radiology) services as elements of doctrinal FRC, but tailored for delivery to a patient in a forward environment (prior to reaching a full Role 3/4 facility) who may have been stabilized (likely through prolonged field care) and moved over an extended period of time (or distance). The limited and tailored selection of these specific and advanced services would be made during the medical planning stage and adjusted during extended deployments as necessary, so as to be provided with the smallest capability packages necessary to support dispersed operations or operations in remote and/or austere environments. This definition draws on the definition of Advanced Medical Services in JP 4-02, Health Services Support.

¹¹ US Army Training and Doctrine Command, *Multi-Domain Battle: Evolution of Combined Arms for the 21st Century 2025-2040* version 1.0 (Washington, DC: Department of the Army, 2017), 2, accessed January 1, 2018, http://www.tradoc.army.mil/multidomainbattle/docs/MDB_Evolutionfor21st.pdf.

and capabilities, and partner forces to deter and, when required, to defeat an adversary plan within days.”¹² No matter the dilemma that an enemy presents, the forces should be resilient enough to effective and cross-domain capable. Our future enemies will contest our forces across all domains and at extended ranges.¹³

The US military must have formations that “maneuver semi-independently, without secured flanks, constant communications with higher headquarters,...continuous lines of communications,...[and] cross-domain capable [while] projecting and accessing power in all domains in order to present the enemy with multiple dilemmas.” These new formations will face an enemy that has the ability to deny or degrade communications, so formations will rely on mission command philosophy and “new capabilities that express and communicate the integration of capabilities across domains, environments, and functions over longer time periods and expanded physical spaces.”¹⁴

All of these capabilities will need to be able to converge—“[integrate]...across domains, environments, and functions in time and physical space to achieve a purpose.”¹⁵ Convergence is an evolution of combined arms that was introduced because of multi-domain battle. Convergence utilizes multiple combinations of lethal and nonlethal capabilities in cross-domain operations in time and space for a single purpose--“create physical, virtual, and cognitive windows of advantage to enable cross-domain maneuver and fires to achieve objectives.” Currently, the Joint Force operates through integration—“a federation of systems and processes.” For convergence to succeed, the Joint Force must have formations that are “organically organized, trained, authorized, and equipped to access, plan, sequence, and operate together in and across multiple domains at all

¹² US Army Training and Doctrine Command, *Multi-Domain Battle: Evolution of Combined Arms for the 21st Century 2025-2040*, 2.

¹³ Ibid., 3.

¹⁴ Ibid., 2.

¹⁵ Ibid., 3.

times” across the range of military operations. In order to achieve full integration in time and space and create windows of advantage, the services will “require significantly new doctrine, organizations, and capabilities that enable maneuver in contested environments.”¹⁶ To support Multi-Domain Battle, the AMEDD must be able to provide an expeditionary, “rapidly employable resuscitation and surgical capability to increase personnel survivability during cross-domain and semi-independent operations.”¹⁷

Based on a historical analysis of the 3d Auxiliary Surgical Group in the European Theater of Operations (ETO) during WWII, the Joint Staff’s *Forward Resuscitative Care (FRC) In Support of Dispersed Operations Capabilities-Based Assessment Shortfalls Report*, and an understanding of the current and future operating environment, this monograph proposes doctrine, organization, and personnel solutions to ensure the Army’s ability to provide tailored advanced medical services that can achieve morbidity and mortality outcomes equal to or better than those currently in Iraq and Afghanistan across the range of military operations. No one can accurately predict when or where the Army will operate next; therefore, the AMEDD must produce capabilities effective in conserving the fighting force. Admiral Michael Mullen, former Chairman of the Joint Chiefs of Staff, echoed this sentiment when he said, “We’re pretty lousy at predicting where we’ll go” and “the kind of warfare we’ll be in, if the last 20 years...serve as an example.”¹⁸

The AMEDD must maintain capabilities that can be applied by a medical planner and meet the Army Health System (AHS) principles of conformity, proximity, flexibility, mobility, continuity, and control to provide continuous support to commanders and not limit the

¹⁶ US Army Training and Doctrine Command, *Multi-Domain Battle: Evolution of Combined Arms for the 21st Century 2025-2040*, 3.

¹⁷ *Ibid.*, 60.

¹⁸ Micah Zenko, “100% Right 0% of the Time: Why the US Military Can’t Predict the Next War,” *Foreign Policy* (October 16, 2012): 5, accessed January 1, 2018, <http://foreignpolicy.com/2012/10/16/100-right-0-of-the-time/>.

commander's tactical options. Conformity ensures that the medical plan complies with the operational plan and "is the most basic element for effectively providing AHS support." Proximity is AHS support at the right time and right place within supporting distance with impeding operations and to keep morbidity and mortality to a minimum. Flexibility is "being prepared to, and empowered to, shift AHS resources to meet changing requirements. Changes in plans or operations make flexibility in AHS planning and execution essential." Mobility is "the principle that ensures that AHS assets remain in supporting distance to support maneuvering forces." Continuity is "achieved by moving the patient through progressive, phased roles of care, extending from the point of injury or wounding to the CONUS-support base." Control is "required to ensure the properly utilization of scarce AHS resources" and "ensures that the scope and quality of medical treatment meets professional standards, policies, and US and international law."¹⁹

With the advent of a 24-hour news cycle in the United States, reports of combat casualties are a regular occurrence. Increases in DOW rates and potentially preventable deaths seen in the media can affect the US center of gravity often—national will.²⁰ Clausewitz stated, "once the expenditure of effort exceeds the value of the political object, the object must be renounced."²¹ To maintain the national will, the AMEDD must ensure that expenditures, casualties, do not exceed the value of war to maintain accord between ruler and the people.²² Therefore, the AMEDD's ability to maintain or improve DOW and potentially preventable death rates maintains the balance of national will for war between the three "magnets" of Clausewitz'

¹⁹ US Department of the Army, Field Manual (FM) 4-02, *Army Health System* (Washington, DC: Government Printing Office, 2013), 1-6.

²⁰ Ehrich D. Rose, "Defending America's Center of Gravity," Strategy Research Project (US Army War College, Carlisle Barracks, PA, March 2006), 1.

²¹ Carl von Clausewitz, *On War*, Trans. Michael Eliot Howard and Peter Paret (Princeton, NJ: Princeton University Press, 1989), 92.

²² Rose, "Defending America's Center of Gravity," 6.

paradoxical trinity.²³ This study was guided by one hypothesis: a historical analysis of 3d Auxiliary Surgical Group support to First Army in the European Theater of Operations (ETO) can be used to suggest potential doctrine, organization, and personnel solutions to current and future gaps in tailored advanced medical services capabilities for the US Army.

The Army Health System (AHS) provides support to the warfighting functions of sustainment and protection. It supports the sustainment and protection warfighting functions through two missions—Health Service Support (HSS) and Force Health Protection (FHP). The HSS mission “supports and services performed, provided, and arranged by the AMEDD to promote, improve, conserve, or restore the behavioral and physical well-being” and the FHP mission “measures to promote, improve, or conserve the behavioral and physical well-being but this study focused on health service support.”²⁴ The BCT is the Army’s main warfighting unit and represents the bulk of the US ground force.²⁵ This study focused on one of the five means—tailored advanced medical services for the forward environment—mentioned in the *Forward Resuscitative Care (FRC) In Support of Dispersed Operations Capabilities-Based Assessment Shortfalls Report*. In order to provide an AMEDD surgical capability example that meets the means of tailored advanced medical services, the study utilized 3d ASG’s support for First Army in the European Theater of Operations (ETO) because the 3d ASG was able to support a forcible entry operation into a contested environment, holding patients until windows of opportunity allowed for patient evacuation, and transitioning to provide continued support to field, evacuation, and base hospitals as they moved to secure Normandy.

²³ Clausewitz, *On War*, 89.

²⁴ FM 4-02, 1-4.

²⁵ Congressional Budget Office, *The US Military’s Force Structure: A Primer* (Washington, DC: Government Printing Office, 2016), 3, accessed January 1, 2018, <https://www.cbo.gov/sites/default/files/114th-congress-2015-2016/reports/51535-fsprimer.pdf>.

This study is based on a primary assumption that the United States military needs to “operate, fight, and campaign successfully across all domains—space, cyberspace, air, land, maritime—against peer adversaries” by 2020.²⁶ A secondary assumption that guides this study is that the AMEDD will have adopted the first responder medical procedures at the point of injury—location where injury occurs, prolonged field care to sustain and stabilize casualties in preparation for movement, extended patient movement activities with enhanced en-route care, and decision aids, to include tele-consultation or other job aids, and scalable/modular equipment sets listed in the *Forward Resuscitative Care (FRC) in Support of Dispersed Operations Capabilities-Based Assessment (CBA) Shortfalls Report*.²⁷

Finally, the US Army has never been 100.0% right in its efforts to predict who it will engage, where it will be engaged, when it will be engaged, and what the nature of the engagement will be, but the AMEDD must be prepared to conserve the fighting strength of the force and maintain the national will to support. Since Operation Desert Storm, potential adversaries have gained capabilities that could prohibit the freedom of maneuver once enjoyed by the US military. Adversaries have developed extensive anti-access/area denial (A2/AD) capabilities that may diminish our dominance in the air domain, thus making the US Army operate in contested environments with no access to aeromedical evacuation.

The AMEDD has a history of gaining knowledge to increase the survivability of wounded during and after major conflict by decreasing preventable deaths and the DOW rate.

²⁶ US Army Training and Doctrine Command, *Multi-Domain Battle: Evolution of Combined Arms for the 21st Century 2025-2040*, 1.

²⁷ US Department of Defense, *Forward Resuscitative Care (FRC) in Support of Dispersed Operations Capabilities-Based Assessment (CBA) Shortfalls Report*, (Washington, DC: Department of Defense, 2017), 3. Prolonged Field Care is defined as: field medical care, applied beyond “doctrinal planning time-lines” by a combat medic, independent duty corpsman (IDC), physician’s assistant, or physicians in order to decrease patient mortality and morbidity. The care utilizes limited resources and is sustained until the patient arrives at the next appropriate level of care. For the purposes of this CBA, this care could include surgical interventions, focusing on stabilizing and preparing the patient for movement, and would technically cease once patient movement activities began. This definition draws on the current NATO definition, adopted for use by certain MHS bodies.

Surgical care is one of those areas of knowledge in which AMEDD has excelled. The auxiliary surgical groups of WWII were one of the resulting capabilities produced out of the knowledge gained but as the lethality of adversary weapons increased and aeromedical evacuation took hold, the AMEDD moved surgical capabilities further away from the forward line of troops.

The next section presents a capability overview of US Military Health System (MHS) combat capabilities since WWII designed to provide tailored advanced medical services. The overview will identify the doctrine, organization, and personnel of each; lessons learned that identify strengths and weaknesses; and doctrine/policies that led to their development.

Capability Overview

One of the biggest challenges will be how to include medical support. Dispersed operations will be common. How will you deliver medical care when forces are more widely dispersed, especially for injuries? In a linear battlefield, we have grown accustomed to the medical evacuation guys meeting the golden hour and getting the injured to the forward surgical team. That may no longer be possible. The medical care we are going to have for regular forces will need to be more like the medical care we have now for Special Forces.

—General David Perkins, former TRADOC Commander

Introduction

To determine a potential DOTMLPF-P solution that will provide tailored advanced medical services, a review of past and present service medical organizations, service medical regulations, and lessons learned from the utilization of each services' medical organization. First, we must look to the past to understand the rationale behind such capabilities. It can be said that tailored advanced medical services traces its roots back to Baron Dominique Jean Larrey, surgeon of Napoleon Bonaparte's Imperial Guard and the father of modern military surgery.²⁸ Napoleon considered Larrey to be the most virtuous man that he has ever known because of Larrey's development of the *ambulances volantes* or flying ambulances.²⁹ Larrey developed the flying ambulance in 1792 after he saw the wounded die during the Battle of the Rhine after thirty-six hours of neglect and he was able to successfully implement the flying ambulance in the Battle of Metz a year later to decrease morbidity and raise morale.³⁰ Larrey designed the flying ambulance to provide care at point of injury including surgery prior to removing the patients from the battlefield. Furthermore, Larrey ensured that the flying ambulances provided supplies—shelter, food, bandages, pharmacy, and water—needed for survival and recovery.³¹

²⁸ Panagiotis N. Skandalakis, et al, "To Afford the Wounded Speedy Assistance: Dominique Jean Larrey and Napoleon," *World Journal of Surgery* 30, no. 8 (2006): 1392.

²⁹ Skandalakis, et al, "'To Afford the Wounded Speedy Assistance'."

³⁰ *Ibid.*, 1395.

³¹ David R. Welling, David G. Burris, and Norman M. Rich, "The Influence of Dominique Jean Larrey on the Art and Science of Amputations," *Journal of Vascular Surgery* 52, no. 3 (2010): 791.

Service Medical Organizations

Auxiliary Surgical Group (ASG) (Army)

At the beginning of World War II, field hospitals were the primary, forward surgical facilities in the Army. However, they had grown to 400 beds and were thus, too large and immobile. It became necessary to place field hospitals near airfields for patient evacuation out of theater. The Office of the Army Surgeon General's Professional Consultants Division proposed the building of four auxiliary surgical groups to restore surgical care to the front that could transition to a surgical augmentation to the field, evacuation, and base hospitals (Figure 1). A fifth auxiliary surgical group was employed later in WWII.

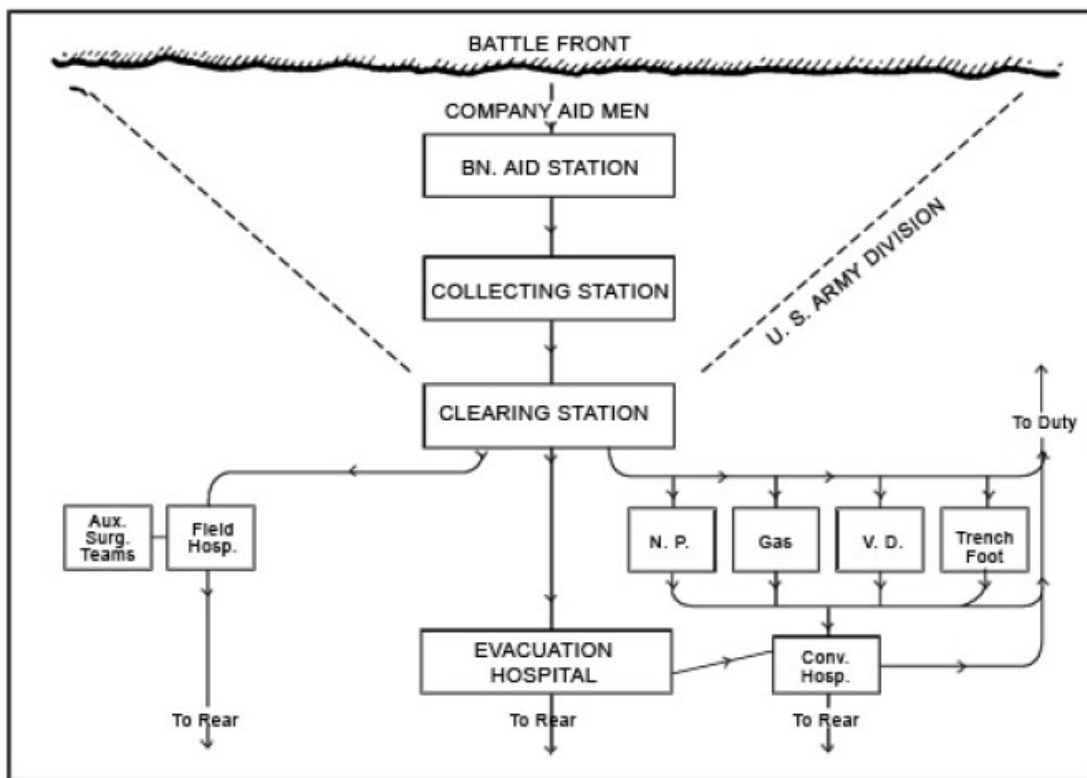


Figure 1. Evacuation of Casualties in an Army Zone. "Schematic representation of evacuation of casualties in an Army Zone," 3d Auxiliary Surgical Group, WW2 US Medical Research Centre, accessed April 12, 2018, <https://www.med-dept.com/unit-histories/3d-auxiliary-surgical-group/>.

The ASGs had 378 personnel broken into a headquarters section and nine types of teams—twenty-four general surgical teams, six orthopedic teams, six shock teams, six gas teams, four maxilla-facial teams, four neuro-surgical teams, four thoracic-surgical teams, four miscellaneous teams, and three dental-prosthetic teams (Table 2). The table of organization for the ASG stated that the surgical teams were comprised of a chief surgeon, assistant surgeon, anesthesiologist, surgical nurse, and two enlisted technicians. The ASGs were built to support divisions (50,000+ Soldiers) in the clearing stations and theater hospitals.³² The ASG teams were credited with decreasing mortality from penetrating abdominal mortality from a high of 66.0% in World War I to 24.0% in World War II.³³

³² Rod Powers, “How the US Army is Organized,” *The Balance Careers* (October 13, 2017), 4, accessed April 21, 2018, <https://www.thebalancecareers.com/u-s-army-military-organization-from-squad-to-corps-4053660>.

³³ Matthew Bradley, et al. “Combat Casualty Care and Lessons Learned from the Past 100 Years of War.” *Current Problems in Surgery* 54, no. 6 (2017): 323.

Table 2. Table of Organization of Auxiliary Surgical Group

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
Unit	Technician grade	Headquarters	24 surgical teams *	6 orthopedic teams *	6 shock teams *	6 gas teams *	4 maxillo-facial teams †	4 neuro-surgical teams ‡	4 thoracic-surgical teams §	4 miscellaneous teams ¶	3 dental prosthetic teams ¶	Total	Enlisted cadre	Remarks
2 Colonel.....		1										1		<ul style="list-style-type: none"> * 1 surgical team consists of— <ul style="list-style-type: none"> 1 general surgeon. 1 assistant general surgeon. 1 anesthetist. 1 nurse. 2 surgical technicians. † 1 orthopedic team consists of— <ul style="list-style-type: none"> 1 orthopedic surgeon. 1 nurse. 2 surgical technicians. ‡ 1 shock team consists of— <ul style="list-style-type: none"> 1 general surgeon. 1 nurse. 2 surgical technicians. § Dental Corps.
3 Lieutenant colonel.....		1										1		
4 Major.....			24	6	6	6	(4) 8	4	4	4	3	45		
5 Captain.....			24	6	6	6		4	4	4	3	50		
6 First lieutenant.....			24	6	6	6		4	4	4	3	52		
7 Total commissioned.....		3	72	18	18	18	8	12	12	12	9	132		
8 Nurse.....		2	24	6	6	6	8	4	4	4		70		
9 First sergeant (585).....		1										1	1	<ul style="list-style-type: none"> ** 1 gas team consists of— <ul style="list-style-type: none"> 1 officer, specially trained in treatment of chemical casualties. 1 nurse. 2 medical technicians. † 1 maxillo-facial team consists of— <ul style="list-style-type: none"> 1 plastic surgeon. 1 oral surgeon. 1 nurse-anesthetist. 1 nurse. 1 dental technician. 1 surgical technician. ‡ 1 neuro-surgical team consists of— <ul style="list-style-type: none"> 1 neuro-surgeon. 1 assistant operating surgeon. 1 anesthetist. 1 nurse. 2 surgical technicians. § 1 thoracic-surgical team consists of— <ul style="list-style-type: none"> 1 thoracic surgeon. 1 assistant surgeon. 1 anesthetist (intra-tracheal anesthesia). 1 nurse. 2 surgical technicians. ¶ Specialists not otherwise provided for and as directed.
10 Staff sergeant, including.....		1										1	1	
11 Mess (524).....		(1)										(1)	(1)	
12 Sergeant, including.....		4										4	4	
13 Section leader (552).....		(2)										(2)	(2)	
14 Supply (821).....		(1)										(1)	(1)	
15 Supply, medical (825).....		(1)										(1)	(1)	
16 Corporal, including.....		1										1	1	
17 Clerk-typist (455).....		(1)										(1)	(1)	
18 Technician, grade 4.....												52	1	
19 Private, first class, including.....		44	48	12	12	12	8	8	8	8	9	79	1	
20 Private, first class.....		1										1	1	
21 Private.....												21	1	
22 Chauffeur (344).....		(3)										(3)	(3)	
23 Chauffeur (345).....		(3)										(3)	(3)	
24 Clerk, general (453).....		(1)										(1)	(1)	
25 Clerk-typist (455).....		5										5	5	
26 Clerk-typist (456).....		(1)										(1)	(1)	
27 Cook (900).....		4										4	(1)	
28 Cook (902).....		5										5	(1)	
29 Cook's helper (821).....		(9)										(9)	(9)	
30 Mechanic, automobile (014).....		5										5	(1)	
31 Orderly (466).....		(10)										(10)	(10)	
32 Stereographer (213).....		4										4	(1)	
33 Technician, dental (067).....		4										(3)	(3)	
34 Technician, dental (067).....		5										(5)	(5)	
35 Technician, medical (122).....		5					(6)			(4)		(10)	(10)	
36 Technician, medical (122).....		4					(6)			(4)		(6)	(6)	
37 Technician, surgical (225).....		4		(24)	(6)	(5)		(4)	(4)	(4)		(44)	(44)	
38 Technician, surgical (225).....		5		(24)	(6)	(5)		(4)	(4)	(4)		(32)	(32)	
39 Basic (371).....		(5)										(5)	(5)	
40 Total enlisted.....		51	48	12	12	12	8	8	8	8	9	176	6	
41 Aggregate.....		56	144	24	24	24	24	24	24	15	12	278	6	
42 Q Car, 5-passenger, light sedan.....		3										3	3	<ul style="list-style-type: none"> ¶ Medical Administrative Corps. † Principal chief nurse and assistant chief nurse. ** Includes 4 nurse-anesthetists.
43 Q Truck, 1½-ton, weapon carrier.....		1										1	1	
44 Q Truck, 1½-ton, cargo.....		2										2	2	
45 Q Truck, 2½-ton, dental laboratory.....												3	3	

Source: Data from "3d Auxiliary Surgical Group," WW2 US Medical Research Centre, "Copy of T/O 8-57, dated 13 July 1942, Organization of the Auxiliary Surgical Group," accessed January 1, 2018, <https://www.med-dept.com/unit-histories/3d-auxiliary-surgical-group/>.

In 1943, the 2d ASG became the first forward deployed ASG when it supported Fifth Army in the North African, Sicilian, and Italian campaigns. The 2d ASG supported operations in southern France with Seventh Army. The 2d ASG treated 22,000 casualties. The 1st ASG provided support to 3d ASG during their time in Normandy and were able to place six of their teams under the control of 3d ASG to support evacuation hospitals. The 1st ASG was able to support XVIII Airborne Corps in September 1944, Seventh Army November to December 1944

and 17th Airborne Division in March 1945. By April 1945, 1st ASG supported Fifteenth Army and had treated 10,469 casualties.³⁴

The 3d ASG supported operations in North Africa and Sicily in 1943 before supporting First Army during Operation Overlord, Operation Market-Garden, and the Battle of the Bulge. The 3d ASG treated 25,000 casualties. The 4th ASG assisted 3d ASG supporting First Army during the invasion of Normandy before supporting Third Army. Because of the dire situation during the Siege of Bastogne, two of the teams from 4th ASG provided support. Furthermore, 4th ASG was able to support 17th Airborne Division during Operation Varsity. The 4th ASG treated 17,222 casualties. Being the last team formed, the 5th ASG supported fewer operations and treated fewer casualties. Neither of these actions take away from their efforts treating 15,000 casualties during their time with Ninth Army and Fifth Army.³⁵

The Annual Report to the Surgeon General from the Third Auxiliary Surgical Group for the Year 1944 noted that 3d ASG provided support to First Army medical units in the ETO but 3d ASG teams needed special surgical equipment to support the clearing stations. Furthermore, the Airborne teams provided early surgery in contested environments where there were no conventional hospitals. The report listed a need for increases in medical administrative officers, from two to three, and an increase of six additional team trucks. The nurses that were assigned to each general surgical team were separated from the ASG and sent to work in the field hospitals,

³⁴ “3d Auxiliary Surgical Group,” *WW2 US Medical Research Centre*, 32-33, accessed January 1, 2018, <https://www.med-dept.com/unit-histories/3d-auxiliary-surgical-group/>.

³⁵ “3d Auxiliary Surgical Group,” 34-36.

and that all specialists, minus neurological and maxillofacial, should have deployed with evacuation hospitals. Most importantly, the report defined

the “ideal” team for a field hospital consists of a general surgeon, a chest surgeon, an assistant with leanings towards orthopedics, an anesthetist, and four enlisted men. There should be at least one chest surgeon for every three teams so that no functioning field hospital platoon will be entirely without a specialist of that sort.³⁶

The Annual Report to the Surgeon General from the Third Auxiliary Surgical Group for the Year 1944 listed similar terms for the “ideal” combination.

A mature general surgeon whose primary interest is abdominal work. A general surgeon whose primary interest is chest work. A younger man with a sound surgical background. If his hospital training has been in orthopedics, so much the better. There is no need for an orthopedic surgeon in the civilian sense of the word. An anesthetist who masters the intricacies of general anesthesia in all its varieties. Four enlisted men with clear heads and steady hands.³⁷

In his report to the Office of the Surgeon General on June 8, 1945, Major Crandall stated

I believe that in an airborne operation early surgery is essential, and therefore there should be adequate personnel committed early in the operation. This means that there is definitely a place for the airborne surgical team, which I think should be permanently attached to the medical clearing company or whatever medical group is serving that combat unit. They should be permanently attached, because it is essential to have a smoothly functioning, well-organized surgical section in a station when it is isolated and even after it is no longer isolated. Evacuation may not be good, the nontransportables must always be operated, and the Medical unit is way out in front of the non-airborne troops.

With a division I think that there should be a minimum of four surgical teams. These would not necessarily have to be auxiliary surgical teams, but judging from what I have seen, a clearing company usually has no one who is qualified to do major surgery. In some clearing companies I have found one or two men who were so qualified. If there is adequate personnel in the clearing company to form these four teams, that is fine; if not, I would recommend that at least two auxiliary surgical teams be attached to each company. With two such teams, the work could be scheduled on twelve-hour shifts. I believe that this arrangement

³⁶ US Army Medical Department, Office of Medical History, “Annual Report to the Surgeon General from the Third Auxiliary Surgical Group for the Year 1944,” 58, accessed April 4, 2018, <http://history.amedd.army.mil/booksdocs/wwii/3dASG/3dASG1944.html>.

³⁷ *Ibid.*, 36.

would result in maximum efficiency. Our team once worked for one hundred hours straight, without rest, but that is too long.³⁸

In his report to the Commanding Officer of the 3d ASG, Major Benjamin R. Reiter, commander of General Surgical Team No. 14, called for shock teams to support surgical teams to maintain surgical output. He stated, “It is impossible for one surgical team to be doing 2 major operations and be running the shock tent simultaneously without great slowing in our surgical output.”³⁹

Forward Surgical Team (FST) (Army)

After the success of the ASG, the AMEDD transitioned to the Mobile Army Surgical Hospitals (MASH) to provide mobile surgical capabilities. After the weight of MASH equipment grew to 200,000 pounds and the MASH scheduled to support Operation Urgent Fury in Grenada in 1983 did not arrive until the fourth day of the invasion, the AMEDD realized that a more mobile, surgical capability was needed to support airborne operations in Operation Just Cause in Panama in 1989. To meet this need, the AMEDD created surgical squads to fill this requirement. As with the MASH, the size and weight of the surgical squad’s equipment necessitated movement by air thus delaying its ability to provide immediate care upon landing with the unit. After this performance, the AMEDD realized that a “small, easy-to-insert surgical capability” was needed to support the force and began development of the FST to provide immediate surgical care.⁴⁰

³⁸ US Army Medical Department, Office of Medical History, “Report of Medical Department Activities in European Theater of Operations by Albert J. Crandall, Major, MC, Third Auxiliary Surgical Group, First Airborne Surgical Team, Prisoner-of-War, 8 June 1945,” 15.

³⁹ US Army Medical Department, Office of Medical History, “General Surgical Team No. 14, 3D Auxiliary Surgical Group,” 6, accessed April 4, 2018, <http://history.amedd.army.mil/booksdocs/wwii/3dASGTeam14DDay.htm>.

⁴⁰ Harry Stinger and Robert Rush, “The Army Forward Surgical Team: Update and Lessons Learned, 1997-2004.” *Military Medicine* 171, no. 4 (April 2006): 269.

In the 1990s, the 274th Medical Detachment (Airborne) and 250th Medical Detachment Surgical (Airborne) were fielded as the Army's first airborne FSTs.⁴¹ The AMEDD designed the FST to be a 20-person team composed of ten officers and ten enlisted personnel. The FST supports one BCT (4,400 to 4,700) or augments US Army hospitals.⁴² To provide surgery, the AMEDD placed three general surgeons, one orthopedic surgeon, two certified registered nurse anesthetists, operating room nurse, and enlisted operating room technicians. The FST can conduct thirty operations in a 72-hour period by doctrine and has limited holding capabilities once completed. The FST needs to be near other units for life support. Unlike Airborne Surgical Team No. 1's ability to hold patients for 72 hours, the FST must evacuate all patients within six to eight hours after surgery.⁴³ FSTs are not built to handle regular sick call duties but can assist if collocated with a BSMC.

The FST has been split into two, 10-person squads to meet mission requirements in Iraq and Afghanistan, but this should only be done as a last resort based on METT- TC requirements because the FST suffers a degradation in capabilities once the split occurs. The Golden Hour has decreased the KIA rate but the DOW rates of casualty treated at an FST are higher than those in the Combat Support Hospital (CSH). Once split, the FST has "clinical imbalances and vulnerabilities" that "generates two unbalanced assets with a clinical capability of roughly 30.0%."⁴⁴ In 2010, it became necessary to submit an Operational Needs Statement to transfer FST property to Theater Provided Equipment to have enough equipment to effectively augment any future FST splits.⁴⁵ Because of this it has been stated that "FSTs must be evaluated with great

⁴¹ Stinger and Rush, "The Army Forward Surgical Team," 269.

⁴² Congressional Budget Office, *The US Military's Force Structure: A Primer*, 3.

⁴³ Stinger and Rush, "The Army Forward Surgical Team," 270.

⁴⁴ Brad Richardson, "Split-Based Forward Surgical Teams," CALL (9 November 2009): 1.

⁴⁵ Brad Richardson, "Forward Surgical Team (FST) Equipment Operational Needs Statement (ONS)," CALL (27 January 2010): 1.

caution during different phases of a conflict (e.g., invasion, maneuver, or retreat) after judging the battlefield conditions, evacuation efficiency, and medical care requirements.”⁴⁶

In a comparison between a split and 20-person FST, it was noted that the 20-person FST had a higher mortality rate which indicates that the full strength might not be advantageous. Medical care in Iraq and Afghanistan has placed the FST further from the front lines and “24.3% of these deaths were identified as potentially survivable.”⁴⁷ This supports the idea that a smaller and more flexible surgical capability would provide greater outcomes. The utilization of a surgical group with numerous smaller teams “could be used separately, combined with each other or joined with other surgical and ancillary medical facilities according to the predicted medical care requirements.” The utilization of the nurse teams used by the surgical groups would provide holding capabilities for a singular team, multiple teams, or a hospital.⁴⁸

Medical Battalion (US Marine Corps)

The Marine Logistics Group medical battalion provides support to elements of the Marine Air-Ground Task Force (MAGTF) (2,200 to 48,000 personnel) that require care beyond their organic capabilities.⁴⁹ The medical battalion provides the only Role 2 medical care that includes initial resuscitative and surgical treatment, emergency care, preventative medicine and patient holding. The medical battalion is comprised of two to three surgical companies and an Headquarters and Service company with an additional surgical company. Each surgical company includes four laboratories, four x-ray, eight to fourteen forward resuscitative surgery systems (FRSSs), eight to fourteen shock trauma platoons (STPs), eight to fourteen enroute care systems

⁴⁶ Brad Richardson, “Split-Based Forward Surgical Teams,” CALL (9 November 2009): 1.

⁴⁷ Yi-Ling Cai, et al, “Military Trauma and Surgical Procedures in Conflict Area: A Review for the Utilization of Forward Surgical Team,” *Military Medicine* 183, no. 3/4 (2018): e103.

⁴⁸ Ibid., e103-106.

⁴⁹ Michael Moron, “Modern Military Force Structures,” *Council on Foreign Relations* (October 26, 2006), 17, accessed April 21, 2018, <https://www.cfr.org/backgrounders/modern-military-force-structures>.

(ERCSSs) (one critical care nurse and one corpsman), four wards, and one combat stress team. The medical battalion units can be tailored to meet the demands of the MAGTF by task organizing the surgical company components to meet mission requirements. FRSS personnel include two surgeons, one anesthesiologist, one critical care nurse, one Independent Duty Corpsman, one Field Medical Technician, and two operating room technicians. The FRSS can perform a maximum of eighteen surgeries in a 48-hour period, but they can only treat five—two pre-op, one intraoperative, and two post-operative—patients at a time. The FRSS equipment weighs 6,300 pounds and covers 640 cubic feet. The FRSS can be placed into and taken out of operation within sixty minutes and does not require materiel handling equipment to be loaded or offloaded. The FRSS has the capability to be rapidly transported and deployed by MV-22 Osprey. Two FRSS teams and an STP added increased HSS capability to units during Operationa Iraqi Freedom II.⁵⁰

The Bravo Surgical Company of 1st Medical Battalion deployed in support of I Marine Expeditionary Force (I MEF) during Operation Iraqi Freedom in April 2004. By August 2004, Bravo Surgical Company had suffered serious administrative issues that hampered its operations and a team of three US Navy medical officers published a paper, “Lessons Learned from Bravo Surgical Company (part of I MEF) in Operation Iraqi Freedom,” that outlined the issues, provided discussion on the issues, and provided solutions to each issue. The paper pointed out the following: unsatisfactory staffing, lack of unit modularity, unable to accept all missions, lack of pediatric capability, and inadequate consumables and equipment.⁵¹

⁵⁰ US Marine Corps, Marine Corps Reference Publication (MCRP) 4-11.1E, *Health Service Support Field Reference Guide* (Washington, DC: Headquarters US Marine Corps, 2015): 2-18, accessed January 1, 2018, http://www.marines.mil/Portals/59/MCWP%204-11_1.pdf.

⁵¹ V. Pothula, James Chimiak, Anil Taneja, “Lessons Learned from Bravo Surgical Company (Part of I MEF) in Operation Iraqi Freedom,” RTO-MP-HFM-109 (September 1, 2004): 5-3—5-7, accessed April 16, 2018, <http://www.dtic.mil/dtic/tr/fulltext/u2/a444897.pdf>. Paper presented at the RTO HFM Symposium on “Combat Casualty Care in Ground Based Tactical Situations: Trauma Technology and Emergency Medical Procedures,” held in St. Pete Beach, USA, 16-18 August 2004, and published in RTO-MP-HFM-109.

The Navy officers stated, “The unsatisfactory staffing...is a poor mix of nurses and physicians. For higher patient flows, Bravo surgical company would not have met its mission.” The Navy officers recommended the following changes to manning: “Shock Stabilization Unit (Shock Trauma Team) with 4-6 Emergency Room physicians, 1 Family Practice Physician, and 1 Physician Assistant; Anesthesia with 5 anesthesiologist and 3 certified registered nurse anethetists; Surgery with 4 general surgeons and 3 orthopedic surgeons; intensive care unit with 3 intensivist and 6 intensive care unit nurses; and a Ward with a mixture of Internal Medicine, Family Practice, and Pediatrics.”⁵²

The Navy officers stated that the company had become “too big and too slow and hard to move, irrelevant in today’s fast moving Marine combat operations, [but] little FRSS with its meager ability to handle large number of casualties is clearly inadequate in major battles where casualties are expected.” The officers felt that “the component parts of each platoon need to be broken down into its smallest independently functioning pieces and loaded into containers appropriately,” so “the appropriate number of [operating rooms] and ward can be sent with the [shock stabilizartion team] to the assigned location” and “be ready to receive patients in hours instead of days with only a moderate lift requirement.”⁵³

In conclusion, the officers found that the medical battalion could not fulfill mission request of the commanding general. They found that the surgical company only had a mission “to perform emergent combat related trauma surgical intervention,” therefore it was unable to “perform sick call, emergent medical treatments, and humanitarian assistance.” The officers suggested that there are surgical and primary care platoons with Obstretician-Gynecologoiist and Pediatric augmentees if applicable.⁵⁴

⁵² Pothula, et al., 5-1—5-8.

⁵³ Ibid.

⁵⁴ Ibid.

The Golden Hour Policy

R. Adams Cowley, prior military surgeon and founder of Baltimore's Shock Trauma Center, felt that trauma patients that receive definitive care within one hour had a better chance for survival. On June 15, 2009, Robert Gates, former Secretary of Defense, instituted the Golden Hour Mandate Policy "with the premise that battlefield casualties would gain additional benefit from further reduced time between injury and care and a firm belief that 1 hour was a matter of morale and moral obligation to the troops." The Golden Hour Policy "mandated a standard of 60 minutes or less, from call to arrival at the treatment facility, for prehospital helicopter transport of US military casualties with critical injuries."⁵⁵ At the time of implementation, medical evacuation times in Afghanistan were closer to two hours. After only being in effect for a few weeks, officials saw medical evacuation times in Afghanistan drop to seven-one minutes.⁵⁶

Ad-Hoc Solutions (Joint)

The FST was created to meet the need for a far-forward surgical capability but over the last decade the AMEDD has created even smaller ad hoc units to maintain compliance with the golden hour mandate. The FST is a singular unit and only one unit identification code thus it can only be split once the entire unit was on orders.⁵⁷ Those capabilities are the Golden Hour Offset Surgical Treatment Team (GHOSTT) employed in 2013 in Afghanistan and the Expeditionary Resuscitative Surgical Teams (ERST) employed in 2016 in Africa. These units were built to provide damage control surgery with a limited supply of medical materiel carried in rucksacks.

⁵⁵ Russ S. Kotwal, et al, "The Effect of a Golden Hour Policy on the Morbidity and Morality of Combat Casualties," *JAMA Surgery* (January 2016): 16, accessed July 31, 2017, <http://jamanetwork.com/journals/jamasurgery/fullarticle/2446845?resultClick=1>.

⁵⁶ Thom Shanker, "Gates Seeks to Improve Battlefield Trauma Care in Afghanistan," *New York Times* (January 27, 2009): 9, accessed April 18, 2018, <https://www.nytimes.com/2009/01/28/washington/28military.html>.

⁵⁷ US Army Force Management School, *SAMAS Code Book: Reference Handbook* (US Army Force Management School, January 24, 2018), 7, accessed April 21, 2018, http://www.afms1.belvoir.army.mil/files/qr/samas_code_book.pdf. The Unit Identification Code (UIC) is a six-digit code which uniquely identifies every MTOE and TDA unit in the Army.

There can be as few as four or five total people on the team. Because of this, US Special Operations Command (USSOCOM) and the Combatant Commands (CCMD) are seeking the GHOSTT or ERST as replacements for the FST.

By supplying the GHOSTT and ERST capability, the AMEDD has seen the operative tempo of its general surgeons increase. Currently, an Army general surgeon is deploying for up to nine months, not including over four months of training, followed by ten to twelve months of “low-acuity, low-volume practices at a stateside military hospital before deploying again.” Further exacerbating this idea is the fact that Army general surgeons are deploying within sixty days of graduating from their residency.⁵⁸ Ad hoc solutions such as the GHOSTT and ERST have the potential “to be ignored by other organizations whose support may be helpful” and “funding...seldom will have utility or sufficiency through multiple fiscal years.”⁵⁹

Summary

A comparison of the ASG, FST, and US Marine Corps Medical Battalion revealed that the ASG and Medical Battalion met a total of 10 categories each (Table 2). The ASG and the Medical Battalion differed in the number of specialty teams, pharmacy, and laboratory. The ASG did not have pharmacy and laboratory and Medical Battalion was missing specialty teams such as neurological and maxillofacial.

⁵⁸ Mary J. Edwards, et al, “Saving the Military Surgeon: Maintaining Critical Clinical Skills in a Changing Military and Medical Environment,” *Journal of the American College of Surgeons* 222, no. 6 (2016): 1258-1264.

⁵⁹ US Army Training and Doctrine Command, US Army Training and Doctrine Command (TRADOC) Pamphlet 525-8-1, *TRADOC Generating Force Study: Innovation and Adaptation in Support to Operations* (Washington, DC: Department of the Army, 2010): 86, accessed April 4, 2018, <http://adminpubs.tradoc.army.mil/pamphlets/TP525-8-1.pdf>.

Table 3. Comparison of Capabilities

	Auxiliary Surgical Group	Forward Surgical Team	Medical Battalion
COMBAT EMPLOYMENT	X Large-scale combat, Multi-Domain Battle	X *Counterinsurgency (COIN) Operations	X *Counterinsurgency (COIN) Operations
SHOCK TEAMS	X		X
SURGICAL SUB-SPECIALTY*	X	X	X
2 General Surgery Teams		X	
2+ General Surgery Teams	X		X
Specialty Surgery Team	X		
3+ Total Surgical Teams	X		
POST-SURGICAL INPATIENT (PATIENT HOLDING)*	X NOTE: Nurse Teams located at hospitals	X	X
PHARMACY*			X
LABORATORY*		X	X
RADIOLOGY*	X NOTE: Mobile X-Ray Units	X	X
SUPPORT MULTIPLE LOCATIONS	X	X	X
2 Locations		X	
2+ Locations	X		X
Mobile	X	X	X
Total Above Criteria Met	10	8	10
<p>* Tailored Advanced Medical Services for a Forward Environment are defined as: those advanced emergency services that may include the surgical sub-specialty, post-surgical inpatient, and ancillary (pharmacy, laboratory, radiology) services as elements of doctrinal FRC, but tailored for delivery to a patient in a forward environment (prior to reaching a full Role 3/4 facility) who may have been stabilized (likely through prolonged field care) and moved over an extended period of time (or distance). The limited and tailored selection of these specific and advanced services would be made during the medical planning stage and adjusted during extended deployments as necessary, so as to be provided with the smallest capability packages necessary to support dispersed operations or operations in remote and/or austere environments. This definition draws on the definition of Advanced Medical Services in JP 4-02, Health Services Support.</p>			

Source: Data provided by author.

Unlike the FST, the ASG can provide teams to multiple locations without degrading the capabilities of the group. As the MASH grew, the AMEDD lost the ability to quickly provide surgical capabilities forward. The FST, which degrades after splitting into two teams, was meant to provide that missing capability. Because of its successful support in the European Theater of Operations, the ASGs provided a prism to look through to develop potential tailored advanced

medical services solutions to support MDB and any future Army operating concept. For this reason, a historical case study will be conducted of ASG support in the ETO. During the historical case study, the 3d ASG will be studied because of its surgical teams' ability to hold patients for approximately seventy-two hours in a contested environment, its headquarters' ability to provide mission control for 150 surgical teams, and its ability to support the range of military operations (forcible entry to large scale, multi-domain combat) and simultaneously augment hospitals to increase surgical and patient holding capabilities.⁶⁰

The ASGs were able to “thrive and grow when exposed to [the] volatility, randomness, disorder, and stressors” associated with supporting First Army in the ETO. The ASG was an example of antifragility being built into casualty care. The ASG could be considered an organization built on Nassim Nicholas Taleb’s barbell strategy—“extreme risk aversion on one side and extreme risk loving on the other”—to avoid “the corruption of the middle.”⁶¹ The ASG provided support to hospitals in the rear areas (risk aversion) and clearing stations (extreme risk loving) simultaneously. The AMEDD avoided adopting the moderate solution.

The next section will define methodologies to define tailored advanced medical services utilized since WWII; to determine which capability best meets the current definition of tailored advanced medical services; to view that capability in a historical context; to determine doctrine, organization, and personnel solutions; to validate whether the solutions meet required capabilities (RCs) identified in Army concepts; and to validate if the solutions can support the quantitative BCT requirements in various scenarios.

⁶⁰ US Army Medical Department, Office of Medical History, “Annual Report to the Surgeon General from the Third Auxiliary Surgical Group for the Year 1944,” 42.

⁶¹ Nassim Nicholas Taleb, *Antifragile: Things that Gain from Disorder* (New York: Random House Trade Paperbacks, 2014), 3 and 161.

Methodology

The Army doesn't need \$1 million solutions to \$100 problems. The army does not buy things to fight. We develop capabilities to win in a complex world that is ever changing.”

—General David. G. Perkins, former TRADOC Commander

Because the Army has changed the *Operations* manual eight times since 1975 and “we have a perfect record predicting future wars...0 percent,” the Army Medical Department (AMEDD) should develop capabilities that support the BCT against a wide variety of opponents and battlefield conditions.⁶² As adversaries become increasingly capable of contesting operations by BCTs and impeding freedom of maneuver, the Army application of the Golder Hour Policy will have to be applied during increasingly limited windows of opportunity. This creates a potential capability gap in medical evacuation.

When a capability gap is identified, the Department of Defense utilizes the Joint Capabilities Integration and Development System (JCIDS) to generate requirements to fill gaps in capabilities that support the National Defense Strategy through an integrated, joint process. JCIDS seeks to fill these gaps by generating materiel or non-materiel solutions across doctrine, organization, training, materiel, leadership and education, personnel, facilities, and policy (DOTMLPF-P) solutions.⁶³

The Office of the Joint Staff Surgeon sponsored the Forward Resuscitative Care (FRC) in Support of Dispersed Operations Capabilities-Based Assessment (CBA) to determine capability gaps in the joint force's ability to provide care forward in a MDB environment. The Office of the Joint Surgeon's *Forward Resuscitative Care (FRC) in Support of Dispersed Operations Capabilities-Based Assessment (CBA) Shortfall Report* revealed four shortfall areas: (1) “lack of ability to plan for and manage FRC in support of dispersed operations or those conducted in

⁶² Zenko, “100% Right 0% of the Time,” 8.

⁶³ US Army Force Management School, *Capabilities Development and System Acquisition Management Executive Primer*, version 18.0 (US Army Force Management School, February 2013), 5-6.

austere or remote environments; (2) insufficient preparation of individuals, teams, and units for the conduct of prolonged field care and FRC in isolated environments; (3) lack of standardization across the Services and USSOCOM for the planning, preparation, and execution of extended patient movement activities, to include the provision of associated en route care; and (4) lack of standardized, modular capabilities readily-available to operational commanders to support the provision of tailored advanced medical services for a forward environment.”⁶⁴

As part of the Joint Force’s JCIDS process, the Army conducts a three-phase assessment process: (1) functional area analysis (FAA), (2) functional needs analysis (FNA), and (3) functional solution analysis (FSA). As the first phase of a CBA, the FAA, based on professional military knowledge, employs a qualitative, operational analysis to provide a framework utilized during the FNA to assess required capabilities (RC). Joint and Army functional concepts “[describe] how the force will operate, the timeframe and environment in which it must operate, its RCs (in terms of missions and effects), and its defining physical and operational characteristics” are the primary inputs to the FAA. The FAA produces RCs with associated tasks, conditions outlined in the Universal Joint Task List (UJTL), and standards outlined in the Army Universal Task List (AUTL) that are used to evaluate current and future capabilities during the FNA.⁶⁵

The second phase of the CBA, the FNA, is an assessment of the ability of the current and future Army capabilities to accomplish “tasks identified in the FAA, in the manner prescribed by the concept, under the full range of operating conditions, and to the prescribed standards.” During this phase, capability gaps and overlaps are identified. The FNA identifies the gaps and overlaps

⁶⁴ US Department of Defense, *Forward Resuscitative Care (FRC) in Support of Dispersed Operations Capabilities-Based Assessment (CBA) Shortfalls Report* (Washington, DC: Department of Defense, 2017), i.

⁶⁵ US Army Force Management School, *Capabilities Development and System Acquisition Management Executive Primer*, 23-24.

as either “cannot be performed, performed to standard, performed in some conditions, or performed in the manner that the concept requires using the current or programmed force.” The capability defined in this monograph must be applicable to joint and coalition warfare. If read, this monograph should provide the reader with a supportable capability and clear understanding of the tactical to strategic effects of not utilizing this capability to fill gaps.⁶⁶

The final phase of the CBA, the FSA, applies potential non-materiel doctrine, organization, training, leadership and education, personnel, facilities, and policy approaches, (often denoted by changing the acronym to DOTmLPP-P), and/or materiel approaches to the capability gaps identified in the FNA. In both the non-materiel DOTmLPP-P analysis and materiel substeps of the FSA, the approach to filling gaps must be strategically responsive, feasible, and realizable.⁶⁷

The next section examines the historical case study of the support provided by the 3d Auxilliary Surgical Group in the European Theater of Operations because of its ability to provide tailored advanced medical services to First Army during multiple operations ranging from forcible entry to large scale combat operations and augmentation to AMEDD hospitals. Furthermore, the section assesses whether the operations of the 3d ASG successfully meet the principles of the Army Health System of conformity, proximity, flexibility, mobility, continuity, and control.

⁶⁶ US Army Force Management School, *Capabilities Development and System Acquisition Management Executive Primer*, 23-24.

⁶⁷ *Ibid.*, 24-25.

“Forward Resuscitative Care” in WWII

The history of antiquity is without doubt the most useless and the barest of all.

—Carl von Clausewitz, *On War*

Introduction

There has been an insistence among observers of war that the only accurate view of war is the one viewed through history, but Clausewitz points out the uselessness of history that is antiquated. Historical examples should only be taken from properly known and evaluated modern military history because conditions were different in antiquated times and antiquated times lose minor elements. Critical analysis illuminates practical life better than doctrine. A critical examination of the 3d ASG’s employment in Operation Overload during World War II shows a direct correlation between their implementation and decreased morbidity of wounded. “It is vital to analyze [3d ASG] down to-its basic elements, to incontrovertible truth.”⁶⁸

Studying the wartime experience of 3d ASG during this period, “counts more than any amount of abstract truths” regarding MDB. The presentation of the historical events surrounding the service of Airborne Surgical Team No. 1 of the 3d ASG during Operation Neptune “makes it possible to deduce a doctrine: the proof is in the evidence itself [because] historical examples always have the advantage of being more realistic and of bringing the idea they are illustrating to life” than a simulation or exercise.⁶⁹

3d Auxiliary Surgical Group

In 1944, the 3d ASG prepared to conduct its first full scale combat operations in the ETO. It supported Operation Overlord by providing surgical teams, mobile surgical units, x-ray teams and dental teams. The 3d ASG provided support to First Army throughout the Normandy campaign with twenty-five general surgical teams, nine specialty teams—two neurosurgical

⁶⁸ Clausewitz, *On War*, 156.

⁶⁹ *Ibid.*, 164, 171.

teams, one maxillofacial team, three x-ray teams, and three dental prosthetic teams—and fifteen nurses' teams. By September, the 3d ASG had control of over 150 teams. The surgical teams supported beach and inland operations. The surgical teams were able to provide support to clearing stations during airborne and amphibious forcible entry operations to augmenting divisional field hospitals.⁷⁰

The 3d ASG landed 20 of its 25 general surgical teams within the first thirty-eight hours of the beach landings during Operation Neptune. 3d ASG assigned Teams 1 to 8 to support the 261st Medical Battalion on Utah Beach; Teams 7 to 12 and 15 and 16 to support 61st Medical Battalion at Omaha Beach; Teams 13, 14, 17, and 18 to support 60th Medical Battalion at Omaha Beach; Team 19 to support 307th Medical Company and 82d Airborne Division; and Team 20 to support 326th Medical Company and 101st Airborne Division. Three teams—21, 22, and 23—provided support on Utah Beach and manned mobile surgical units that augmented field hospitals. During its service in the ETO to First Army, the 3d ASG conducted 12,385 surgeries on 9,782 patients: 776 in the clearing stations on the beach; 7,088 in the field hospitals; 3,613 in the evacuation hospitals; and 1,305 in the field hospitals that served as evacuation hospitals.⁷¹

Airborne Elements

Airborne Surgical Team No. 1 (Surgical Team No. 20)

To support the flanks during Operation Neptune, the Allied European Command plan called for airborne operations to cut off routes to the beach. The ASG attached Airborne Surgical Team No. 1 to the 326th Medical Battalion in support of the 101st Airborne Division. Airborne Surgical Team No. 1 consisted of: Major A. J. Crandall, MC; Captain C. O. Van Gorder; Captain J. S. Rodda; Captain Saul Dworkin; Technician 4 Allen N. Ray; Technician 5 Emil K. Natalie;

⁷⁰ US Army Medical Department, Office of Medical History, "Annual Report to the Surgeon General from the Third Auxiliary Surgical Group for the Year 1944," 42-58.

⁷¹ *Ibid.*, 30.

Technician 5 Ernest E. Burgess; and Private Francis J. Muska. During the glider operations of Operation Neptune, Airborne Surgical Team No. 1 “[established] aid stations on the field and adjacent fields of the landing zones not covered by medical aid and to render emergency treatment to all casualties in the vicinity; established and operate a surgical installation for major operative procedures as advanced echelon of the 326th Airborne Medical Company; and functioned as an Auxiliary Surgical Team attached to the 326th Airborne Medical Company.”⁷²

On June 6, 1944, the first wave of gliders carrying Airborne Surgical Team No. 1 took off from Aldermaston airdrome, England and crash landed into its landing zone near Hiesville under darkness at H-3 hours. The team established its aid stations near the landing zones and the members rendezvoused by H-1 hours under enemy mortar fire from a chateau north of Hiesville. By 0915, Airborne Surgical Team No. 1 had treated casualties in the landing zones and established two major and one minor surgical table. Airborne Surgical Team No. 1 worked while receiving enemy sniper and small arms fire until it was neutralized by 101st Airborne Division troops. After the chateau was captured, medical personnel utilized glider borne vehicles, French vehicles, wagons, and improvised litters to transport casualties.

By 2000 hours on June 6, 1944, the second echelon of the 326th Medical Company by glider and the sea borne elements had arrived. The arrival of the additional medical personnel allowed medical personnel to establish four major and three minor surgical tables in the chateau. The medical personnel maintained the seven tables and treated all non-transportable casualties until an aerial bomb destroyed the chateau at approximately 2345 hours on June 9, 1944. On June 10, 1944, the 326th Airborne Medical Company and Airborne Surgical Team reconstituted equipment, replaced personnel, and moved to a position north of Carentan where tentage was

⁷² US Army Medical Department, Office of Medical History, “Airborne Surgical Team No. 1, Third Auxiliary Surgical Group, Attached to 326 A/B Medical Company, 101st Airborne Division, 29 July 1944,” 3, accessed April 4, 2018, <http://history.amedd.army.mil/booksdocs/wwii/Overlord/3dASGTeam20DDay.htm>.

established to conduct medical operations. The team of the 326th and Airborne Surgical Team No. 1 worked tirelessly until relieved on July 11, 1944.

Because of heavy fighting, Airborne Surgical Team No. 1 had to hold patients, approximately 40.0% of all casualties treated during the landing, 72 hours until fighting allowed for the movement of patients to beachhead hospitals and medical battalions. After it released patients for evacuation and obtained new equipment, Airborne Surgical Team No. 1 reassembled and supported the 101st Airborne Division's 36-day assault on Carentan and holding of the defensive line between Carentan and St. Sauver. Airborne Surgical Team No. 1's ability to transition from glider operations near Hiesville to a large-scale assault on Carentan allowed it to treat over 2,000 patients and perform 250 operations.⁷³ At the completion of the 101st Airborne Division's operations, Airborne Surgical Team No. 1 returned to England on July 13 to prepare for its next operation, Operation Market Garden.

Airborne Surgical Team No. 2 (Surgical Team 19)

The 3d ASG provided Team 19, Airborne Surgical Team No. 2, to the 82d Airborne Division to support the 307th Medical Company during Operation Neptune and Operation Market Garden. Over the two operations, the 82d Airborne Division treated 8,171 casualties of which 5,795 were surgical conditions.⁷⁴ Team 19 conducted 1,250 operations—75.0% extremity, 3.0% cranial injury, 8.0% chest wounds, and 11.0% abdominal wounds—with an operative mortality of 3.0%.⁷⁵ Because of concerns of the Commanding General of the 82d Airborne Division, Team 19 was split to provide a surgeon, Major James J. Whitsett, direct surgical care to the Division staff.

⁷³ US Army Medical Department, Office of Medical History, "Airborne Surgical Team No. 1, Third Auxiliary Surgical Group, Attached to 326 A/B Medical Company, 101st Airborne Division, 29 July 1944," 13.

⁷⁴ US Army Medical Department. Office of Medical History. "Headquarters 82nd Airborne Division, Office of the Surgeon, APO 469 US Army, 30 January 1945," 3, accessed April 4, 2018. <http://history.amedd.army.mil/booksdocs/wwii/bulge/82dAirborneDivisionMedServ1944.htm>.

⁷⁵ Ibid.

Major Whitsitt landed in a field along the Carentan-St. Mere highway at H-41 and the remainder of Team 19 arrived the evening of D+1 south of Blosville.⁷⁶ Major Whitsett's service in France began with him saving the life of Colonel Eaton, the 82d Airborne Division Chief of Staff.

Because of the hard landing of their glider, Colonel Eaton loss consciousness and injured his leg. Major Whitsitt moved Colonel Eaton from ditch to ditch throughout the night until noon the next day when Major Whitsitt was able to get him to a chateau that he knew had been identified as the location for an aid station. Upon arriving at the chateau, Major Whitsitt found the chateau crowded with casualties and no battalion medical personnel or medical supplies. By H+8, Major Whitsitt was able to begin surgery with the help of a dental officer acting as his anesthetist. Major Whitsett performed a laparotomy with the basic instrument set, dressings, sterile linens, and sutures. Major Whitsitt worked for 24 hours in the chateau until all patients were evacuated and then he worked with Airborne Surgical Team No. 1 for an additional 24 hours at Hiesville. Major Whitsitt reunited with Team 19 on D+2 at noon. Team 19 landed under heavy machine gun fire but the remaining team members arrived unscathed. Team 19 continued its support of the 82d Airborne Division for a 36-day campaign north to Montebourg and then south to Pont l'Abbe prior to its transition to supporting field hospitals.⁷⁷

Seaborne Elements

The 3d ASG provided surgical teams to 261st Medical Battalion to support the landings on Utah and Omaha Beaches. The 261st Medical Battalions supported the First Engineer Special Brigade, 4th Infantry Division and VII Corps on Utah Beach on the right. The 60th Medical Battalion and 61st Medical Battalion supported the Sixth Engineer Special Brigade, Fifth

⁷⁶ US Army Medical Department, Office of Medical History, "Annual Report to the Surgeon General from the Third Auxiliary Surgical Group for the Year 1944," 4.

⁷⁷ Ibid., 16-17.

Engineer Special Brigade, British Second Army, V Corps, 1st Infantry Division, and 29th Infantry Division on Omaha Beach in the center.

Utah Beach

Prior to D-Day, the 261st Medical Battalion served in the Sicilian campaign. To provide maximum coverage during D-Day, the 261st Medical Battalion divided into three clearing companies—A, B, and C. Each of the clearing companies was supported by two surgical teams. Teams 4 and 5 supported Company A, Teams 1 and 6 supported Company C, and Teams 2 and 3 supported Company B. Companies A and C landed on D-Day and Company B landed on D+1.⁷⁸

Companies A and C landed unmolested and had established areas on the beach by H+6. Company A provided support in the rear area of Uncle Red and Company C provided support in the rear area of Tare Green, the center and western-most US sectors respectively. Company A and C received casualties by noon on D-Day but because of a delay in equipment, Teams 1, 4, 5, and 6 did not perform its first surgeries until H+11 and H+21. As it waited for surgical facilities to be established, Teams 1, 4, 5, and 6 supported Companies A and C as it treated over one hundred patients. Teams 1, 4, 5, and 6 supported Company A and C as it received a steady flow of casualties for one week.⁷⁹

Teams 2 and 3 landed at 1700 on D+1 with Company B, located next to Company C, and provided much needed, albeit short, rest to Teams 1, 4, 5, and 6 after 36 hours of operation before all teams were back operating at full capacity by midnight. To decrease the workload, Teams 1 to 6 developed a rotation and six 4th ASG teams provided support for 24 hours en route to support the 42d Field Hospital. The 3d ASG provided its three reserve teams—Teams 21 to 23—for overnight support on D+4. Teams 1 to 6 received much needed support from other teams during its

⁷⁸ US Army Medical Department, Office of Medical History, “Annual Report to the Surgeon General from the Third Auxiliary Surgical Group for the Year 1944,” 20.

⁷⁹ Ibid.

support on Utah, but by and large, Teams 1 to 6 provided the majority of the surgical capability utilized by the 261st Medical Battalion as it supported five infantry divisions during its coverage on Utah. Teams 1 to 6 supported the 261st Medical Battalion for three weeks until all patients were evacuated to England.⁸⁰

Omaha Beach

Teams 7 to 18 crossed the English Channel in three ships—SS *Empire Anvil*, SS *Dorothea Dix*, and LST (Landing Ship, Tank) 351—with the 60th and 61st Medical Battalions to support combat operations on Omaha Beach. Teams 13, 14, 17, and 18 were aboard LST 351 and supported the 60th Medical Battalion and the 634th Clearing Company on the western portion of Omaha Beach. Teams 7, 9, 10, and 12 were aboard the SS *Dorothea Dix* and Teams 8, 11, 15, and 16 aboard the SS *Empire Anvil* supported the 61st Medical Battalion and the 391st, 392d, and 393d provisional Collecto-Clearing Companies which each consisted of a clearing platoon and collecting company on the eastern portion of Omaha Beach. Teams 8 and 11 supported the 391st, Teams 10 and 12 supported the 392d, and 7, 9, 16, and 16 supported the 393d. The teams landed in an area two-miles long and 300 yards wide that rose from a ridge before falling 80 feet into a tank-ditch. Further complicating the landings were the German gun emplacements in the bluff overlooking the area.⁸¹

All teams landed in three teams except Team 11 led by Major Serbst which landed three hours in advance on the morning of D-Day and Team 18 led by Major Hurwitz which trailed the other teams landed at 1000.⁸² Major Serbst and Team 11 had to endure choppy sea conditions, alignment on the wrong beach, and a flooded boat. After an hour attempting to land, Team 11 returned to the SS *Empire Anvil* to prepare for another attempt to land. Team 11 landed

⁸⁰ US Army Medical Department, Office of Medical History, “Annual Report to the Surgeon General from the Third Auxiliary Surgical Group for the Year 1944,” 20-21.

⁸¹ *Ibid.*, 21.

⁸² *Ibid.*, 21-28.

successfully at H+5 on D-Day to a beach covered with dead, wounded, and German artillery to become the first team from 3d ASG on Easy Green sector of Omaha Beach.⁸³ Because of the effectiveness of the German artillery, Team 11 was unable to organize and sort casualties and make liaison with the Naval shore party medical section and the 16th Infantry Medical Detachment. Team 11 worked with morphine, water in their canteens, and first-aid bags gathered from the surf to save lives. Team 11 gained support from medical officers of the First Division and of the collecto-clearing companies over night until noon the next day.

Teams 8, 15, and 16 came under the same pressures endured by Team 11, but after four attempts these teams landed successfully at H+11 on Dog Red. The teams provided first-aid on the beach until nightfall when they were able to advance further inland to treat the wounded. The teams occupied a dug-out on Easy Red that was within 200 yards of the water's edge with six-foot reinforced concrete walls, a sanded roof, a concealed entrance, and capable to hold 50 litters. The teams and 61st Medical Battalion treated casualties into the hundreds until noon on D+1. Teams were able to recover equipment from the 391st Collecto-Clearing Company and begin surgery on D+2 at 1800. The teams provided surgery and cleared patients for five days on Omaha Beach prior to joining the field hospitals.⁸⁴

The Teams 10 and 12 landed under heavy artillery fire and through landmines at H+7. The teams had to dig craters with their helmets where they remained until nightfall. Teams 7 and 9 were able to begin surgery at 1800 on D+2 with 393d Medical Battalion on Easy Green and Teams 10 and 12 began at 1800 on D+3 with 392d on Fox Green. Teams 7, 9, 10, and 12 provided surgery for four days prior to its move to support the field hospitals.⁸⁵

⁸³ US Army Medical Department, Office of Medical History, "Annual Report to the Surgeon General from the Third Auxiliary Surgical Group for the Year 1944," 23.

⁸⁴ *Ibid.*, 25.

⁸⁵ *Ibid.*, 27.

Teams 13, 14, 17, and 18 disembarked with the 634th Clearing Company and the 29th Division onto a rhino ferry. The mission called for the rhino ferry to land at Dog White, Dog Red, and Easy Green. Prior to arriving at Dog White, the teams had to provide care to wounded as two artillery shells struck the rhino ferry 1600 yards from the shore. The teams remained at sea for over four hours on D-Day with no success and returned to the LST to prepare for an attempt the next morning. On D+1, Teams 13, 14, and 17 boarded landing craft and landed successfully at 0800 on Easy Green and Team 18 landed at 1000. As the other teams advanced, Team 18 treated and evacuated over 100 casualties for five hours on Dog White before helping 634th Clearing Station establish operations.⁸⁶

After landing with Team 13 and Team 18 respectively, Major Campbell and Major Williams provided support to the First Division Clearing Station. The clearing station had no equipment for major surgery so Majors Campbell and Williams fashioned materials they found to provide anesthesia and linens. Major Campbell and Williams had two basic surgical sets. They split one set over two tables and kept the other sterilized. After surgery, Teams 13 and 18 provided three personnel to form a postoperative ward. Teams 13 and 18 continued under these conditions until the evening of D+1 when a functioning station was established. To begin surgery, Major Reiter and Team 14 searched for its equipment but found 25 serious casualties in Les Moulins. In an exposed position, the team worked under a barrage of German sniper fire for several hours and was able to transfer the wounded to the First Division clearing station in the afternoon. Another truck of supplies was found and Major Hurwitz and Team 17 began surgery at 1800. All teams provided surgery in Les Moulins for six days.⁸⁷

⁸⁶ US Army Medical Department, Office of Medical History, "Annual Report to the Surgeon General from the Third Auxiliary Surgical Group for the Year 1944," 28.

⁸⁷ *Ibid.*, 29.

Headquarters, Reserve, and Additional ASG Teams

The 3d ASG commanding officer arrived off Omaha Beach as part of Detachment A with the neurosurgeon and six teams from the 4th ASG aboard the SS *Naushon* on the night of D+1. Detachment A provided surgery “for the first 12 hours aboard ship, went ashore at 1000 the next morning, stayed two days with the clearing stations and then worked at the field hospitals until the evacuation hospitals opened.” Detachment B of 3d ASG was aboard the SS *Lady Connaught*. Detachment B consisted of six 4th ASG general surgical teams for Utah Beach. Detachment B landed the evening of D+2. Detachment B operated at the clearing stations for one day, several days at the field hospitals, and the evacuation hospitals for the remainder of the month.⁸⁸

The 3d ASG reserve teams—Teams 21, 22, and 23—landed on D+4 on Utah Beach, supported the clearing stations, and joined the field hospitals. the remainder of the 3d ASG headquarter and nurses and motor convoy landed on D+16 and D+22, respectively. The nurses were placed into service in the field hospitals and Teams 24 and 25 began service as mobile surgical teams.⁸⁹

Doctrine

The general surgical teams were required to establish communication with the hospitals they were supporting during Operation Overlord to standardize supplies and procedures while augmenting hospital operations. General Surgical Teams worked the clearing stations during beach landings and then provided teams to the field hospitals and evacuation hospitals. Nurses worked within the field hospitals to provide continuity once the surgical team arrived to provide support. ASG nurses were responsible for field hospital operating rooms and postoperative wards. Four nurses were assigned to each of the three platoons that supported a field hospital. Two

⁸⁸ US Army Medical Department, Office of Medical History, “Annual Report to the Surgeon General from the Third Auxiliary Surgical Group for the Year 1944,” 30.

⁸⁹ Ibid.

general surgical teams supported each field hospital surgical platoon unless the platoon acted as a holding unit and then only one team are required. Mobile surgical units were attached to field and evacuation hospitals. Mobile x-ray units increased the capacity of hospitals. Each unit had the capacity to see thirty to fifty patients per day. A surgical team had the capacity to conduct ten surgeries per twelve hour shift. At this rate, the nurse teams could handle twenty postoperative cases per day. In an evacuation hospital, the evacuation hospital chief of surgery regulated the actions of the ASG surgical teams.⁹⁰

Organization and Personnel

The standard auxiliary surgical group was comprised of twenty-four general surgical teams supported by neurosurgical teams, a maxillofacial team, x-ray teams, dental prosthetic teams, and nurse teams. The surgical teams were comprised of five members—three officers, a nurse, and two enlisted. Shock teams were meant to support each of the surgical teams, but only six were available to 3d ASG. The Group was supported by five mobile surgical units, three dental units. ASGs were manned by sixty-five nurses and 166 enlisted men—116 to support the teams and fifty for the headquarters. Each group was supported by two administrative officers while in garrison but demand during operations could require an additional administrative officer. The mobile x-ray units added an additional officer and three enlisted men to the total number of personnel serving within the ASGs.⁹¹

The Group found that two technicians per team was insufficient to adequately staff an operating room with two tables. With only two technicians on the job, it is was very difficult to avoid delay between cases, but four technicians eliminated waiting and made it possible to operate two tables simultaneously. The four technicians were: one scrub assistant, one anesthetist

⁹⁰ US Army Medical Department, Office of Medical History, “Annual Report to the Surgeon General from the Third Auxiliary Surgical Group for the Year 1944,” 33-46.

⁹¹ *Ibid.*, 4-5.

helper, and two circulators. In light of the increased efficiency gained by additional surgeons and technicians, the 3d ASG rebuilt each of its general surgical teams with four officers and four enlisted.

Summary

The 3d ASG proved that “the time factor between infliction of the wound and surgery is of cardinal importance.”⁹² The Golden Hour Policy was enacted to take advantage of our improvements in aeromedical evacuation and decrease the time factor for our wounded to a definitive level of care. For the Golden Hour Policy to be successful, the US military must have air superiority. Over the years, our adversaries have closed that gap and increased their A2/AD capabilities requiring our shift to MDB. The MDB concept provides a means for the US military to offset that challenge. The 3d ASG surgical teams provided an example of how surgical capability can be provided to forward-deployed troops, joint forcible entry operations, and transition to support of hospitals and achieve success. The 3d ASG surgical teams were able to arrive with its supported forces, treat patients in the clearing stations, and augment surrounding hospitals when needed. Furthermore, 3d ASG surgical teams showed that small, mobile and forward-deployed surgical capability can support operations and hold patients until a window of opportunity opens for evacuation. The findings from the historical review of 3d ASG during its support in the ETO provide good DOTMLPF-P approaches to be analyzed against the required capabilities identified in the Army Operating Concept and the Army Universal Task List.

⁹² US Army Medical Department, Office of Medical History, “Annual Report to the Surgeon General from the Third Auxiliary Surgical Group for the Year 1944,” 19.

Findings and Analysis

Army Medicine may have to change the concepts used for medical support...you may have to sustain the injured for a much longer period of time until they can be evacuated. Medical squads who are out there in the future will have access to exceptional capability. The question to be answered is how do we get the medical capability from a medical center to the battlefield. ... It is important for our Soldiers that they know, if there is any way possible, they will get medical care. We will provide the best medical care anywhere in the world. When Soldiers know that, they know they will be OK. How many tank battalions is that worth?

—General David Perkins, former TRADOC Commander

Introduction

The Army lacks the ability to provide “tailored advanced medical services for the forward environment” in support of operations in the current and 2020-2040 operating environments.⁹³ Through the analytical phases of the Army JCIDS CBA—FAA, FNA, and FSA, this study suggests an appropriate “materiel or non-materiel approach, with DOTMLPF-P implications, that provides the identified required capability (RC) based on satisfying need, technical maturity, technical risk, supportability, affordability (best available data), timeliness of delivery, and potential for meeting full capability.”⁹⁴

⁹³ US Department of Defense, *Forward Resuscitative Care (FRC) in Support of Dispersed Operations Capabilities-Based Assessment (CBA) Shortfalls Report* (Washington, DC: Department of Defense, 2017), 3; US Army Training and Doctrine Command (TRADOC) Pamphlet 525-4-1, *US Army Functional Concept for Sustainment (AFC-S) 2020-2040* (Washington, DC: Department of the Army, 2017), 8. Accessed January 1, 2018, <http://www.tradoc.army.mil/tpubs/pams/tp525-4-1.pdf>. The 2020-40 OE is an environment of contested norms where increasingly powerful states and select non-state actors use any and all elements of power to establish their own set of rules unfavorable to the United States and its interests. Many weaker states become increasingly incapable of maintaining good governance creating persistent disorder. Adversaries coerce neutrals, partners, and allies through economic pressure, political subversion, and the threat of military force. Potential enemies use deception, surprise, and speed of action to achieve their objectives and exploit seams within established US operating methods.

⁹⁴ US Army Force Management School, *Capabilities Development and System Acquisition Management Executive Primer*, 22.

Functional Area Analysis (FAA)

The FAA begins with a thorough review of the Universal Task List (Figure 2), Joint Concept for Health Services (JCHS) (Figure 1), The US Army Operating Concept: Win in a Complex World (Figure 1), The Army Universal Task List (Figure 2), and The US Army Functional Concept for Sustainment (2020-2040) (Figure 1) to determine the RCs and tasks and performance standards that past, present, and future surgical capabilities were evaluated against during the FNA.

Joint Concept for Health Services
<p>Required Capability #7: Medical Treatment Facilities (MTFs). Improve the ability to employ a continuum of healthcare delivery units tailored and scaled for different domains, operational environments, and spectrums of conflict in support of Joint Force operations. MTFs function in multiple roles in support of joint health service support. MTFs provide the DoD's principal platform for attaining currency, as defined and managed by the Services, and developing and maintaining competency in addition to training affiliation agreements with civilian healthcare institutions that extend DoD's capability to train and sustain medical personnel with essential clinical skills.</p> <ul style="list-style-type: none"> b. Provide Essential Resuscitative Care for joint forces that may be integrated at lower echelons, such as battalion or group. This includes stabilizing the patient in preparation for transportation to higher capability treatment facilities. c. Provide Definitive Care in the JOA to support joint or coalition patients as directed by the JFC, regardless of operational relationships through agile and mission-tailored capabilities that repair, restore, or stabilize patients. These include preparation for further evacuation, return to duty, or processes for rehabilitation, as appropriate. d. Provide Definitive Care outside the JOA that is planned resourced, and accessed as a Joint Force support asset to improve the ability to provide longterm, complicated, or specialty care capabilities outside the JOA in a supporting CCMD areas of responsibility (AORs). These include the capabilities to repair, restore, stabilize, or rehabilitate the patient for return-to-duty, improve patient status during planned evacuation stopovers, or prepare patient for transition out of the Department of Defense.
<p>Required Capability #9: Patient Management. Improve the ability to effectively apply the required scope of health service capabilities for each casualty or injury accepted into care as a patient in order to achieve the lowest mortality and morbidity possible in support of Joint Force operations. Match treatment capabilities to patient needs by employing modular, scalable, deployable or fixed-facility, packaged elements, and by applying joint protocols that improve the ability to employ remedies to patients for a disease or injury.</p>
The US Army Operating Concept
<p>Design Army formations capable of deploying rapidly and operating to achieve missions across the ROMO.</p>
The US Army Functional Concept for Sustainment
<p>Future Army forces require enhanced medical capability at the point of injury with advanced trauma and resuscitation and prolonged patient holding forward to support MDB and semi-independent operations (AFC-S 4-6.a(3); AFC for Movement and Maneuver (AFC-MM) 3-6.f.(5); AOC B-2.a.(12), (14), and (16); and MDB p.12).</p>
<p>Future Army forces require an expeditionary Army health service support capability to provide combat casualty care from the point of injury through the continuum of care to improve medical outcomes for Soldiers during MDB (AFC-S 4-6.a.(3); AOC B-2.a.(5), (12), (14), and (16); and ACC B-6.b.).</p>
<p>Future Army sustainment forces require the capability to task organize dynamically including combine, distribute, and recombine multi-functional capabilities, and conduct decentralized, mission tailored sustainment operations to support semi-independent operations during MDB (AFC-S 4-6.b.; AOC B-2.a.(15) and (16); ACC B-6.c.; and JCL-GIL-10 and 19).</p>

Figure 2. Concepts. *Top*, Joint Concept for Health Services Required Capabilities; *Middle*, The US Army Operating Concept Required Capability; *Bottom*, The US Army Functional Concept for Sustainment Required Capabilities. US Department of Defense, US Joint Chiefs of Staff, *Joint*

Concept for Health Services (JCHS) (Washington, DC: US Joint Chiefs of Staff, 2012), 15-17; US Army Training and Doctrine Command. US Army Training and Doctrine Command (TRADOC) Pamphlet 525-3-1, *The US Army Operating Concept: Win in a Complex World* (Washington, DC: Department of the Army, 2017): 33, accessed January 1, 2018, <http://www.tradoc.army.mil/tpubs/pams/tp525-3-1.pdf>; US Army Training and Doctrine Command. US Army Training and Doctrine Command (TRADOC) Pamphlet 525-4-1, *US Army Functional Concept for Sustainment (AFC-S) 2020-2040* (Washington, DC: Department of the Army, 2017): 35-37, accessed January 1, 2018, <http://www.tradoc.army.mil/tpubs/pams/tp525-4-1.pdf>.

Universal Joint Task List
OP 4.4.3.8 Provide Forward Resuscitative Care: Provide essential resuscitative care and/ or damage control surgery. JP 4-02
Army Universal Task List
ART 4.3.1 Provide Combat Casualty Care. Casualty care encompasses a number of Army Medical Department functions. It groups organic and area medical support, hospitalization, the treatment aspects of dental care, clinical laboratory services, and behavioral health and neuropsychiatry, and the treatment of chemical, biological, radiological, and nuclear patients. (FM 4-02)
ART 4.3.1.1 Provide Medical Treatment (Organic And Area Medical Support) 4-149. Units provide medical treatment (organic and area medical support) for all units in the area of operations (AO). Units examine and stabilize patients. They evaluate wounded and disease and nonbattle injuries. Units examine the general medical status to determine treatment and medical evacuation precedence. Units document patient encounters either digitally (preferred method) or on paper (when digital means are not available). (FM 4-02)
ART 4.3.1.2 Provide Hospitalization 4-150. Hospitalization resources are medical treatment facilities capable of providing inpatient care and services. Hospitalization continues the medical care provided at Roles 1 and 2 of the Army Health System. It also provides a far forward surgical capability that provides essential care in theater, outpatient services, patient administration services (to include electronic documentation of patient encounters), and ancillary support (pharmacy, clinical laboratory, radiology services, and nutritional care). (ATP 4-02.5)
ART 4.3.1.4 Provide Clinical Laboratory Services 4-152. Units perform clinical laboratory diagnostic procedures in support of medical treatment activities. Units document laboratory test results in the patients' individual health record. (ATP 4-02.5)

Figure 3. Tasks. Top, Universal Joint Task List; Bottom, Army Universal Task List. US Department of Defense, US Joint Chiefs of Staff, *Universal Joint Task List*, 1019, accessed January 1, 2018, http://www.jcs.mil/Portals/36/Documents/Doctrine/training/ujtl_tasks.pdf?ver=2018-04-20-085805-037; US Department of the Army, Army Doctrine Reference Publication (ADRP) 1-03, *The Army Universal Task List* (Washington, DC: Government Printing Office, 2015): 4-90—4-94.

Functional Needs Analysis (FNA)

An FNA of the 3d ASG reveals that it was able to meet the one UJTL task and 3 out of the four AUTL tasks (Table 4). The 3d ASG was able to provide x-ray to its teams but due only three x-ray teams existed services were not available to all teams simultaneously if needed. The 3d ASG did not provide ancillary services such as pharmacy, clinical laboratory, and nutritional care. Ancillary services such as pharmacy, laboratory, and radiology are listed as inclusive to

tailored advanced medical services for a forward environment. Therefore, the 3d ASG did not provide all services needed to be an effective tailored advanced medical service whenever needed to support the range of military of operations.

Table 4. FNA Analysis of 3d ASG

Universal Joint Task List	
OP 4.4.3.8 Provide Forward Resuscitative Care: Provide essential resuscitative care and/ or damage control surgery. JP 4-02	X
Army Universal Task List	
ART 4.3.1 Provide Combat Casualty Care. Casualty care encompasses a number of Army Medical Department functions. It groups organic and area medical support, hospitalization, the treatment aspects of dental care, clinical laboratory services, and behavioral health and neuropsychiatry, and the treatment of chemical, biological, radiological, and nuclear patients. (FM 4-02)	X
ART 4.3.1.1 Provide Medical Treatment (Organic And Area Medical Support) 4-149. Units provide medical treatment (organic and area medical support) for all units in the area of operations (AO). Units examine and stabilize patients. They evaluate wounded and disease and nonbattle injuries. Units examine the general medical status to determine treatment and medical evacuation precedence. Units document patient encounters either digitally (preferred method) or on paper (when digital means are not available). (FM 4-02)	X
ART 4.3.1.2 Provide Hospitalization 4-150. Hospitalization resources are medical treatment facilities capable of providing inpatient care and services. Hospitalization continues the medical care provided at Roles 1 and 2 of the Army Health System. It also provides a far forward surgical capability that provides essential care in theater, outpatient services, patient administration services (to include electronic documentation of patient encounters), and ancillary support (pharmacy, clinical laboratory, radiology services, and nutritional care). (ATP 4-02.5)	X (-) *
ART 4.3.1.4 Provide Clinical Laboratory Services 4-152. Units perform clinical laboratory diagnostic procedures in support of medical treatment activities. Units document laboratory test results in the patients' individual health record. (ATP 4-02.5)	
* Note: electronic documentation did not exist during WWII but due to high rates of casualties, surgical teams were unable to maintain good records at all times. Radiology services were no organic to the surgical teams but available through mobile x-ray teams of the ASG. The ASG had no pharmacy, clinical laboratory, and nutritional care services.	

Source: US Department of Defense, US Joint Chiefs of Staff, *Universal Joint Task List*, 1018, accessed January 1, 2018, http://www.jcs.mil/Portals/36/Documents/Doctrine/training/ujtl_tasks.pdf?ver=2018-04-20-085805-037; US Department of the Army, Army Doctrine Reference Publication (ADRP) 1-03, *The Army Universal Task List* (Washington, DC: Government Printing Office, 2015): 4-90—4-93.

Functional Solutions Analysis (FSA)

Doctrine, Organization, and Personnel Solutions

ASG nurses were responsible for field hospital operating rooms and postoperative wards. Four nurses were assigned to each of the three platoons that support a field hospital. A surgical team had the capacity to conduct ten surgeries per 12-hour shift. At this rate, the nurse teams could handle twenty postoperative cases per day. In an evacuation hospital, the evacuation hospital chief of surgery regulated the actions of the ASG surgical teams. The standard auxiliary surgical group was comprised of twenty-four general surgical teams supported by neurosurgical

teams, a maxillofacial team, x-ray teams, dental prosthetic teams, and nurse teams. The surgical teams were comprised of five members—three officers, a nurse, and two enlisted men. The “ideal” team for a field hospital consists of a general surgeon, a chest surgeon, an assistant with leanings towards orthopedics, an anesthetist, and four enlisted men. There should be at least one chest surgeon for every three teams so that no functioning field hospital platoon will be entirely without a specialist of that sort. Other specialists are better deployed in evacuation hospitals. There is room for three neurosurgical and three maxillofacial teams.

Scenarios

The scale of the required medical capabilities that emerge from the FAA, must be compared to potential futures in order to determine the severity of the gaps that face the force in a future multi-domain environment. RAND has developed three force planning scenarios that have become the basis for such analyses. They are: one major war, which requires the defeat of forces of any single adversary, including either of the major powers (China or Russia), in a localized conflict; one major and one regional war, which requires the defeat of the forces of one major and one regional adversary (i.e., North Korea or Iran); and two major wars, which require the defeat of the forces of any two adversaries essentially simultaneously (Figure 3).

- **One Major War: Defeat the forces of any single adversary, including either of the major powers (China or Russia), in a localized conflict.** The joint force that we judge to be appropriate for this force planning construct is developed by sizing and equipping each major force element—Army combat brigades, U.S. Air Force (USAF) and U.S. Marine Corps (USMC) fighter squadrons, U.S. Navy (USN) carriers, and so forth—so that it can meet the demands posed by the most stressing scenario within the portfolio for that force element. As examples, the Army’s brigade combat teams (BCTs) in our One Major War force are sized to meet the demands of a Korea scenario but equipped to successfully combat Russian ground forces; USAF fighter squadrons are sized by the demands of a fight against Russian forces in Europe and equipped to successfully fight Chinese forces. The resulting force would be smaller than today’s and would cost marginally less, but should be capable of defeating aggression by any adversary under plausible conditions.
- **One Major and One Regional War: Defeat the forces of one major and one regional adversary (i.e., North Korea or Iran).** We develop this force by providing the capabilities and capacity called for by the most-demanding scenario (as above) and the third most-stressing scenario for each force element. Some elements of this force would be larger than today’s.
- **Two Major Wars: Defeat the forces of any two adversaries.** We develop this force by providing the capabilities and capacity called for by the two most demanding scenarios for each force element. Most elements of this force would be larger than today’s, and it would cost considerably more than today’s defense budget to sustain it.

Figure 3. Force Planning Constructs. David Ochmanek, et al., *US Military Capabilities and Forces for a Dangerous World: Rethinking the US Approach to Force Planning* (Santa Monica, CA: RAND Corporation, 2017), xii-xiii.

RAND’s scenarios focus on China, Russia, North Korea, Iran, and Salafist-Jihadi groups and force levels employed against each (Table 5).

Table 5. Summary of Force Levels Employed Against Adversaries

		North Korea			China			CT*	Russia			Iran	
		Steady State	Major Conflict	Post-Conflict	Steady State	Major Conflict	South China Sea	Steady State	Steady State	Hybrid	Major Conflict	Steady State	Major Conflict
USAF	Fighter Squadrons	4	24	4	4	25	6	5	5	7	28	2	21
	Heavy Bomber Squadrons	—	4	1	1	7	3	1	—	1	7	—	5
	ISR Orbit-High End	1	2	—	1	10	4	—	1	—	5	1	3
USN	Aircraft Carriers	—	5	—	1	5	3	—	—	—	2	1	4
	Carrier Air Wings	—	5	—	1	5	3	—	—	—	2	1	4
	Amphibs	—	30	—	3	15	12	3	—	—	—	3	18
USMC	Infantry Battalions	—	18	3	1	6	6	3	—	3	6	1	6
	Fighter Squadrons	—	15	—	1	8	4	1	—	3	6	1	6
Army	Total BCTs	1	16	10	—	3	2	3	2	1	9	—	3

* CT = counterterrorist operations.

Source: David Ochmanek, et al, *US Military Capabilities and Forces for a Dangerous World: Rethinking the US Approach to Force Planning* (Santa Monica, CA: RAND Corporation, 2017), Table 7.1.

RAND developed these scenarios to fill what they considered to be a disjuncture between the current environment and scenarios previously utilized. RAND stated, “This disjuncture is partly to blame for the fact that the United States now fields forces that are, at once, larger than needed to fight a single major war, failing to keep pace with the modernizing forces of great power adversaries, poorly postured to meet key challenges in Europe and East Asia, and insufficiently trained and ready to get the most operational utility from many of its active component units.”⁹⁵

The Army is utilizing the FST, GHOSTT, or ERST concepts to meet requirements identified by the Joint Staff and Army. According to the Modified Table of Organization and Equipment (MTOE), one FST is allocated to support one brigade combat team. In FY19, the AMEDD will have fifteen active duty and twenty-two reserve FSTs available to support fifty-two

⁹⁵ Ochmanek, et al, *US Military Capabilities and Forces for a Dangerous World*, xii.

BCTs across Active Duty and National Guard, Special Operations, and any other geographically regional operations.⁹⁶ The total number of BCTs required to support RANDs scenarios are—one major war (27), one major war with one regional conflict (30), and two major wars (31)—is in Table 6. The combined thirty-seven active and reserve FSTs provides a false picture because the availability of US Army Reserve units are not guaranteed, as evidenced by the call-up of Reserve and National Guard medical units during Operation Desert Shield/Desert Storm.

Table 6. Force Structure for Two Major Wars Force

	Force Element Type	Program (FY 2019)	One Major War	One Major + One Regional	Two Major Wars
USAF	Fighter squadrons	51	48	64	69
	Heavy bomber squadrons	9	9	14*	16*
	ISR orbit-high end	7	8	12	12
USN	Aircraft carriers	11	7	10	11
	Carrier air wings	10	6	9	10
	Amphibious ships	33	33	45**	48**
USMC	Infantry battalions	24	21	24	27
	Fighter squadrons	22	18	20	23
Army	BCTs (active component)	30	27	30	31

* = No practical options exist to field a new bomber prior to the B-21 in the late 2020s. Assumes five to seven squadrons swing from first to second conflict.
 ** = Assumed 12 ships swing from first to second conflict.

Source: David Ochmanek, et al, *US Military Capabilities and Forces for a Dangerous World: Rethinking the US Approach to Force Planning* (Santa Monica, CA: RAND Corporation, 2017), Table 7.5.

Of the 23,000 medical personnel, fifty-five percent were Reserve and National Guard.⁹⁷ Doctor and nurse deployability was of huge concern during this time. The GAO report, *Operation Desert Storm: Full Army Medical Capability Not Achieved*, that 578 PROFIS were identified to deploy in August 1990 but only 339 (~57.0%) deployed with their active units which was similar

⁹⁶ FMSWeb, accessed April 19, 2018.

⁹⁷ US Government Accountability Office, *Operation Desert Storm: Full Army Medical Capability Not Achieved*, GAO/NSIAD-92-175. Washington, DC: US Government Accountability Office, August 1992, 11, accessed April 19, 2018, <https://www.gao.gov/assets/160/152150.pdf>.

for Reserve and National Guard units. A thoracic surgeon team was unable to mobilize from Fort Carson, Colorado because they were missing the two MTOE required thoracic surgeons. The team eventually was able to deploy but only after one thoracic surgeon was cross-leveled over to it. With all of these challenges, the Army was forced to deploy 25 of the 41 hospital units without all authorizations.⁹⁸

The 3d ASG participated in the ETO with twenty-five general surgical teams, nine specialty teams—two neurosurgical teams, one maxillofacial team, three x-ray teams, and three dental prosthetic teams—and fifteen nurse teams. The number of ASG general surgical teams and the number of FSTs in FY19 would be insufficient to support either scenario. The 3d ASG found that the ideal surgical team should have four officers—2 general surgeons, an orthopedic surgeon, and an anesthetist—and four enlisted—one is a scrubbe assistant, one assists the anesthetist, and two rotating surgical technicians.⁹⁹ The ideal surgical team is equivalent to splitting the current FST into two, 10-person teams. If this is done, this split could produce 30 surgical teams for a unit similar to the ASG. The ASG would be able to support all scenarios except two major wars which it would be one surgical team short.

Summary

The organizational structure of the 3d ASG during its support of First Army in the ETO was not able to provide surgical capabilities to the required number of BCTs in each RAND planning scenario, but if the current organizational structure of the FST is split into two, 10-person teams and are considered general surgical teams, then the 3d ASG would have been capable of supporting all of the scenarios except two major wars which it would be one surgical

⁹⁸ Ibid., 24-26.

⁹⁹ US Army Medical Department, Office of Medical History, “Annual Report to the Surgeon General from the Third Auxiliary Surgical Group for the Year 1944,” 42.

team short. Furthermore, the ASG would need to add pharmacy and laboratory specialties to its organizational structure and increase its x-ray capabilities.

The monograph applied potential doctrine, organizational, and personnel approaches that were successful from past surgical capabilities to mitigate the high-risk gaps that were identified during the FNA while ensuring that each approach was “strategically responsive and [delivered] approaches when and where they are needed; feasible with respect to policy, sustainment, personnel limitations, and technological risk; and able to be resourced and implement by the [Department of Defense] by 2020.”¹⁰⁰ The 3d ASG organizational structure made it possible for it to respond to the surgical needs of First Army but its organizational structure during this time would not meet the tailored advanced medical services requirement of the Joint Force today due to its lack of laboratory and pharmacy services in whole and x-ray services in part. For this reason, the 3d ASG surgical organizations would serve as a feasible foundation to the development of a non-materiel solution.

A Tailored Advanced Medical Services (TAMS) Conceptual battalion-level, medical unit that combines the teams, sections, and platoons of the ASG and US Marine Medical Battalion would create an ideal organization that can provide support to BCTs, Special Operations Forces, and emergent requests from Combatant Commands (CCMDs) simultaneously (Figure 4). The number of companies and specialty groups would vary per medical battalion. Each of these teams, sections, and platoons would be a stand-alone unit that is capable of deploying individually or as a group. The companies would support BCTs, Special Operations Forces, and emergent CCMD requests, if required, and the specialty groups would augment BCTs and support SOF and emergent CCMD requests. In order to provide tailored advanced medical services to BCTs, SOF, and CCMDs, the medical battalion, potentially the current Multifunctional Medical

¹⁰⁰ US Army Force Management School, *Capabilities Development and System Acquisition Management Executive Primer*, 25.

Battalion, would fall under the command and control of the active duty Army Medical Brigades and each would align with five of the six GCCs (Figure 5)—AFRICOM, CENTCOM, EUCOM, PACOM, and SOUTHCOM—minus NORTHCOM which would be covered by similar organizations under the US Army Reserve Medical Command (ARMEDCOM).

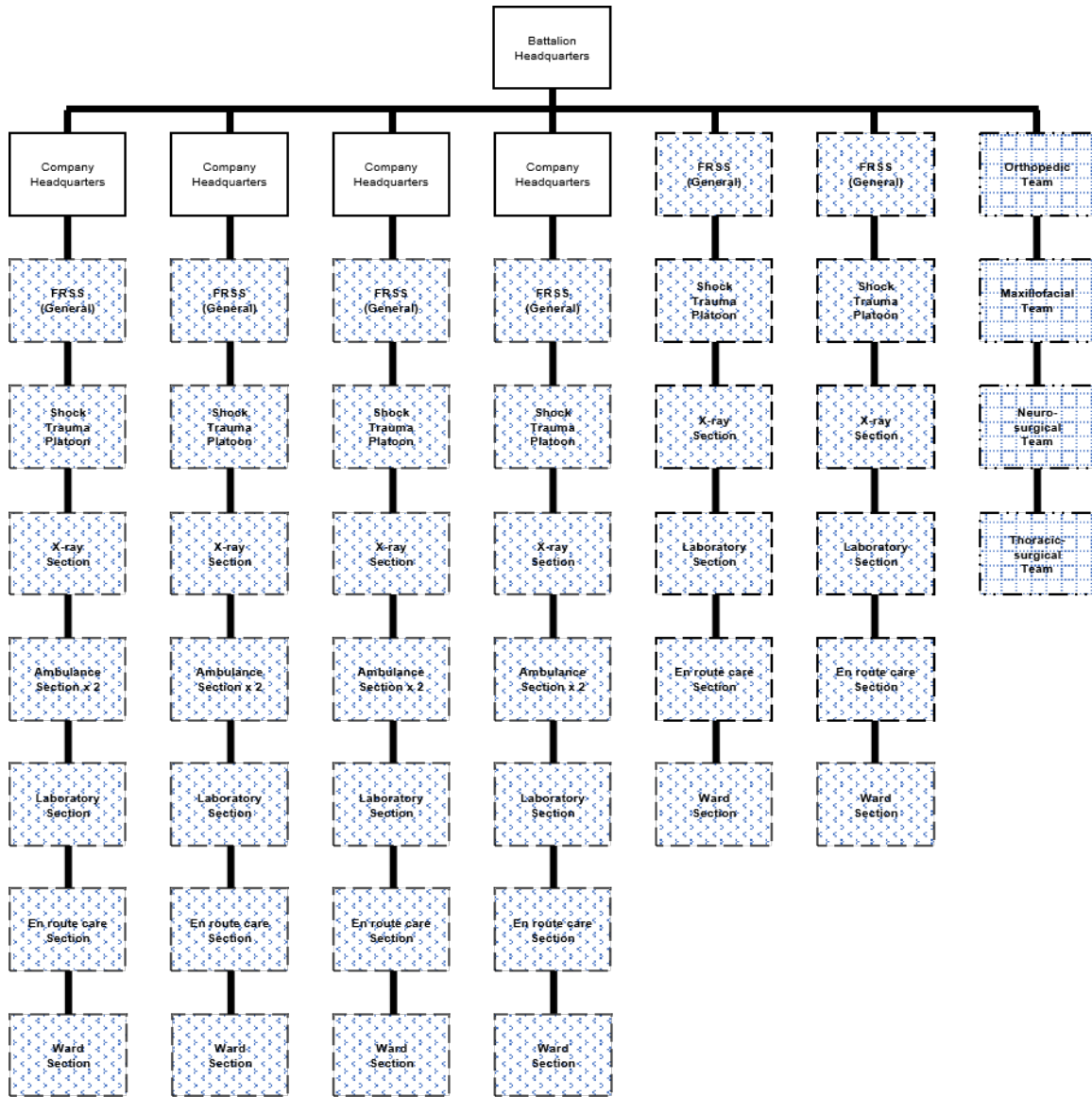


Figure 4. Tailored Advanced Medical Services (TAMS) Conceptual Unit, battalion-level command with tailored advanced medical services to support BCTs, SOF, and CCMD emergent requests. US Marine Corps, Marine Corps Reference Publication (MCRP) 4-11.1E, *Health Service Support Field Reference Guide* (Washington, DC: Headquarters US Marine Corps, 2015), accessed January 1, 2018, http://www.marines.mil/Portals/59/MCWP%204-11_1.pdf; “3d Auxiliary Surgical Group,” *WW2 US Medical Research Centre*, Copy of T/O 8-571, dated 13 July 1942, Organization of the Auxiliary Surgical Group, accessed January 1, 2018, <https://www.med-dept.com/unit-histories/3d-auxiliary-surgical-group/>.



Figure 5. Medical Unit Alignment with Geographic Combatant Commands. Adapted from “Geographical Combatant Commands,” *US Transportation Command (USTRANSCOM)*, accessed April 19, 2018, <https://www.ustranscom.mil/cmd/associated/customs/gcc.cfm>.

The integration of the ASG and US Marine Medical Battalion units would create “health services that are sufficiently modular, interoperable, and networked.”¹⁰¹ The medical battalion would provide Globally Integrated Health Services with “Integrated Joint Requirements in Medical Force Development that [mitigates] threats to health services specifically, and the Joint Force generally, in contested environments; Modular and Interoperable Medical Capabilities that meet a core set of joint standards and requirements while also conforming to [Army] requirements; Global Network of Health Service Nodes [divided up amongst GCCs] that...are flexible enough to rapidly mobilize and deploy medical capabilities and resources; and Tailored Medical Forces and Operations that reduce lift requirements, sustainment requirements, and physical persence while improving quality of care.”¹⁰²

¹⁰¹ US Department of Defense, US Joint Chiefs of Staff, *Joint Concept for Health Services (JCHS)*, Washington, DC: US Joint Chiefs of Staff, 2015, ii.

¹⁰² US Joint Chiefs of Staff, *Joint Concept for Health Services (JCHS)*, ii. GIHS is the strategic management and global synchronization of joint operational health services that are sufficiently modular,

To create the TAMS, the AMEDD could utilize the FY19 MTOE authorized personnel for the nineteen Area Support Medical Companies, fifteen Forward Resuscitative Surgical Teams (FRSTs), four Ground Ambulance Companies, six Hospital Augmentation Detachments, three Head and Neck Detachments, nine Intermediate Care Wards, and six Surgical Augmentation Detachments to create TAMS' units equivalent to those of the Marine Medical Battalion and ASG. The cumulative total of personnel by AOC (Table 7) and MOS (Table 8) was found to be inadequate to fill the total number of personnel required to construct the five TAMS required to support AFRICOM, CENTCOM, EUCOM, PACOM, and SOUTHCOM (Table 9).

Table 7. FMSWeb Authorized Personnel Totals by AOC

Title	AOC	Total
Commander	05A00	19
Urologist	60K00	9
Ophthalmologist	60S00	6
Otolaryngologist	60T00	3
Psychiatrist	60W00	18
Primary Care Physician	61H00	18
General Surgeon	61J00	30
Thoracic Surgeon	61K00	9
Orthopedic Surgeon	61M00	30
Neurosurgeon	61Z00	6
Emergency Physician	62A00	30
Field Surgeon	62B00	57
General Dental Officer	63A00	19
Comprehensive Dental Officer	63B00	9
Oral and Maxillofacial Surgeon	63N00	9
Physical Therapist	65B00	18
Physician Assistant	65D00	57
Public Health Nurse	66B00	18
Psychiatric/Behavioral Health Nurse	66C00	9
Perioperative Nurse	66E00	33
Nurse Anesthetist	66F00	90
Medical-Surgical Nurse	66H00	145
Critical Care Nurse	66S00	246
Emergency Room Nurse	66T00	30
Behavioral Science Officer	67D00	19
Platoon Leader	70B67	88
Microbiologist	71A67	18

Source: FMSWeb, accessed April 4, 2018.

interoperable, and networked to enable the Joint Force Commander to quickly and efficiently combine and synchronize capabilities.

Table 8. FMSWeb Authorized Personnel Totals by MOS

Title	MOS	Total	Title	MOS	Total
Signal Support System Specialist	25U1O	38	Ear, Nose, and Throat Specialist	68U3O	3
Human Resources Specialist	42A1O	4	Respiratory Specialist	68V2O	36
Biomedical Equip Specialist	68A1O	46		68V3O	18
	68A2O	21		MOS Total	54
	MOS Total	67	Combat Medic Specialist	68W1O	727
Practical Nursing Specialist	68C1O	168		68W2O	324
	68C2O	105		68W3O	65
	68C3O	18		68W4O	61
	68C4O	27		68W5M	23
MOS Total	318	MOS Total	1,200		
Operating Room Specialist	68D1O	42	Mental Health Specialist	68X1O	37
	68D2O	36	Eye Specialist	68Y2O	3
	68D3O	27	Chemical, Biological, Radiological, and Nuclear Specialist	74D1O	23
	MOS Total	105		Wheeled Vehicle Mechanic	91B1O
Dental Specialist	68E1O	37	91B2O		23
	68E2O	9	MOS Total		69
	MOS Total	46	Utilities Equipment Repairer	91C1O	18
Physical Therapy Specialist	68F2O	18	Tactical Power Generation Specialist	91D1O	37
Pat Admin Specialist	68G1O	28	Petroleum Supply Specialist	92F1O	4
Medical Log Specialist	68J1O	18	Unit Supply Specialist	92Y1O	23
	68J3O	19		92Y2O	23
	MOS Total	37		MOS Total	46
Medical Laboratory Specialist	68K1O	37			
	68K2O	19			
	MOS Total	56			
Nutrition Care Specialist	68M1O	27			
Radiology Specialist	68P1O	25			
	68P2O	19			
	MOS Total	44			

Source: FMSWeb, accessed April 16, 2018.

Table 9. FMSWeb Authorized Personnel Totals versus Army TAMS Requirement Totals

FRSS		Total MMB	Required Total	Army Total	Delta
Position	Qty				
General Surgeon	2	12	60	30	-30
Anesthesiologist/CRNA	1	6	30	30	0
CCRN	1	6	30	30	0
IDC	1	6	30	30 (SS)	0
Corpsmen	1	6	30	30	0
OR Tech	2	12	60	60	0
Shock Trauma Platoon		Total MMB	Required Total	Army Total	Delta
Position	Qty				
ER Physician	2	12	60	30	-30
ER RN	3	18	90	30	-60
PA	1	6	30	30	0
IDC	1	6	30	30 (SS)	0
Corpsmen	7	42	210	210	0
X-ray Tech	3	18	90	44	-46
Marines (Non-Med)	4	24	120	120 (SW)	0
X-ray Section		Total MMB	Required Total	Army Total	Delta
Position	Qty				
X-ray Tech	3	18	90	0	-90
Lab Section		Total MMB	Required Total	Army Total	Delta
Position	Qty				
Lab Tech	3	18	90	56	-34
Ambulance Section		Total MMB	Required Total	Army Total	Delta
Position	Qty				
Marine Drivers (Non-Med)	2	12	60	60 (SW)	0
Corpsmen	2	12	60	60	0
Ward Section		Total MMB	Required Total	Army Total	Delta
Position	Qty				
Family Practice Physician	1	6	30	18	-12
Medical Surgical Nurse	2	12	60	60	0
Corpsmen	8	48	240	240	0

Ortho Surgical Team		Total MMB	Required Total	Army Total	Delta
Position	Qty				
Orthopedic Surgeon	1	1	5	5	0
Anesthesiologist	1	1	5	5 (SC)	0
Medical Surgical Nurse	1	1	5	5 (SS)	0
OR Tech	1	1	5	5	0
Neuro Surgical Team		Total MMB	Required Total	Army Total	Delta
Position	Qty				
Neuro Surgeon	1	1	5	5	0
Assistant Surgeon	1	1	5	5 (SP)	0
Anesthesiologist	1	1	5	5 (SC)	0
RN	1	1	5	5 (SS)	0
OR Tech	2	2	10	10	0
Maxillofacial Surgical Team		Total MMB	Required Total	Army Total	Delta
Position	Qty				
Plastic Surgeon	1	1	5	0	-5
Oral Surgeon	1	1	5	5	0
Anesthesiologist	1	1	5	5 (SC)	0
RN	1	1	5	5 (SS)	0
OR Tech	1	1	5	5	0
Dental Tech	1	1	5	5	0
Thoracic Surgical Team		Total MMB	Required Total	Army Total	Delta
Position	Qty				
Thoracic Surgeon	1	1	5	5	0
Assistant Surgeon	1	1	5	5 (SP)	0
Anesthesiologist	1	1	5	5 (SC)	0
RN	1	1	5	5 (SS)	0
OR Tech	1	1	5	5	0

Key:

- **SC** – Substituted 66F (Certified Registered Nurse Anesthetist)
- **SP** – Substituted 65D (Physician Assistant)
- **SS** – Substituted 66S (Critical Care Nurse)
- **SW** – Substituted 68W (Combat Medic)

Source: US Marine Corps, Marine Corps Reference Publication (MCRP) 4-11.1E, Health Service Support Field Reference Guide (Washington, DC: Headquarters United States Marine Corps, 2015), accessed January 1, 2018, http://www.marines.mil/Portals/59/MCWP%204-11_1.pdf; “3d Auxiliary Surgical Group,” WW2 US Medical Research Centre, Copy of T/O 8-571, dated 13 July 1942, Organization of the Auxiliary Surgical Group. Accessed January 1, 2018, <https://www.med-dept.com/unit-histories/3d-auxiliary-surgical-group/>; FMSWeb, accessed April 16, 2018.

As with the 3d ASG, the TAMS Concept Unit is able to provide strategically responsive surgical care when and where needed but unlike the 3d ASG, the TAMS Concept Unit is able to provide the other tailored advanced medical services of laboratory, pharmacy, and x-ray in whole. Even though the FY19 MTOE authorized personnel numbers of General Surgeons, Emergency Room physicians, Emergency Room nurses, x-ray technicians, laboratory technicians, Family Practice physicians, and Plastic Surgeons were insufficient to meet the numbers required to fill all

of the TAMS Concept Units, the AMEDD has the numbers needed to remove these deltas within the MTFs. By adding the additional numbers within the MTF via the Professional Filler System (PROFIS), the TAMS support policies and current sustainment requirements and personnel limitations. By adopting the TAMS Concept Unit, the AMEDD would be able to produce a non-materiel solution that would be fully mission capable by 2020. The TAMS Concept Unit would be able to mitigate the high-risk gaps that were identified during the FNA.¹⁰³

With all of the changes that are occurring in the Military Health System, future research will need to be done at every level of care to ensure that the Army is able to support all missions—readiness of the force, operational support, and benefits—of the MHS when required. The next section summarizes the findings of the study and suggests considerations for future research.

¹⁰³ Army Force Management School, “Capabilities Development and System Acquisition Management Executive Primer,” version 18.0 (February 2013): 25.

Conclusion

Our vision is to remain the premier expeditionary globally integrated force that's ready to meet the ever-changing challenges of today and tomorrow.

—Lieutenant General Nadja West, Surgeon General of the US Army

The US military has been unchallenged in the air domain since Desert Storm. This freedom has allowed Army ground forces to maintain freedom of maneuver. Our adversaries have not sat idly by and let our superiority in the air domain go unchallenged. Our once near-peer adversaries have increased their A2/AD capabilities to deny our forces access. Since 2009, the survival rate of combat wounded has risen over 92.0% because of the golden hour mandate established by then Secretary of Defense, Robert Gates. With the current and predicted future challenges that our adversaries will present in the way of A2/AD, medical evacuation assets will not be able to fly as freely as they do now in Iraq and Afghanistan to retrieve the wounded. The wounded will have to wait for windows of opportunity now to be retrieved by medical evacuation.

The Office of Joint Surgeon Staff produced the *Forward Resuscitative Care (FRC) In Support of Dispersed Operations Capabilities-Based Assessment Shortfalls Report* to determine means to maintain current levels or decrease KIA, DOW and potentially preventable deaths. One of those identified gaps—tailored advanced medical services—was researched to identify a potential DOTMLPF-p solution. Over the last decade the US military has produced several ad hoc solutions—the GHOSTT and the ERST—to meet this need, but with the increased requirements for deployment by general surgeons. This increased requirement has placed a strain on the general surgeons because of minimum time between deployments and diminishment of skills because of the lack of time to train once returning home. The FST was not a viable option because it was found that a 20-person FST had a worse mortality rate than splitting a FST into two, 10-person teams. The split FST meets the requirement but splitting the FST degrades the capability and takes a full FST out of the inventory to support future operations.

A historical examination of the 3d Auxilliary Surgical Group's performance in WWII suggests that history may provide the answers needed for the problem of operating within the dispersed conditions associated with the anticipated future operating environment envisioned in the multi-domain battle concept. The 3d ASG provided unparalleled supported to First Army during operations in the European theater of operations. The 3d ASG, like other ASGs, maintained a minimum of twenty-four general surgical teams and other specialty teams to augment them. Unlike the FST, the surgical teams only provided surgical care but the nurse teams of the ASG worked in the hospitals and provided the post-operative care.

Future Research Considerations

On December 23, 2016, Congress released the National Defense Authorization Act (NDAA) of Fiscal Year 2017. In the NDAA, Congress directed the MHS to change from the current Service-oriented management structure to an integrated health care system. With the NDAA, Congress sought to optimize the delivery of health care. Congress' intent with the NDAA was to drive the overarching goals "to ensure trained and ready military medical personnel, to deliver an improved health care experience to beneficiaries, and to perform both functions as one efficient enterprise."¹⁰⁴

To meet these goals, the Department of Defense developed five lines of effort to transform the MHS: "a clear, measurable definition of the medical readiness for which the health system is responsible for delivering is necessary; optimize MTFs as training platforms for the ready medical force...[by designating]...medical centers and primary training platforms for critical wartime specialties with level I or II trauma capability, serving as the foundation of military graduate medical education; centralization of health care administration will focus on

¹⁰⁴ David J. Smith, Raquel C. Bono, and Bryce J. Slinger, "Transforming the Military Health System," *JAMA* 318, no. 24 (2017): 2427, accessed April 29, 2018, <https://jamanetwork.com/journals/jama/fullarticle/2663037>.

standardization of health care delivery and readiness support; improve the patient experience so that each MTF is the first choice for beneficiaries where available and appropriate; and modernize the TRICARE health plan.”¹⁰⁵

Once the Defense Health Agency (DHA) becomes the centralized health care administration for all military treatment facilities (MTFs), further research will be required because the Army is currently utilizing surgeons from their MTFs to fill surgical positions in the FSTs. The AMEDD utilizes the Profession Filler System (PROFIS) to designate the assignment or attachment of these surgeons into those designated surgeon positions in the FSTs. If a surgeon is unable to deploy, the AMEDD requires the commander of the MTF or regional health command to replace that person within twenty working days. The MTFs not only serve the Soldiers, retirees and dependents, but also as readiness platforms to train our clinical staff to fill these PROFIS positions. Once DHA assumes control of all MTFs, what requires them to honor our need for personnel in the MTOE units? DHA will be required to produce relative value units (RVUs) for care that is given but what happens when the Army’s Modified Table of Organization and Equipment (MTOE) needs conflict with their RVU generation need?¹⁰⁶ The research should explore the potential for a reverse PROFIS system where the physicians and other clinical staff will be assigned to the Army MTOE unit but PROFIS to the MTF.

The Army Reserve Medical Command (ARMEDCOM) mission is to “[provide] trained, equipped, medically proficient units and Citizen-Soldiers to meet global requirements across

¹⁰⁵ David J. Smith, Raquel C. Bono, and Bryce J. Slinger, “Transforming the Military Health System,” *JAMA* 318, no. 24 (2017): 2427-2428, accessed April 29, 2018, <https://jamanetwork.com/journals/jama/fullarticle/2663037>.

¹⁰⁶ Christopher G. Pernin, et al., “Exploring the Value of the MTOE for Readiness Reporting,” *Readiness Reporting for an Adaptive Army* (Santa Monica, CA: RAND Corporation, 2013): 22, accessed April 21, 2018, <http://www.jstor.org/stable/pdf/10.7249/j.ctt5hhvmf.11.pdf?refreqid=excelsior:05e6413c2de258b18777524c5468ab74>. *MTOE* prescribes the organization, personnel, and equipment for a specific unit to perform a full-spectrum mission at a point in time. MTOEs are doctrinal models for unit types that specify the Minimum Mission Essential Warfare Requirements (MMEWR) capability to perform a defined full-spectrum mission.

unified land operations.”¹⁰⁷ ARMEDCOM has the preponderance of the AHS hospitals and medical groups with 70.0% and 67.0%, respectively.¹⁰⁸ Once PROFIS personnel are called upon to serve in their MTOE positions there are positions within the MTFs that need to be backfilled. Typically, the ARMEDCOM supplies the Soldiers to fill these positions. In the early stages of Operation Iraqi Freedom and Operation Enduring Freedom in Afghanistan, MTFs reported that the percentage of fills ranged from 23.0% in the Medical Corps to the high of 71.0% in the Nurse Corps, but backfill coverage lasted for only 50.0% of the PROFIS deployment.¹⁰⁹ Further research should be conducted on the viability of transferring HSS and FHP assets from the ARMEDCOM back to the Active AMEDD, determining which positions in an MTF are non-deployable and can be filled by medically non-deployable personnel, and establishing national backfill contracts that would provide backfills to MTFs or accept patientloads.

¹⁰⁷ “About Us,” Army Reserve Medical Command, *US Army Reserve*, 1, accessed April 29, 2018, <http://www.usar.army.mil/Commands/Functional/ARMEDCOM/About-Us/>.

¹⁰⁸ *Ibid.*, 2.

¹⁰⁹ Melony E. Sorbero, et al., *Improving the Deployment of Army Health Care Professionals: An Evaluation of PROFIS*, No. RAND-TR-1227-A (Santa Monica, CA: RAND Arroyo Center, 2013): 52, accessed May 1, 2018, https://www.rand.org/content/dam/rand/pubs/technical_reports/TR1200/TR1227/RAND_TR1227.pdf.

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