



U.S. ARMY

# MEDICAL SUPPORT FOR LARGE-SCALE COMBAT OPERATIONS:

Observations from the 2022 Russian Aggression in Ukraine

Controlled by: U.S. Army Office of the Surgeon General (OTSG)  
Controlled by: OTSG, G-35  
CUI Category: CUI/OPSEC  
Distribution/Dissemination Controls FEDCON, REL TO USA,  
BRA, CHL, ISR, JPN, KOR, MEX, PER, SGP, SWE, FVEY,  
NATO, NATO Member Nations  
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## **Foreword**



***“A bend in the road is not the end of the road...Unless you fail to make the turn.”***

~ Helen Keller

In December of 2022 I met with Major General Tim Hodgetts, my friend and counterpart from the United Kingdom and Chairman for the NATO Committee of the Chiefs of Military Medical Services (COMEDS). The conflict in Ukraine was a central topic of our discussion and we reflected on how fast the unimaginable became a reality. General Hodgetts presented me a list of observations he had collected over the conflict’s previous ten-months, and we discussed what those observations might mean for the future of our respective medical departments as well as those of our allies. I left that meeting inspired. Tim recognized and acted upon a monumental opportunity. The largest conflict in Europe since World War II was being fought with emerging technology and we had a lot to learn from it.

I authorized this study to amplify General Hodgetts’s work and to inform our vision for a ready, reformed, reorganized, responsive and relevant Army Medical Department. It is my intent for this study to ignite a professional discussion regarding the future of Army Medicine. I encourage you to review the observations and recommendations made within, debate them, and focus studies to further confirm or deny their relevance. Change is a leader’s responsibility. Prepare tomorrow’s leaders to navigate change by starting a conversation about the indicators we are seeing today. They may miss their turn if we stop calling out the bends in the road.

Army Medicine is a calling to become an expert in complexity. We must study war to sustain the medical excellence we are entrusted to deliver within it. This report aims to stimulate our regiment’s pursuit of experience and progress- “Experientia et Progressus”.

**R. Scott Dingle**

Lieutenant General, U.S. Army  
The Surgeon General and  
Commanding General,  
U.S. Army Medical Command





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## **Ukraine Medical Lessons Learned**

### **Extract**

The U.S. Army Surgeon General assembled a multi-disciplinary team in February 2023 to examine the 2022 Russian Invasion of Ukraine and collect observations to inform lessons learned for medical support during large-scale combat operations (LSCO). This assessment aims to help inform policy development, force design, future investments, training strategies, and multi-nation partnerships to deliver and assist future operational health service support and force health protection. The team conducted dozens of interviews over two weeks and collected hundreds of observations to assess Ukraine's operating environment on the first anniversary of the invasion of Ukraine. The aggregation of the observations produced the following nine tactical-to-strategic theses for the U.S. Army Medical Department's preparation for future large-scale combat operations, each to be discussed in a subsequent chapter:

1. Pre-hospital care and speed of evacuation are important determinants of survivability for those wounded in action on the battlefield.
2. LSCO requires renewed focus on multi-modal medical evacuation (MEDEVAC) and casualty evacuation (CASEVAC).
3. Disease and non-battle injury (DNBI) will continue to cause a large percentage of casualties in large-scale combat operations.
4. Outside the Contiguous U.S. (OCONUS) institutional forces must be prepared to become operational.
5. The only thing worse than adhering to the Law of Armed Conflict is not adhering to the Law of Armed Conflict.
6. Improving coordination and collaboration among allies and partners across strategic contexts is imperative.
7. Multi-national medical collaboration is impaired by individual national responsibilities, laws, and expectations.
8. Military medicine excels in competition and conflict but struggles in the transition to crisis.
9. An army might be quickly raised, but a continuum of care must be constantly provided and maintained.

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## Methodology

Russia's unlawful invasion of Ukraine led to intense large-scale combat operations (LSCO). This conflict provides a unique opportunity to gain perspectives into how the North Atlantic Treaty Organization's (NATO) and European Union's various military healthcare systems operate in times of crisis and conflict. Maj Gen Tim Hodgetts, Surgeon General of the United Kingdom Defence Medical Services and Chairman of the NATO Committee of the Chiefs of Military Medical Services (COMEDS), recognized this opportunity, developed an initial list of LSCO lessons learned (Tab-B), and suggested the U.S. Army conduct its assessment.

The Surgeon General of the U.S. Army commissioned the 2023 LSCO Medical Lessons Learned (MLL) Study on the first anniversary of Russia's invasion of Ukraine. A multi-functional MLL team of 10 experienced commissioned and non-commissioned officers were assembled (Tab-A), and took two weeks to collect observations from multi-national and joint partners on the Armed Forces of Ukraine's (AFU's) transition from competition to conflict. The observations were through the lens of the U.S. Army's ten medical functions. The analysis focused on the AFU's efforts and the multi-national LSCO support to the Armed Forces of Ukraine.

Dozens of interviews capture a wide breadth of perspectives. The MLL team identified common themes through hundreds of observations. The aggregation of observations and themes informed the development of nine LSCO medical theses from tactical to strategic. MLL team contributors and enterprise stakeholders reviewed and adjudicated those theses for concurrence. We should establish that this is an independent analysis before comparing it to other studies, writings, or analyses. Though this study is an independent analysis, it reinforces many of Maj Gen Hodgetts' observations (Tab-B).

This document presents the MLL Team's analysis in the following order:

1. **Thesis** is the bottom-line developed to concisely describe the aggregation of observations.
2. **Observations** collected by multiple MLL team members that informed the development of thesis. These observations are arranged to describe pertinent conditions prior to conflict and then describe how the effect of those conditions manifested in conflict.
3. Assessment of **applicability to U.S. Army LSCO** to translate observed Ukrainian, EU, and NATO experiences into actionable recommendations to refine U.S. Army Health System capabilities.
4. Actionable **recommendations** for the U.S. Army, and to inform the joint force regarding research, policy development, force design, investment, training, and multi-national engagement to produce favorable medical readiness outcomes for a modern U.S. Army, joint, or multi-national force confronted with LSCO.

## Limitations

The purpose of this section is to describe this study's known limitations so they may be eliminated or addressed during subsequent analysis and decision-making and considered during planning for future MLL studies. It is important the reader understand the limitations of this LSCO MLL study to evaluate impact on thesis validity.

First, the lack of access to Armed Forces of Ukraine (AFU) perspectives and patient data cannot be overemphasized. The AFU remained in sustained high-intensity combat throughout this document's development and publication. AFU operational tempo and security mandates eliminated the MLL team's access to AFU perspectives and data. As a result, casualty data used in the development of this study is anecdotal and aggregated.





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Second, U.S. force protection policy throughout the data collection process eliminated the MLL team's opportunity to conduct firsthand, boots on ground validation of interview-based observations. Rigorous validation of the enclosed observations with quantifiable data may only be possible with greater access to AFU's patient data at the conclusion of this conflict.

Third, every perspective is subject to its own cultural and organizational biases. This MLL team's perspective was undoubtedly influenced by its familiarity with the concepts of multi-domain operations and the supporting U.S. Army Health System. The AFU's resilience under extraordinary combat conditions virtually eliminated the influence of Western bias. "Western" is used throughout this report to contrast some of Ukraine's Soviet style systems from most of its NATO multi-national supporting partners.

Finally, lack of substantial context results in an inability to derive reliable cause and effect. LSCO outcomes result from an immeasurable combination of operational variables that are impossible to replicate. The U.S. MLL team remained cautious about deriving inappropriate lessons by acknowledging where we anticipate the U.S. Army's LSCO operating environment to differ from the AFU's.

### The Operational Environment

The MLL team captured the following characteristics of Ukraine's operational environment at the commencement of hostilities to help the reader distinguish its experience from the U.S. if confronted with LSCO:

- **Political:** Ukraine's government is young. It regained its independence 32-years ago and its governance has vacillated between Soviet and Western tendencies ever since. This almost certainly has a downstream effect on the speed and quality of public health and military policy implementation. Some areas within Ukraine continue to prefer the Soviet style government which Russia exploits for military advantage.
- **Military:** Ukraine is a conventional power fighting a nuclear power. It cannot leverage the North Atlantic Treaty Organization (NATO) or the European Union (EU) to improve its negotiating position in the same way the U.S. and its European allies would. With regard to military medicine, the AFU's Medical Corps began receiving non-lethal Western security assistance in 2014 when fighting first erupted in the Donbas Region.<sup>1</sup> The AFU remained in sustained conflict with Russian aligned forces following the 2014 annexations.
- **Economic:** Ukraine played an important role within the Soviet economy for industry, agriculture, nuclear power, and tourism. Following the dissolution of the USSR, the economy of Ukraine became a lower-middle income oligarchic Democracy that was increasingly integrating into the global economy with significant exports in agricultural products and neon. Russia's 2014 annexation of Crimea resulted in a reduction in Ukraine's trade with Russia. This increased economic ties to Europe and Western nations, which incentivized Ukraine to implement reforms and crackdown on corruption.<sup>2</sup>
- **Social:** The AFU along with Ukrainian society began this conflict while undergoing a transition from Soviet to Western ideologies. The duality of these ideologies permeated across several disciplines in ways that are difficult to quantify. For example, Soviet-style medicine emphasizes the primacy of the attending physician's judgment on all issues whereas an American approach integrates specialties and allied sciences to create an optimized multi-disciplinary patient care plan.

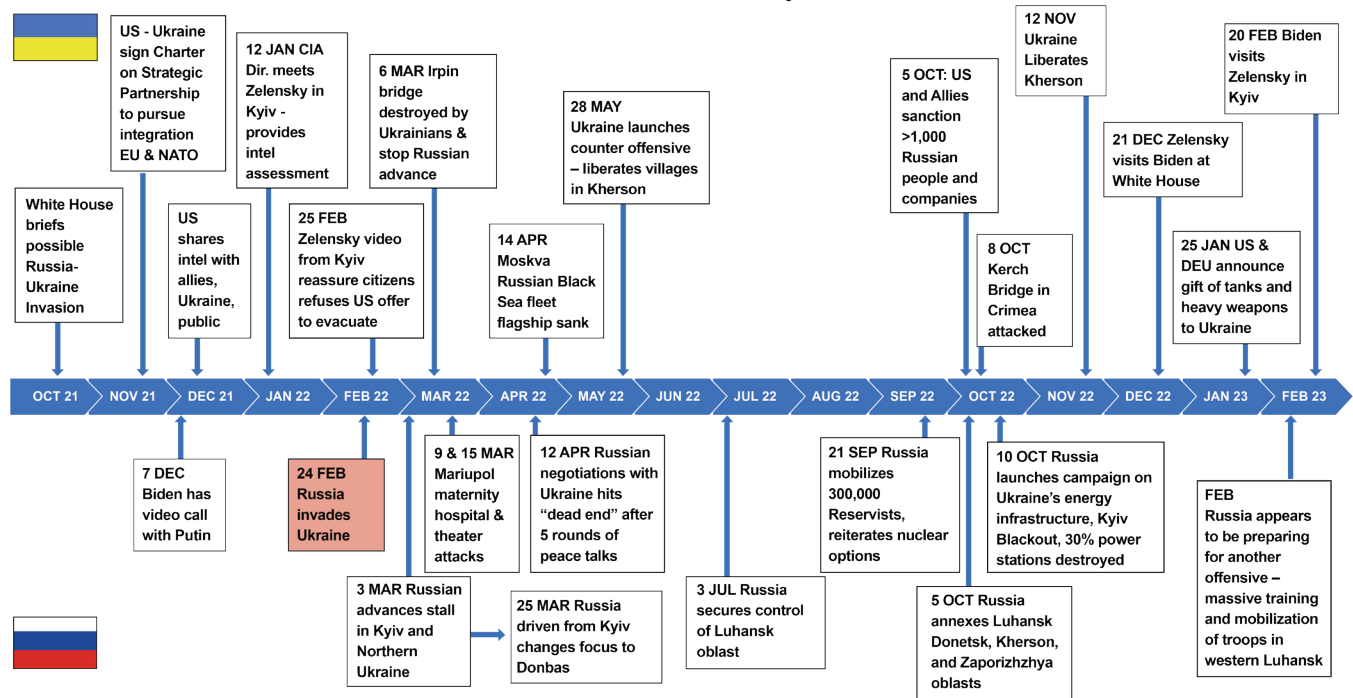
<sup>1</sup> (Hartzell 2020)

<sup>2</sup> (Gorodnichenko 2022)

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- **Information:** Ukraine has an open, pluralistic society where citizens can express criticism of the government. However, media outlet owners often use their platforms as tools to influence and spread their agenda. Ukraine's alignment with Western Europe drew closer in a series of events leading up to the February 2014 Maidan Revolution. Ukraine established relationships with the European Union and Council of Europe in increasing media transparency and media reforms. However, since the 2022 Russian invasion, the Ukraine government implemented controversial policies and governance to expand media regulation.<sup>3</sup>
- **Infrastructure:** Ukraine's main battle area is within its homeland which enables an enhanced level of civilian/military integration. Every vehicle can be an ambulance, every building a hospital, and every citizen a Soldier.
- **Physical Environment:** Ukraine is a large European country fighting within contiguous lines of communication. Its size ranks in the top quarter of nations on Earth in terms of geography and population which offers it more strategic depth than most NATO countries (slightly smaller than the U.S. State of Texas); however, it is a fraction of The Russian Federation's size (the largest geographic country on Earth). This hinders its ability to force Russian culmination. Boggy ground and bitter Ukrainian winters have a marked impact on the maneuverability, moral, and health readiness of troops on both sides. Rugged mountains and rivers also limit maneuvers for both sides, whereas the presence of Black Sea along Ukraine's southern coast creates opportunity for the employment of Russia's Black Sea Fleet.
- **Time:** Time helped Ukraine prior to the conflict but threatens its access to security assistance. Ukraine developed a strong national identity as an independent democracy since the collapse of the Soviet Union that delegitimized many of Russia's pretexts for war. Following the transition to conflict, Ukraine quickly became reliant upon Western aid. The international support Ukraine relies upon is dependent upon the domestic priorities of contributing nations. Enthusiasm for support is expected to wane with the passage of time if Russia's occupation is normalized and contributing-nation priorities shift. The converse of these international sanctions taking an intolerable toll on the Russian economy thereby forcing culmination if international support for Ukraine endures the test of time.

Major Events of the Ukraine-Russia War  
October 2021–February 2023



<sup>3</sup> (Freedom in the World 2021: Ukraine 2021)



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***“Army Medicine does not win wars, but it can lose them.”***

~ Mr. Pete Kalamaras, Chief of Force Management, U.S. Army Office of the Surgeon General

**Thesis 1: Pre-hospital care and speed of evacuation are important determinants of survivability for those wounded in action on the battlefield.**

**Observations:**

The Ukrainian military medical system was still shedding the vestiges of Soviet influence at the beginning of the 2022 invasion. This resulted in a tactical health system that needed more functional agility, operational integration to conform to the tactical plan, and more forward capability for LSCO. Regional military emergency medical systems were effective within their areas of operation but unprepared to coordinate across unit boundaries for mutual support. Medical personnel were not included in tactical mission planning and many first responders near the front were not empowered with advanced pre-hospital training.<sup>4</sup>

In the transition to conflict, many of the AFU's best tactical combat casualty care (TC3) trainers served near the front lines. Russia's heavy reliance on indirect fire resulted in the destruction of medical treatment facilities and caused injury patterns involving high percentages of traumatic fragmentary wounds to the head and upper body. The AFU recognized the risk these conditions created for battlefield forces and began implementing systematic change to their employment of medical forces while under resourced and under fire. Several AFU units modified their scheme of maneuver for medical forces to protect and preserve medical force multipliers who were central to their health service support system. They did this by allowing the qualifications of healthcare personnel to inform positioning in relation to Russian weapons ranges to reduce the rate of loss of advanced medical capabilities. While it is unclear how Aero-MEDEVAC/CASEVAC capability existed within the AFU before conflict, employment was either limited or denied by the arrival of Russian air defense capability. These actions extended ground evacuation distances and associated timelines.

Isolated casualty collection points (CCPs) emerged. Obvious ground lines of communication were disrupted by enemy targeting, leaving few to no alternatives for evacuation. There is no evidence that evacuation windows were coordinated with protection assets. Opportunity CASEVAC, including the use of non-military vehicles, emerged as the primary means of evacuation due to platform availability. CASEVAC movements were often delayed until the tactical situation near CCPs improved. This routinely created multi-hour delays between the point of injury and higher echelons of care. The AFU is familiar with the theory of prolonged care but lacked the training and materials to provide it once the battlefield was set. Multiple sources interviewed during this study assessed that the lack of timely evacuation, the absence of effective enroute care, and extremely limited medical treatment capability far forward increased the proportion of AFU Soldiers killed in action.

The AFU continues to learn and adapt from these lessons. Non-standard evacuation has emerged as preferred training at AFU force generation sites. AFU trainees who demonstrate a desire and skill to comprehend advanced treatment protocols at U.S. led training sites are identified to receive a TC3 train-the-trainer program of instruction.<sup>5</sup>

<sup>4</sup> (Landers 2023)

<sup>5</sup> (McCarthy 2023)

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### **Applicability to U.S. Army LSCO:**

Russian battlefield behavior validates Western multi-domain operating concepts that anticipate isolation of casualty collection nodes through the disruption of air and ground lines of communication. Lack of medical personnel close to the forward line of troops (FLOT) and significant casualty events associated with LSCO means that it is essential that non-medical personnel be able to provide immediate aid for life-threatening injuries. Timely and proper self-aid, buddy aid, and medical first responder interventions are paramount and must be anticipated and trained extensively. Triage must consider evacuation and medical supply limitations as well as the necessity to return wounded to the fight as quickly as possible rather than expend significant supplies on the most seriously injured (reverse triage). Chemical and nuclear threats further challenge triage decision-making. These conditions appear to validate the requirement for the following capabilities:



Underground Ukrainian Role 2 with plastic sheeting to limit dust and risk of infection. (Provided by AFU Support Personnel)

- Emphasis on training and sustaining TC3 for all service members to the appropriate skill level.
- Standardized CASEVAC training, equipping, and integration into mission planning.
- Health service support and force health protection integration into tactical mission planning.
- Importance of triage training focusing on evacuation and medical supply limitations and return to duty necessity.
- Prolonged care training and equipping.

### **Recommendations:**

- Ensure full training of all U.S. Service Members on the appropriate level of TC3.
- Encourage all allies and partners to adopt TC3 or equivalent training and sustaining programs to ensure appropriate point-of-injury medical treatment by non-medical and medical personnel.
- Ensure that the Maneuver and Sustainment Centers of Excellence incorporate robust casualty evacuation teaching into all appropriate programs of instruction.





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- Research to improve early intervention for chemical and radiation injury with diagnostic and prognostic tools.
- Develop and implement a triage training methodology that incorporates consideration of supply shortages and the need to return as many casualties to duty as possible quickly.
- Assess doctrinal solutions to guide the appointment of qualified triage personnel.
- Continue a comprehensive doctrine, organization, training, materiel, leadership and education, personnel, facilities, and policy (DOTMLPF-P) approach to develop capabilities for prolonged casualty care at all roles within the military health system.
- Implement training that educates leaders on the integration of health system planning into the development of the maneuver plan.

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***“It’s not the will to win that matters- everyone has that. It’s the will to prepare to win that matters.”***

~ Paul “Bear” Bryant, former head coach, University of Alabama

## **Thesis 2: LSCO requires broadened focus on multi-modal MEDEVAC and CASEVAC.**

### **Observations:**

AFU’s ground evacuation compensated for a lack of aero-MEDEVAC/CASEVAC. Their special operations forces (SOF) tripled the number of ground ambulances its regiments retained after the February 2022 invasion.<sup>6</sup> AFU medics continue to wrestle with protection, scale, and transitions, however.

The proliferation of drone technology for intelligence, surveillance, and reconnaissance impaired the ability to achieve protection through concealment for small teams operating throughout Ukraine. Protection is being achieved through armor and speed. Purpose-built light ambulances are easily identifiable and more vulnerable than alternatives. Armored ambulances are among the AFU’s top requests for donation according to senior members of the UK Medical Services.<sup>7</sup> Feedback from the frontline indicates a strong preference for armored ground ambulances such as the M-113 variants provided by the U.S. and FV 104 Samaritans provided by the UK. These vehicles provide their crews confidence that they have sufficient protection to survive evacuation under fire albeit at a slower speed than light wheeled vehicles.

The AFU are forced by battlefield realities to use light and fast evacuation by non-tactical vehicles of opportunity, often coordinated through non-military networks. This leaves the casualty awaiting transport for extended periods and exposed to the elements without medical care enroute. The AFU’s lack of dedicated and experienced tactical medical personnel to provide enroute care was a recurring observation. It is unclear as to whether their absence was the result of a lack of qualified medical personnel, a reluctance to expose them to fires, or both.

Evacuation at scale is performed over hundreds of miles to alleviate Role 2 patient holding. The AFU does not possess the organic ability to conduct theater evacuation at scale, so Ukraine leveraged civilian and humanitarian relief non-governmental organizations (NGO) to revive rail evacuation. The AFU reports ~64% of its theater evacuation is being conducted by rail.<sup>8</sup> One of these trains possesses the capacity to evacuate up to 150 patients in one trip and the capability to provide enroute surgical and critical care.<sup>9</sup>



Well-equipped AFU CASEVAC platform. (Provided by AFU Support Personnel)



AFU evacuation with patient in vehicle (not pictured) and one on top (placed on tires for shock absorption). (Provided by AFU Support Personnel)

<sup>6</sup> (Levchuk 2023)

<sup>7</sup> (Bowley, Bland and Morehouse 2023)

<sup>8</sup> (Ostashchenko 2023)

<sup>9</sup> (Humanitarian and Medical Emergency Team (Poland) 2022)





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Europe is relearning challenges associated with rail evacuation transitions. The UK Defence medical leaders reported that they examined a hospital carriage from a museum to reacquaint partners with the lost science of rail evacuation.<sup>10</sup> Rail routes are not responsive to need and ambulance exchange points must be carefully coordinated. Evacuation planners must account for routes where rail gauges change between Eastern and Western Europe.

### **Applicability to U.S. Army LSCO:**

U.S. Forces may also experience evacuation challenges with protection, scale, and transitions in LSCO. Materiel solutions may someday be developed to overcome tactical challenges described above; however, operationalization will require holistic DOTMLPF-P adjustments.

MEDEVAC is “the timely and effective movement of the wounded, injured, or ill to and between medical treatment facilities on dedicated and properly marked medical platforms with enroute care provided by medical personnel.”<sup>11</sup> Consequently, U.S. Army MEDEVAC units are trained, organized, and equipped to develop highly skilled practitioners in both medical treatment as well as tactical movement throughout two domains: ground and air. Wargaming models inform the level of protection and scale these units must be tailored to operate under.

Current U.S. Army concepts project that mass casualty events are inherent in LSCO. CASEVAC platforms are employed when the scale of vehicle or medical personnel requirements exceed capacity. This means the employment of CASEVAC is often unplanned and in *extremis*. The utilization of non-standard evacuation platforms is only limited by the evacuation coordinator’s imagination. U.S. Army doctrine illustrates over two dozen litter configurations for non-standard ground, air, and maritime vehicle families.<sup>12</sup> Equipment and crew training is required to configure most non-standard vehicles for CASEVAC. The availability of these two resources at the point of need is unlikely without prior planning and preparation. For example, the operator’s manual for the M1083 5-ton Vehicle Series makes no mention of CASEVAC configurations for operator training.<sup>13</sup>

Physical domain and organizational transitions slow operational tempo. The military service departments specialize in operations tied to a physical domain meaning physical domain transitions will often require joint organizational coordination. Most LSCO casualties will occur during unified land operations and thus enter the continuum of care on evacuation platforms supporting the U.S. Army or Marine Corps. FM 3-0 envisions all domains as increasingly contested, which will limit land component access to organic vertical lift for logistics and evacuation. This suggests multi-modal solutions must be developed and exercised to support ground domain and maritime operations. Emerging naval medical craft and Army watercraft offer dedicated “roll on/roll off” capabilities to accelerate ground to maritime transitions with adjustments to training and equipment.



Inside of medical evacuation train staffed by Doctors Without Borders in collaboration with the Ukrainian State Railways. (Photo Credit: Undated presentation by Polish Humanitarian and Medical Emergency Team)

<sup>10</sup> (Defence Medical Services Functional Team (2023)

<sup>11</sup> (Headquarters, Department of the Army 2020)

<sup>12</sup> ATP 4-02.13

<sup>13</sup> TM 9-2320-366-10-1

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Organizational transition challenges are not limited to evacuation. It is also applicable towards medical logistics distribution. The Army Health System must integrate, coordinate, and synchronize with the sustainment enterprise but competes for distribution capability because it does not possess dedicated medical logistics distribution assets. Organizational transitions between medical logistics units and the sustainment enterprise create opportunities for risk. This problem is exacerbated without the presence of dedicated ground medical evacuation assets capable of delivering medical logistics (MEDLOG) in *extremis*. Integration of MEDLOG distribution functions with medical evacuation under the same command and control mitigates the risk of organizational transition and reduces the reliance on medical materiel. Medical command and control headquarters may have dedicated MEDEVAC and MEDLOG capabilities task organized to them, but neither MEDEVAC nor MEDLOG organizations maintain MEDLOG distribution as a core mission essential task.



Conceptual depiction of the U.S. Navy's Expeditionary Medical Ship (EMS) currently in development. (Photo Credit: U.S. Naval Institute News, "Navy Medicine is Preparing for the Future of Expeditionary Combat" February 22, 2023)

Opportunities also exist for the U.S. Army to exploit the institutional knowledge of MEDEVAC formations to shape theater evacuation challenges in competition and crisis and prepare for multi-modal evacuation during conflict. Winning during competition is achieved through deterrence. Military medicine's role in deterrence is to maximize combat power and project force resilience. MEDEVAC formations possess high concentrations of well-led exportable MEDEVAC specialists to build credible tactical medical formations through global health engagement (GHE). Leveraging these formations to build partner capability at scale strengthens an alliance's resilience and collective credibility to deter aggression. The U.S. Army's MEDEVAC role to build partner medical capability is especially relevant in Europe where there is a high density of allies and partners that rely on ground lines of communication. The U.S. Army divested much of its theater MEDEVAC force structure during the early days of the Global War on Terror. As a result, the U.S. Army Europe and Africa lacks an assigned theater ground evacuation asset to enable deterrence through this type of GHE as of the writing of this assessment.<sup>14</sup>

### Recommendations:

The following recommendations are changes to doctrine, organization, training, materiel, and leader development to optimize the employment of multi-modal MEDEVAC and CASEVAC capabilities.

- Identify a U.S. Army CASEVAC proponent.
- Update tactical vehicle technical manuals to include standardized casualty evacuation configurations with associated updates to additionally authorized items list.
- Normalize CASEVAC backhaul planning and rehearsals into tactical logistics convoy operations.
- Institutionalize proficiency on multi-modal evacuation at scale (i.e., trains, busses, snowmobiles, ferries, four-wheelers, unmanned platforms) to increase agility and operational tempo in resource constrained and joint environments.

<sup>14</sup> (Huggins et al. 2023)





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- Work with the Department of the Navy and Army watercraft units to integrate maritime transfer into planning and exercise across service departments as mass casualty evacuation platforms and bulk CL VIII resupply vessels.
- Leverage advancement in materiel development such as incorporation leader-follower technology to create ground MEDEVAC platforms that achieve higher levels of crew protection and scale without sacrificing speed and maneuverability.
- Add MEDLOG distribution to the mission essential task list (METL) for dedicated theater evacuation assets and refine their tactics, techniques, procedures (TTPs), manning and equipment to push medical supplies forward.
- Leverage the robust 68W population in echelon-above brigade MEDEVAC units to improve the theater commander's ability to surge medical treatment security assistance during competition and crisis. They have potential in competition as Medical Security Force Assistance enablers.
- Reposition at least one active component ground ambulance company to Europe.
- Participate in exercises such as NATO's Casualty Move (CAMO) Tabletop Exercise to increase policy development and tactical/operational proficiency when conducting multi-domain combined/joint MEDEVAC/casualty movement at scale.
- Train on and exercise with alliance partners' patient evacuation and regulation tactics, techniques, and procedures to ensure efficient combined integration.
- Increase interoperability between U.S. and NATO material and non-material solutions.

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***“A corps of medical officers was not established solely for the purpose of attending the wounded and sick; the proper treatment of these sufferers is certainly a matter of very great importance, and is an imperative duty, but the labors of Medical officers cover a more extended field. The leading idea, which should be constantly kept in view, is to strengthen the hands of the CG by keeping his army in the most vigorous health, thus rendering it, in the highest degree, efficient for enduring fatigue and privation, and for fighting.”***

~ MAJ Jonathan Letterman MD, Medical Director, Army of the Potomac

### **Thesis 3: DNBI will continue to cause a large percentage of casualties in Large-Scale Combat Operations.**

#### **Observations:**

On 15 November 2022, the AFU’s Commander of the Medical Forces gave an update to the NATO Committee of Chiefs of Military Medical Services regarding AFU medical situation. This presentation characterized 50.4% of AFU casualties as “Diseased” and another 3.4% as “Non-Combat Injuries.” An increase in sanitary losses from June to November 2022 as well as U.S. Army Europe and Africa (USAREUR-AF) reporting indicates that the proportion of these casualties continued to increase throughout the winter. These proportions were verified by leaders in the Multi-national Medical Coordination Centre/European Medical Command (MMCC/EMC) as well as partners with firsthand knowledge of conditions on the ground.<sup>15</sup> Additionally, it cannot be ascertained to what degree unsanitary conditions contributed to morbidity of combat casualties. Observations suggest disease and non-battle injury casualties resulted from three primary factors: poor conditions, limited training, and urgent accessions.

The destruction of Ukrainian infrastructure leading to unsanitary conditions is well publicized. Russian reliance on imprecise indirect fire decimated civil infrastructure. This resulted in AFU reliance on available rations and field equipment which were often resourced through multi-national efforts. Domestically sourced supplies and equipment are not optimized for expeditionary conditions. Personal issue items like cold and wet weather clothing are purchased off the shelf and not military grade. Billets and fighting positions are hastily constructed to remain relevant to the speed of combat for personal protection and not force health protection.



Ukrainian soldiers in transit somewhere along the Eastern front. (Provided by AFU Support Personnel)

Ukraine’s defense is a national mobilization effort that transforms citizens into soldiers in short order. Force generation training priorities are set to sustain a homeland defense that requires velocity and lethality. This results in a low emphasis on field sanitation’s role in force health protection and limited time for such training. Multi-national training sites are designed to preserve or improve the health readiness of new recruits to preserve combat training time and quality. Newly minted soldiers

<sup>15</sup> (Blaha 2023)





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are routinely put to the field without developing habitual field sanitation practices. The AFU and allied trainers recognized the impact of force health protection on the battlefield. This resulted in allied medical personnel developing and integrating modified field sanitation programs of instruction into the margins of Allied facilitated combat and trauma skills training.

Loose accession standards have an unquantifiable but impactful downstream effect on the rate of disease and non-battle injuries (DNBI). Historically unconstrained public access to antibiotics made the regional accessions pool predisposed to multi-drug resistant (MDR) infections. These infections are beginning to appear across Europe wherever there is an influx of trainees and refugees. One source surmised that emphasis is given towards simply reviewing an AFU recruit's medical history documentation vice conducting an exam for military fitness.<sup>16</sup> Training sites report dental, musculoskeletal, and EENT (eye, ear, nose, and throat) conditions continue to rise and degrade the quality of training.<sup>17</sup>

### **Applicability to U.S. Army LSCO:**

Modern LSCO associated challenges with DNBI can be described in three areas: detection, accessions, and culture.

The emerging LSCO battlefield is seeing a proliferation of tactical drones. These sensors broaden the detection and destruction of targets within artillery range. This has numerous force health protection implications. Specifically, infrastructure designed to support force health protection must be near supported forces to be relevant. This makes them subject to identification by drones and targeted for destruction. Integrating force health protection requires time and makes operating sites conspicuous for targeting. The tempo of LSCO may not afford opportunity for theater commanders to plan and prepare protective positions that intuitively support force health protection. Soldiers who do not succumb to DNBI as unsanitary conditions develop will be at increased risk for secondary infections if they become combat casualties.<sup>18</sup>

DNBI grows with conflict duration. Whole-of-nation war efforts to force generate commence while trained and ready forces culminate. This may put military entrance processing stations in the difficult position of balancing an applicant's will to fight against their medical ability to fight. Motivated but unready volunteers do not complete required training, stress battlefield medical systems, and become unreliable on the front. U.S. Army Regulation 40-502 states "Other (medical) standards may be prescribed by DOD in the event of mobilization or a national emergency" however, it does not describe the latitude accessions medical personnel may be given to approve previously exempted inductees for military service.

Field sanitation requires training and continuous leadership emphasis. There are several reasons this could be a modern LSCO challenge. One is the psychological inability to prioritize sanitation when under persistent fire. Another is the inability to cross-level leaders experienced in fieldcraft while an Army is undergoing rapid growth. A third reason may be urbanization's effect on society's ability to be self-reliant without public health infrastructure and the emergence of industrial hazards. Finally, there is a lack of technical understanding how unique operating environments affect humans and military working animals. These are but a few of numerous reasons rapidly mobilized U.S. Soldiers will struggle with preventive medicine when put to the field in a modern LSCO.

<sup>16</sup> (Landers 2023)

<sup>17</sup> (McCarthy 2023)

<sup>18</sup> (Blyth, et al. 2016)

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## Recommendations:

- Assess and exercise DOD decision space and process to modify accession and deployment medical readiness requirements in declared national emergencies. Account for second-order medical care resource implications at accession sites.
- Prepare the U.S. operational MEDLOG system to broaden acquisition and sustainment of chronic medications for a rapidly expanding Army with relaxed medical accession standards.
- Assess the DOD's apparatus to assess and consolidate the study of environmental impacts on Soldiers in an expeditionary environment.
- Resource U.S. Army Training and Doctrine Command (TRADOC) to institutionalize field sanitation within leader development training programs.
- Develop new expeditionary solutions to prevent or reduce wound infection's impact on morbidity/mortality; especially as relates to MDR infections.
- Ensure Class I supplies are carefully evaluated for wholesomeness prior to consumption in any potential engagement with a near peer adversary. Rations are ideally suited for LSCO due to their caloric density and ease of distribution. Confirm capacity and training of personnel to assess and acquire wholesome rations as well as the ability to retain their quality during prolonged or disrupted distribution.
- Ensure country health threat briefs are updated for military working animals and zoonotic diseases. Consider adding trans-boundary animal diseases (TAD) that may impact agriculture within any theater of operation and upon a unit's return CONUS.
- Develop modernization solutions to allow bacterial culture and sensitivity testing for MDR infections to identify optimal antibiotic treatment. Ubiquitous presence of MDR organisms in the expeditionary environment will raise morbidity and mortality rates over similar conditions in the U.S.
- Reassess current field sanitation training, education, equipment, and supplies at the tactical unit level; implement changes to mitigate conditions/threats the Army of 2030 will face.





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***“You may not be interested in war, but war is interested in you.”***

~ Leon Trotsky

#### **Thesis 4: OCONUS institutional forces must be prepared to become operational.**

##### **Observations:**

“The institutional force consists of Army organizations whose primary mission is to generate, prepare, and sustain operating forces of the Army”.<sup>19</sup> U.S. Army Medical Command (MEDCOM) has institutional force elements positioned forward within overseas combatant command areas of operation. MEDCOM units are positioned forward to man fixed medical treatment facilities operated by the Defense Health Agency (DHA). MEDCOM’s Medical Readiness Command Europe maintains a presence at fixed medical, dental, and veterinary treatment facilities across Europe with the largest at Landstuhl Regional Medical Center (LRMC).



U.S. Soldiers, Airmen, and civilian staff at Landstuhl Regional Medical Center receive patients who were medically evacuated from Kabul, Afghanistan, after U.S. service members and Afghan civilians were injured in a series of attacks outside of Hamid Karzai International Airport, Aug. 26, 2021. (U.S. Army photo)

The LRMC staff conducted an unplanned mission rehearsal exercise for wartime bed expansion through its support to Operation Allies Welcome throughout the latter half of 2021. This support prepared LRMC for the impact of the crisis in Ukraine by invigorating refinement of its bed expansion common operating picture (COP) under DHA authorities. The LRMC Team worked with USAREUR-AF and MEDCOM to prepare scalable request-for-forces (RFF) packages to expand and sustain LRMC from 36 to 68 beds. LRMC also initiated dialogue with the Reserve Component for the resourcing of manpower in a transition to crisis.

Some of the institutional processes established during the Cold War to ensure European MTF’s responsiveness to emergent conflict are no longer in place. European MTFs are not assigned a defined role in the theater’s contingency operations plans (OPLANs) and LRMC does not maintain a relocation plan if it is targeted for attack. These MTFs are readiness training platforms for personnel assigned to European operational forces. These multi-service personnel also have forecasted obligations to their respective service during a time of war. Furthermore, the U.S. Army no longer possesses force strength or mission to backfill DHA facilities out of the Reserve Component. The Department of Defense (DOD) civilian personnel augmenting these facilities are vital to the healthcare delivery system but are not designated as emergency wartime personnel prepared to persist in a transition to conflict. The risk of their loss is theoretically mitigated through the arrangement of emergency privileging clauses designed to arrange for German healthcare personnel to work within U.S. facilities if differences in language and equipment can be overcome.<sup>20</sup> Concurrent German national mobilization for LSCO may further invalidate this mitigation.

##### **Applicability to U.S. Army LSCO:**

Army operations doctrine anticipates adversaries will attempt to contest the institutional Army with lethal and non-lethal effects across multiple domains throughout the operating environment.<sup>21</sup> Forward fixed MTFs are integral to the Joint Force’s ability to project capability. They are also immobile

<sup>19</sup> (Headquarters, Department of the Army 2019)

<sup>20</sup> (Landers 2023)

<sup>21</sup> (Headquarters, Department of the Army 2022)

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and susceptible to enemy threats. Reliance on otherwise committed operational forces and the voluntary commitment of civilian personnel create opportunities for an adversary to debilitate theater health service support plans that rely on fixed MTFs by introducing the mere perception of threat.

Fixed MTF capability sustainment or bed expansion will require military force generation to replace military losses to operational requirements and civilian losses to non-combatant evacuation. These requirements will be passed to military service departments if they are successfully approved through a saturated request for forces process. Additionally, over half of the Army's medical capability rests within the Reserve Components, which no longer retain the mission or force structure to backfill fixed MTFs.

Fixed MTFs are threatened on the LSCO battlefield. The legitimacy of this threat increases when they are collocated with the warfighters they are intended to serve. Their locations are well known, and their staffs live in the surrounding communities. Modern warfare's increased range and lethality raises the probability of collateral damage if protection measures fail. Fixed MTFs are engineered to provide a high standard of care but lack the ability to displace if threatened. This makes the facility's ability to provide a safe medical environment dependent upon the operating environment's ability to ensure protection.

### Recommendations:

- Define organizational responsibilities and authorities to decide OCONUS fixed facility roles in support of the combatant commander. This includes determining if a fixed facility is defined as critical infrastructure.
- Integrate OCONUS institutional force medical planners into theater wargames to develop decision support tools and processes for the protection and expansion of healthcare capacity and capability as well as to define the conditions for a transfer of authorities.
- Develop medical mission planning rules that consider the impact on manpower availability and protection challenges when making recommendations to integrate a fixed MTF into theater OPLANs.
- OCONUS fixed MTF leaders must have a playbook to assess their ability to expand or distribute patient workload if components of the theater's institutional health network is threatened.
- Health facility planners may need to account for expansion and protection when developing OCONUS fixed MTFs. For example, the parking deck at the Rambam Health Care Campus in Haifa, Israel, incorporated innovative design to serve as a safe and fortified expansion space.<sup>22</sup> This space that was activated during the height of the COVID epidemic.
- Develop/maintain agreements with host and adjacent nations to allow hospitalization of U.S. personnel (South Korea model—Wartime Host Nation Support [WHNS]).
- Develop a comprehensive Army policy for Operational QA&S to enable multi-national credentialing and privileging and exercise OCONUS hospital continuity of operations plans (COOP).
- Explore options to convert overseas DOD Civilian Corps into an expeditionary workforce.

<sup>22</sup> (Siegel-Itzkovich 2012)





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***“In war, truth is the first casualty.”***

~ Aeschylus

**Thesis 5: The only thing worse than adhering to the Law of Armed Conflict is not adhering to the Law of Armed Conflict.**

**Observations:**

The Ukrainian people as well as their allies and partners have developed a pervasive distrust of The Russian Federation’s will to adhere to medical protections described in the Geneva Convention. This is despite The Russian Federation’s long-standing endorsement of the Conventions and the incorporation of its protections into its military doctrine (as of 1990). The World Health Organization reports 845 attacks on Ukrainian health care infrastructure between February 24th, 2022, and June 28th, 2023.<sup>23</sup> Routine reports of these attacks are broadcast across mainstream and social media.



Marked civilian ambulance with combat damage. (Provided by AFU Support Personnel)

Ukrainian civilian ambulances were similarly identifiable throughout the country like the one depicted in the above photo at the beginning of the conflict. This made the assessment of battle damage to these assets easily measurable throughout the duration of conflict. The perception of targeting intent resulted in changes to the AFU’s tactics, techniques, and procedures to protect evacuation assets and patients. Purpose built ambulances were repainted to make them indistinguishable from other vehicles as the conflict ground on. Tactical lines of evacuation were extended to position advanced medical assets outside of indirect fire range and prevent their destruction.<sup>24</sup>

The Office of Naval Research analysis suggests Russia implemented a strategy of attacking health care facilities, warehouses, transport, and workers to reduce the availability of health care. This is also known as the “kill twice effect”.<sup>25</sup> An objective assessment of intent to destroy medical assets is threatened by the fog and friction of war. Results are the only objectively verifiable data-points on the battlefield. This conflict has resulted in significant damage and or destruction of Ukrainian medical assets regardless of intent.



Purpose built ambulance repainted to blend with other tactical equipment. (Provided by AFU Support Personnel)

<sup>23</sup> (World Health Organization 2023)

<sup>24</sup> (Blaha 2023)

<sup>25</sup> (Cohn 2022)

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### **Applicability to U.S. Army LSCO:**

The U.S. Army's ability to rapidly generate and project force remains a critical advantage over potential adversaries. Medical capability conserves and regenerates trained and lethal forces. Destruction of medical infrastructure may be interpreted as a means of forcing the U.S. Army's culmination by degrading its force regeneration and morale. Future LSCO adversaries may assess their size or nuclear capability allows them latitude to implement a kill-twice strategy with impunity. Furthermore, implementation of this strategy by an enemy may challenge conventional interpretation of the laws of armed conflict.

### **Recommendations:**

- Reiterate the purpose and strategic importance of medical markings to U.S. Army medical personnel regardless of their perceived tactical effectiveness.
- Develop and field ground ambulances with improved survivability and mobility.
- Develop unmanned MEDEVAC platforms that meet the conditions for medical protection and remove crews as a variable in adherence to the laws of armed conflict.
- Explore additional methods of marking, signals, etc., of military medical forces to further identify protected units/personnel.
- Review Army-wide doctrinal and tactical guidance to ensure health and medical battlefield survivability is adequately addressed.
- Integrate MEDEVAC and CASEVAC planning efforts with the protection warfighting function through distribution management cycles/forums.





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***“Simplicity leads to success, but, though successful, [GHE] isn’t simple.”***

~ Maj Gen Norbert Weller, then Chief of Staff, Medical Service Command of the German Armed Forces

## **Thesis 6: Improving coordination and collaboration among allies and partners across strategic contexts is imperative.**

### **Observations:**

Global Health Engagement builds trust and confidence, shares information, coordinates mutual activities, maintains influence, and achieves interoperability in health-related activities that support U.S. national security policy and military strategy. It includes both military-to-military and military-to-civilian engagement activities in support of joint and civil-military operations.<sup>26</sup>

Each service component command in Europe is assigned areas (countries) of responsibility in Europe. These are known as country lead components (CLCs). The U.S. European Command (USEUCOM) integrates and synchronizes the GHE activities of the Service components across the continent. USAREUR-AF was the CLC for Ukraine until USEUCOM elevated responsibility to the EUCOM Command Surgeon after Russia annexed parts of it in 2014.



U.S. Army SGT Stephanie Travieso from the 1st Area Medical Laboratory observes as Ukraine MoD officers set up the polymerase chain reaction during diagnostic testing training in Kyiv, Ukraine. (U.S. Army photo)

Several U.S. GHEs with Ukraine prior to February 2022 were focused on specialized and Role 4 levels of care. For example, between the 2014 annexation and the February 2022 invasion, U.S. combat operational stress units established a Restoration and Reconditioning Center (RRC) to strengthen Ukrainian Soldiers’ coping skills and adaptive stress reactions. These behavioral health engagements began to demonstrate quantifiable changes to the AFU’s approach to combat stress control.

Specialty engagements were predominately conducted by elements of the 30th Medical Brigade, LRMC and the Defense Institute for Medical Operations. The LRMC commander developed a strategic initiatives group (SIG) to address the requests for training and GHE support flowing out of USAREUR-AF and U.S. Air Forces in Europe (USAFE) GHE.<sup>27</sup> Elements of a U.S. brigade combat team with a Role 1 medical element also sustained a persistent presence as members of the Joint Multi-national Training Group-Ukraine (JMTG-U) in Yavoriv, Ukraine, throughout this period to train Ukrainian soldiers individual first aid skills. As intelligence reports throughout the Fall of 2021 indicated increased probability of conflict, the pace of GHE with Ukraine slowed.

The DOD’s freedom of movement to satisfy Ukrainian GHE requests was significantly reduced when its operational and political authority to conduct engagements within Ukraine were halted as conflict broke out. The JMTG-U relocated from Yavoriv, Ukraine to Bavaria, Germany where it consolidated with 7th Army Training Command (ATC) to reframe the train and assist mission as the AFU demonstrated resilience to the invasion. The AFU began relaying its medical requirements through the NATO COMEDS. The COMEDS assembled a coalition of the willing to gain approval from their national

<sup>26</sup> (Department of Defense 2017)

<sup>27</sup> (Landers 2023)

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command authorities to provide support. Coalition partners reframed their contributions to AFU readiness across a spectrum of national authorities. Medical support initiatives captured immediate interest across Europe as an alternative to lethal aid. The UK for example, established a series of train, equip, and assist efforts (Operations Interflex, Interbow and Catalyze) to build individual, collective, and strategic AFU medical capability both outside and within Ukraine. The AFU continued to request highly specialized and complex GHE through these venues to prepare them to address the growing strategic issue of rehabilitating the seriously wounded.

Multiple indicators and first-hand observations from Ukraine reiterated an immediate need to develop and resource the AFU's combat casualty care capability at scale. The winter of 2022 afforded the AFU space to deliberately generate forces following a series of successful fall counter offensives. By that point, the JMTG-U reinvigorated its train and assist mission. Combat medical training was not an initial priority. Time and interest in making it a training priority appeared as AFU recruits demonstrated exceptional training comprehension and training time was economized. The medical element developed ad-hoc medical training programs but struggled to conduct tactical-level training at scale with personnel or equipment due to installation and enterprise-level resource constraints such as training equipment sets. NATO partners expressed a desire to standardize tactical training tasks and equipment as training initiatives developed across the multi-national advise and assist effort. Static resourcing did not posture USAREUR-AF to augment emergent successful NATO and tactical security assistance initiatives while Ukrainian authorities continued to request U.S. support for complex specialty care training and equipment.

#### **Applicability to U.S. Army LSCO:**

Military engagement and security cooperation extends across the Army's strategic contexts of competition, crisis, and conflict.<sup>28</sup> It may never be possible to quantify how U.S. GHE efforts contributed to the AFU's battlefield performance in LSCO, but reflection on security cooperation efforts throughout escalation of strategic contexts towards LSCO offer insights on the frictions GHE priorities may encounter.

The first friction point is prioritization of theater shaping activities. GHE planners must balance the partner nation requests with the U.S. security assistance goals and the forces available to execute engagements. GHE planning occurs at the operational level within combatant command and service component command headquarters while theater medical assets are tasked for execution. The U.S. Army Health System's corps and theater medical assets are inherently specialized whereas the preponderance of capacity for tactical combat casualty care is organized within maneuver units.<sup>29</sup> In fact, the 30th MED BDE is taking an active role in GHE by participating in more than 20 NATO exercises, and it is projected to conduct 60% of the theater's global health engagements in 2023.<sup>30</sup> This creates opportunities for disparity between operational-level capabilities and tactical necessities.

The second friction point is the ability to sustain meaningful GHE when a partner nation transitions to LSCO. The combination of political and military operating environments will impact what activities U.S. Forces are authorized to conduct within an area of operations. The U.S. Military Health System must retain military healthcare teams to preserve its own readiness which results in a shortage of forces available to conduct GHEs. When U.S. military medical personnel are available, their presence may be construed as escalatory and rigid protection policies limit freedom of maneuver in an area of combat operations when compared to civilian or non-governmental health engagement activities. This constrains a GHE planner's ability to position activities where they are needed most in time and space.

<sup>28</sup> (Headquarters, Department of the Army 2022)

<sup>29</sup> (Headquarters, Department of the Army 2020)

<sup>30</sup> (Henderson 2023)





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## Recommendations:

- Develop plans to sustain GHE's role in partner nation force training as they transition through crisis and conflict using civilian or non-governmental capabilities.
- Leverage chief of mission authorities in areas with sustained diplomatic presence.
- Integrate Office of the Deputy Assistant Secretary of the Army for Defense Exports and Cooperation (DASA DE&C) and Defense Logistics Agency (Troop Support) to develop policies and resources that enable GHEs to equip partner nation personnel with the with medical equipment sets and individual medical materiel (Standardized Joint First Aid Kit) they are trained on (as the UK does).
- Develop exportable and expendable GHE training equipment set program for high frequency tactical training programs of instruction.
- Develop RFFs for "GHE Augmentation Teams" to provide tailored capabilities that can be sourced across the service components (as was done for COVID Urban Augmentation Teams).
- Facilitate knowledge sharing between incoming & outgoing GHE instructors & participants.
- Establish relationships between Army Service Component Commands (ASCCs) and the institutional force to produce security assistance education and training products in the supported nation's language at scale (also known as "pointy-talkies").
- Refine process to evaluate and adjudicate partner nation wants against U.S. assessments.
- Consider wider freedom of movement authorities for GHE in relation to other security assistance activities to assess requirements and resource multi-disciplinary support.
- Encourage multi-national alliance partners to establish standardized certifications as the baseline for tactical medicine training initiatives.
- Evaluate development of GHE training and certification program for Army Medical Department leader development with an additional skill identifier as is done in the Veterinary Corps.
- Further develop roles and responsibilities at echelon for GHE, paying particular attention to the future role of the Theater Medical Command in this space in support of an ASCC.

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***“The British Army fights all its battles uphill and usually on the junction of four map sheets.”***  
~ Field Marshal Sir William Slim

## **Thesis 7: Multi-national medical collaboration is impaired by individual national responsibilities, laws and expectations.**

### **Observations:**

Organizational barriers may be one of Ukraine’s greatest impediments to a responsive health service support system. Although the AFU developed a robust medical command within the UKR Ground Forces prior to the invasion, it lacked integration with the homeland defense elements that were external to the Ukrainian Ground Force. This means that subcomponents of Ukraine’s defense apparatus, such as the Ministry of Defense’s Territorial Defense Forces or the National Guard under the Ministry of Internal Affairs, have regional and organizational health service support systems that are neither synchronized nor interoperable with adjacent defense forces. The AFU also did not account for the volume of Russian prisoners of war, which further complicated the AFU medical system and taxed the health service support system.<sup>31</sup> Ukraine recognized early in the conflict the necessity to receive international support to absorb the medical workload the conflict produced. The MLL team observed points of friction between the Ukrainian Ministry of Health’s (MoH’s) desire to quickly return service members to the fight and the length of time international partners needed to conduct rehabilitative care outside of Ukraine.

A multi-national effort mobilized to regulate patients requiring rehabilitative care and to distribute medical logistics. The Ukrainian MoH established itself as the single point of contact for patient regulating. Multiple countries from throughout NATO, the European Union, and beyond volunteered to accept Ukrainian casualties although the MoH relies heavily on countries with large Ukrainian populations.

The EU is a supra-national organization with power or influence transcending national boundaries or governments, but the U.S. is not a member. The EU was already postured to assume a leadership role in Ukrainian patient distribution because of efficiencies gained in the NATO medical system and the recent coronavirus pandemic. The Multi-national Medical Coordination Center/European Medical Command (MMCC/EMC) was established as a joint NATO/EU effort to stimulate “supra-national medical coordination and cooperation” of member nations. All MMCC staff come from NATO member nations; however, not all NATO members contribute, and the U.S. withdrew its liaison officer to the MMCC early in the conflict despite allied requests. The EMC component is designed to support all EU member nations regardless of NATO membership. It obtained initial operational capacity in 2019 and achieved full operational capacity one month after the Ukrainian conflict began.<sup>32</sup>

The MMCC/EMC coordinated for the evacuation of 2,175 Ukrainian patients at the time of this assessment. It accomplished this through a patchwork of systems and agreements. The MMCC/EMC does not possess an international patient regulating system despite attempts to develop one. This slows patient regulating to a two-week process to evacuate a patient to their host nation. NATO staff communicates through the EU’s Early Warning and Response System to seek out volunteer nations to host patients. Norway volunteered to conduct aero-medical evacuations from the patient exchange point to the identified host medical facility on behalf of the EU.<sup>33</sup>

<sup>31</sup> (Landers 2023)

<sup>32</sup> (Multinational Medical Coordination Center/European Medical Command 2023)

<sup>33</sup> (Multinational Medical Coordination Center/European Medical Command 2023)





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As one multi-national effort was assembled to get casualties out of Ukraine, a separate but no-less intricate system was developed to get medical logistics into Ukraine. Military donations to the AFU have been crowdfunded between donors and specific units since Russia annexed parts of Ukraine in 2014. Almost immediately upon the commencement of the 2022 conflict, a multi-national effort was well prepared to facilitate the exchange of Ukrainian requirements against international donations. The International Donor Coordination Center (IDCC) was established and employed an information technology network called KOROVAI to match requirements with donors. KOROVAI was initially intended for general-purpose warfighting material. Medical materiel was added upon system refinement.<sup>34</sup> Several medical logistics requirements are also satisfied through a series of bi-lateral requests outside of the KOROVAI system.

International materiel donations have proven to be a lifeline to the AFU, but they came with challenges. The significant amount of materiel donated to Ukraine lacks standardization and complicates AFU interoperability. For example, donated oxygen regulators may not fit oxygen tanks from other countries; the number of different repair parts to support the numerous donated pieces of equipment increases the supply chain's complexity and delays the time required to return equipment to operational capability. Other important requirements such as blood products could not be donated due to legal restrictions governing their use.<sup>35</sup>



Room full of donated medical supplies in Ukraine. (Provided by AFU Support Personnel)

The IDCC was established to fill NATO's gap for security assistance resulting in mass diversification of equipment. The fact that a great deal of tactical medical materiel is donated by NATO members may not have been as efficient as it could have been at points during the Cold War. NATO efforts to achieve and maintain interoperability through the establishment of standardization agreements (STANAGs) has atrophied in recent years. Some sources within the UK Defence Medical Services observe that NATO STANAGs began to diverge around 2017. These partners assess NATO's doctrinal interoperability is in better shape than its equipment interoperability.<sup>36</sup>

### **Applicability to U.S. Army LSCO:**

The EU is not a military alliance, but an economic and political union among 27 European countries.<sup>37</sup> The MMCC/EMC is staffed with European/NATO military officers to execute an EU funded mission with four lines of effort (LOEs):<sup>38</sup>

1. Supporting multi-national medical coordination efforts
2. Improving readiness of medical C3 and preparedness through exercising and wargaming
3. Improving medical civil-military interaction and networking
4. Coordinating the medical capability enhancement on request of nations and organizations

<sup>34</sup> (Defence Medical Services Functional Team (2023)

<sup>35</sup> (Murray 2023)

<sup>36</sup> (Defence Medical Services Functional Team (2023)

<sup>37</sup> (The European Commission 2022)

<sup>38</sup> (Weller 2023)

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The MMCC/EMC creates an apparatus robust enough to exercise individual medical functions at scale for planning and preparing against systematic LSCO problems by following these LOEs. Europe's CIV/MIL integration for exercises and planning serves to improve whole of government response and contingency planning. These LOEs benefit the collective political, economic, and social stability of several longstanding NATO allies, yet they are not synonymous with NATO strategy. A possibility exists under other circumstances that supra-national efforts involving military alliance members are at odds with military alliance goals and threaten military cohesion. Furthermore, DOD doctrine may not adequately address to what degree limited DOD resources can be integrated with supra-national efforts. This is an example of how U.S. national responsibilities may impair medical collaboration.

Allied medical support to the AFU demonstrated promising collaboration to overcome organizational limitations. The U.S. Undersecretary of Defense for Personnel and Readiness granted authority for LRMC to provide inpatient and outpatient care to the AFU but did not authorize evacuation or other transportation costs. Fortunately, the MMCC secured transportation through both governmental and non-governmental entities, thereby allowing LRMC to provide comprehensive care before returning combatants to their units in the AFU. This established a model for patient regulation and multi-national interoperability at scale. This is an example of how collaboration and integration with a supra-national organization achieved goals beyond the capability of individual nations.<sup>39</sup> LSCO will affect the complex interdependence between medical DOTMLPF-P. NATO doctrine acknowledges several variables must be considered when providing multi-national medical support. It states:

“Each member state’s national security/defence strategy and policy has implications for the provision of healthcare and the diversity within the Alliance necessitates a balance between national and NATO requirements. To be considered in this context are: force structures; legislation; educational requirements; cultures; political perspectives; operational procedures; and technical compatibility”<sup>40</sup>

Divergence from established STANAGs is an example of how national interests across an alliance impair medical collaboration. Reliance on multiple national manufacturing bases for like items creates strategic depth. STANAGs are intended to make multi-national medical systems interoperable and mitigate the risk of degradation to an allied nation’s industrial base. NATO member domestic acquisition policies increased military reliance on commercial off-the-shelf medical materiel and information systems. This increases variance across alliances and challenges interoperability. NATO members often field domestically produced off-the-shelf equipment that is neither vetted nor compatible with NATO STANAGs. Interoperability challenges emerge if a partner’s domestic production capacity is exhausted during LSCO (as occurred in Ukraine) and it must be supplemented with an allies’ non-STANAG compliant systems.

### Recommendations:

- Examine DOD’s guidance concerning involvement with supra-national entities and account for it in policy and doctrine.
- Reinvigorate STANAG Medical Working Groups.
- Examine and promote the medical standards necessary to regulate patients to a host nation and use that analysis to work within legal parameters to improve interoperability.
- Collaborate with health information technology industry to enable protected transfer of automatically translatable health records between military and civilian MTFs and integrate with current Army Medical Modernization efforts.

<sup>39</sup> (Murray 2023)

<sup>40</sup> (North Atlantic Treaty Organization 2019)





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- Examine whether U.S. patient regulating software could be shared with our Allies and Partners and incorporated into NATO STANAG to exchange federated data and enhance interoperability.
- Incentivize interoperability by associating commercial off-the-shelf medical materiel with NATO Stock Numbers (NSNs) and develop a catalog that identifies acceptable NSN substitutions.
- Investigate how UKR military and civilian numbers compare against multi-national LSCO casualty estimates. Communicate the scope of allied military medical investment and risk due to investment shortfalls with refined casualty estimates.
- Incorporate allied partner patient tracking and repatriation in LSCO combined exercises.
- Adapt and exercise an IT application and process like KOROVAI during humanitarian assistance and disaster relief (HADR) and security assistance missions to synchronize multi-national requirements and build sustained and responsive coalition resilience.
- Appoint a liaison, full- or part-time, to the MMCC.

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***“The supreme art of war is to subdue the enemy without fighting.”***

~ Sun Tzu

## **Thesis 8: Military medicine excels in competition and conflict but struggles in the transition to crisis.**

### **Observations:**

The assessed conflict is a LSCO between the Federation of Russia and Ukraine, however the U.S. Army’s involvement throughout the examined period was best characterized as crisis. Joint Doctrine defines crisis as “an incident or situation involving a threat to the U.S., its citizens, military forces, or vital interests that develops rapidly and creates a condition of such diplomatic, economic, or military importance that commitment of military forces and resources is contemplated to achieve national objectives.”<sup>41</sup> It is important to frame crisis as a potential waypoint between competition and conflict as Army doctrine addresses this strategic context to account for the unique challenges facing ground forces. The Army’s goal in crisis is to deter further provocation by demonstrating readiness if deterrence fails.<sup>42</sup> This section examines the U.S. Army’s prioritization for medical materiel, personnel, and service support in the transition to crisis to demonstrate its deterrence challenge.



International Donor Coordination Centre staff members from the United Kingdom and the U.S. work at Patch Barracks, Germany, on June 3, 2022. The organization has coordinated and synchronized the timely delivery of contributions for security assistance from more than 40 allied and partner nations. (U.S. Air Force photo)

International medical materiel support to Ukraine began within days of the transition to conflict albeit for humanitarian purposes. The International Donor Coordination Centre (IDCC) was subsequently established within a month of the invasion to coordinate Ukrainian requests for military aid.<sup>43</sup> The IDCC grew as world leaders rallied behind the Ukrainian cause. Twelve Ukrainian liaison officers were embedded within the IDCC to communicate requirements and coordinate receipt of military aid from 25 recognized donor nations and an untold number of anonymous donors by the one-year anniversary of the conflict.<sup>44</sup> Military medical leaders from across the international effort caught the sensation that the AFU undersold the amount of medical materiel they required out of a concern it would detract from the quantity of weapons they required to defend their country. There is some legitimacy to this concern as relates to the U.S. effort as executed through Congressionally limited Presidential Drawdown Authority.<sup>45</sup>

The U.S. contributed approximately a third of the military medical materiel processed by the IDCC by the conflict’s one-year anniversary.<sup>46</sup> Three challenges were observed in the resourcing of medical materiel packages. First was a recognition that U.S. military medical logistics packages are configured for a young healthy population. They are not well equipped to serve a refugee or mobilized population with complex medical histories. Second, the availability of excess theater military medical materiel is low.

<sup>41</sup> (Department of Defense 2022)

<sup>42</sup> (Headquarters, Department of the Army 2022)

<sup>43</sup> (Chevevard 2023)

<sup>44</sup> (Chevevard 2023)

<sup>45</sup> (Blaha 2023)

<sup>46</sup> (Blaha 2023)





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Finally, Presidential Drawdown (PD) authorities require materiel to be distributed within a finite period within the country for which it is intended. This means that AFU Soldiers training outside of Ukraine do not immediately benefit from PDs. U.S. training sites trained AFU on a patchwork of U.S. medical materiel that was often unavailable for issue when they returned to Ukraine. The 7th ATC received some medical material to support for training but was unsuccessful at obtaining improved first aid kits (IFAKs) and combat lifesaver (CLS) bags for issue at scale due to lack of authorities for assistance.<sup>47</sup>

The number of medical personnel dedicated towards the emergent Ukrainian “Assure and Deter” mission did not increase at the rate of the mission. Residual civil affairs augmentation existed within the USAREUR-AF Headquarters at the beginning of the conflict as a vestige of Operation Allies Welcome augmentation. The UN Medical Cluster assumed interagency medical lead because there “was a complete lack of understanding as to who was in charge” and the prevalent medical focus was towards humanitarian relief.<sup>48</sup> Immediate response forces (IRF) from the XVIII Airborne Corps deployed to Europe for deterrence with organic health service support capabilities. USAREUR-AF assigned medical forces rounded out gaps in the maneuver force’s organic capabilities where necessary. The IRF developed a joint manning document (JMD) for an expanded and enduring security assistance mission as it became apparent the Ukrainians could withstand the invasion. A dedicated medical cell was omitted from this JMD which evolved into the Security Assistance Group-Ukraine (SAG-U). The USAREUR-AF Office of the Command Surgeon staff was assigned responsibility for all SAG-U medical portfolio items without any augmentation. An eleven-person Joint/Combined medical operations cell was incorporated into subsequent SAG-U JMD iterations. Short-term rotational forces were identified as the sourcing solution for much of this staff structure, and these forces were beginning to arrive after the conflict’s on-year anniversary.<sup>49</sup>

Resources remained scarce at the tactical level. The JMTG-U’s mission remained the same but with new complexity as it began training AFU at its new location in Bavaria. The 7th ATC augmented the JMTG-U’s training capacity; however, the training mission’s relocation to Germany multiplied its administrative workload. The 7th ATC became the base operating support-integrator (BOS-I) for AFU trainees but lacked a surgeon cell. AFU trainee medical readiness diminished as Ukraine broadened the segments of its population leveraged to generate combat power throughout the 2022-2023 winter training season. Poor AFU medical readiness distracted from limited training time and created an additional requirement for JMTG-U organic medical assets. The JMTG-U integrated AFU medics into patient sick call operations to augment capability and capture aid-station training value; however, many of the patients required diagnostic and treatment procedures performed at Role 2 or above levels of care. JMTG-U medical personnel were forced to reallocate training bandwidth towards the transport and regulation of AFU patients to the local German healthcare network because Defense Health Program authorities limited this population’s access to care on U.S. installation MTFs. The amount of chronic and upper respiratory conditions requiring pharmaceuticals, x-rays, and isolation grew over the winter although the 30th Medical Brigade was able to alleviate some of the AFU’s dental readiness challenges with an operational dental detachment.<sup>50</sup>

### **Applicability to U.S. Army LSCO:**

Crisis is inevitable in the journey towards LSCO. The Army reaches a difficult decision point in a transition to crisis: expend finite medical readiness resources to shape crisis outcomes or preserve readiness to mitigate the escalated risk of conflict.

<sup>47</sup> (McCarthy 2023)

<sup>48</sup> (Chevevard 2023)

<sup>49</sup> (Blaha 2023)

<sup>50</sup> (McCarthy 2023)

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The conflict in Ukraine began as a humanitarian crisis for Europe involving hundreds of thousands of dislocated civilians. The DOD plays a supporting role to other government agencies for humanitarian assistance and medical care,<sup>51</sup> but lethal aid became the immediate security assistance focus for DOD. Health service support and force health protection appeared to be an afterthought as the security assistance mission grew. This may have contributed to the omission of a health service support cell in the initial establishment of the SAG-U as well as the 7th ATC. Rotational forces eventually augmented these security assistance efforts improves assigned staff personnel bandwidth; however, continuity of effort remains a risk.

DOD policy states that Secretarial Designee (SECDES) authorities to provide space-available healthcare within U.S. military MTFs “shall be used very sparingly, and only when it serves a compelling DOD mission interest”.<sup>52</sup> LRMC obtained these authorities for a finite number of AFU early in the conflict. By October 2022, the Assistant Secretary of Defense for Health Affairs authorized cart blanch space available access to LRMC for wounded in-action AFU personnel regulated by the MMCC.<sup>53</sup> This authorization did not account for the routine care AFU trainees under U.S. security assistance programs required at scale. As a result, the 7th ATC worked with Medical Readiness Command-Europe to develop a local network of civilian and military healthcare nodes to treat emergent health conditions in the trainee population. This system was effective at addressing the trainee populations ailments; however, it impacted AFU training in ways comparable to U.S. training and mobilization platforms with low civilian capacity to absorb specialty healthcare.<sup>54</sup> These models not only inform how the U.S. Army Health System may support security assistance missions in future crisis, but they are a harbinger of the challenges expected during rapid expansion of a remote U.S. mobilization platforms in conflict. LSCO will overwhelm the installation and local healthcare market capacity with routine healthcare referrals. Furthermore, current policy releases trained Soldiers at U.S. mobilization sites from active duty (REFRAD) if a deployment limiting medical condition cannot be corrected within 25 days of reporting to active duty.<sup>55</sup> The likelihood that these deployment limiting conditions will not be corrected increases at installations where the health infrastructure is overwhelmed.

Exercises are planned and resourced years in advance to sustain readiness to support the Combatant Commander’s Theater Engagement Plan while balancing installation medical readiness missions. Theater commanders must take calculated risks to balance the commitment of assigned medical forces between planned readiness activities and emergent crisis mitigation. Rotational forces and individual deployers from across all components are a manpower sourcing solution if theater assigned operational forces are not leveraged in crisis. Furthermore, the unplanned commitment of medical personnel from any component towards crisis is concerning as their absence stresses the resilience of the military and civilian communities they serve during peaceful competition.

Theater commanders must also assess the utilization of Army prepositioned stocks (APS) in crisis for medical support. APS allow the U.S. Army to rapidly generate forward combat power. These stocks are configured for military readiness in conflict as opposed to crisis. APS medical materiel is expensive to procure and maintain and cannot be comingled with operational medical materiel stocks. Utilization of sparse APS stocks expends combat readiness. Leveraging this resource to shape outcomes in the transition to crisis limits a theater commander’s decision space if the crisis transitions to conflict.

<sup>51</sup> (The Joint Staff 2019)

<sup>52</sup> (Undersecretary of Defense for Personnel & Readiness 2011)

<sup>53</sup> (Cisneros 2022)

<sup>54</sup> (McCarthy 2023)

<sup>55</sup> (Headquarters, Department of the Army 2020)





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## Recommendations:

The Army Health System's transition to crisis in Europe identified opportunities in three decision making areas to balance the tension between crisis response and readiness for conflict: Manning, Authorities, and Materiel.

### Manning:

- Leverage Active-Duty Operational Support, Reserve Component (ADOS) volunteers to mitigate continuity of effort risks inherent with rotational forces. Consider resumption of the medical backfill mission for U.S. Army Reserves medical personnel.
- Develop and exercise decision support tools, policies, and procedures to rapidly expand the institutional medical assets at training and mobilization platforms to accommodate rapid Army expansion in LSCO.
- Develop policy options to retain/reassign medically non-deployable Soldiers who cannot correct deployment-limiting conditions at mobilization platforms during armed conflict.
- Develop decision support tools to address conditions for exercise cancellation and un-forecasted commitment of Modified Table of Organization and Equipment (MTOE) Assigned Personnel (known as MAP) towards transition of operational medical units from competition to crisis.

### Authorities

- Develop accelerated SECDES and Defense Health Agency processes that authorize and resource eligibility for care expansion among OCONUS installation hospitals and clinics during the transition to crisis.
- Create flexibility in making healthcare access decisions for non-authorized beneficiaries; codify in policy refinement.
- Leverage U.S. Army Health Contracting Agency (USAHCA) to surge contracted healthcare delivery to support crises on installations where access to institutional healthcare resources is limited.
- Define and delegate authorities to combatant commanders for immediate provision of non-lethal military aid to disaggregate from political decision-making for lethal aid.

### Materiel

- Institutionalize, train and exercise IT systems like KOROVAI in HADR to accelerate the DOD's materiel procurement focus in crisis.
- Increase APS medical materiel resourcing to improve readiness and create crisis decision space for the theater commander.
- Shift APS to "activity sets" by adjusting Defense Logistics Agency policies to authorize dynamic consumption of medical materiel in competition and crisis for stock circulation.
- Assess APS medical materiel stock gaps for non-combatant evacuation operations (NEO) and humanitarian assistance disaster response (HADR) operations (i.e., pediatrics and geriatrics).

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***“The best time to plant a tree was 20 years ago. The second-best time is now.”***  
~ Chinese Proverb

**Thesis 9: An Army might be quickly raised, but a military health system must be constantly provided and maintained.**

**Observations:**

At the conflict’s one-year mark, the Russian strategy appears to have devolved from a rapid offensive to seize Ukraine’s key political and economic centers of gravity into a war of attrition designed to break its national will for resistance. Destruction of healthcare personnel and infrastructure support this perspective. Recognition of the threat this poses in LSCO to the national fighting strength appears to have developed over the course of a year. National and international priorities have shifted to reconstitute and reinforce the AFU health service support system as described throughout this document.

Firsthand observations from early in the conflict assess AFU doctrine and policy did not acknowledge medicine’s role in sustainment and protection. Combat casualty care was neither mandated nor incorporated into unit battle drills. The positioning and duties of medical personnel varied from unit to unit. Over-utilization of medical personnel for combat and logistics tasks limited access to care where needed. Furthermore, operational, and tactical medical leaders were often excluded from tactical mission planning resulting in delayed evacuations and preventable deaths. Every international provider who traveled to assist Ukraine required centralized credentialing from the MoH in Kyiv which slowed momentum of international assistance efforts. Credentialing was later decentralized to local medical directors to accelerate assistance.<sup>56</sup>

The AFU interest in turning Soldiers into medics is growing, but unfortunately it does not have the time to train good medics to become great medics. “At this point the Ukrainians are too busy chopping wood to sharpen the axe” as one British Officer put it.<sup>57</sup> U.S. medical training began as hip-pocket filler for AFU Soldiers between prioritized training in combat tasks and evolved into abbreviated TC3 training. Individual medic and collective medical platoon training was developed for AFU personnel who demonstrated the will and aptitude to learn advanced combat medicine. The JMTG-U developed medical platoon training for cohorts from across multiple units of 25-30 Soldiers at a time. This training was tailored to each cohort’s training proficiency.<sup>58</sup>

The struggle to generate capability and capacity under attack is not limited to tactical medicine. Ukraine’s military and political leaders are working to establish five rehabilitation centers throughout the country to care for the conflict’s wounded. International assistance has been requested to develop the country’s infrastructure and skills to perform complex rehabilitative care. Persistent threats and damage to infrastructure limit the international effort’s ability to assist Ukrainian healthcare teams achieve the full potential these teams demonstrate. Global health specialists from across the continent agree that achieving the Ukrainian vision will require years of investment and infrastructure development even under permissive conditions.

The AFU’s ability to procure and field quality interoperable medical materiel remains a challenge. The immediate scale of conflict quickly surpassed domestic medical supply materiel production, and the AFU became reliant upon procurement and international aid when supply stocks were exhausted. Consistency is a problem with this acquisition model and put quality and safety at risk. For example, pharmaceutical labeling, concentration, and quality standards vary across the globe.

<sup>56</sup> (Landers 2023)

<sup>57</sup> (Defence Medical Services Functional Team (2023)

<sup>58</sup> (McCarthy 2023)

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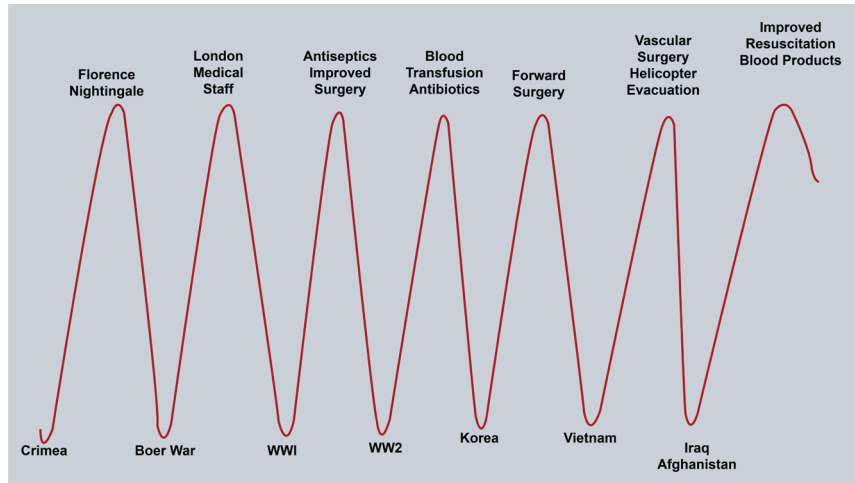


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The Ukrainians appear to be encountering issues with obtaining reliable epinephrine at a consistent dosage.<sup>59</sup> In other instances, low quality or fake tourniquets are appearing on the battlefield that fail at the lifesaving function they were acquired to perform.

### Applicability to U.S. Army LSCO:

The U.S Military Health System has an opportunity to capture lessons from Ukraine as it relates to strategic medical readiness. Europe's 2022 experience is ironically relatable to the British military medical experiences following the Crimean War in 1854. In military medical circles "The Walker Dip" is associated with military medical readiness and attributed to U.K. Surgeon Commodore Alasdair Walker. Dr. Walker observed a cycle in which military health system readiness peaks in conflict and regresses during interwar years at the expense of Soldiers at the onset of subsequent wars.<sup>60</sup> An effective military health system cannot be grown over the course of an appropriation cycle. It requires national emphasis, continuous investment, combat mindset, and institutional experience.



Graphic depiction of The Walker Dip from the British perspective. (Presented by Surgeon Commodore Alasdair Walker at the Military Health System Research Symposium in Fort Lauderdale, Florida on 12 August 2013.)

The U.S. Army improved leader emphasis by implementing TC3 as an improvement to the Combat Lifesaver Program following the recent Global War on Terrorism; however, it never institutionalized training as a readiness reporting requirement. Medical Simulation Training Centers (MSTCs) were established at installations across the Army to improve medical skills training for non-medical and medical occupational specialties alike. Overall MSTC responsibility, resourcing, and oversight remains inconsistent and unclear. This threatens the program's sustainability and creates the risk that MSTCs will fall victim to Walker's Dip.

The Army Health System relies on an ecosystem of rigorously tested and approved medications with extraordinary lifesaving potential. The process to deploy these medications in LSCO cannot reliably occur at the speed and scale of relevance, however. The U.S. pharmaceutical industry divested itself of most of its raw-material manufacturing capacity and relies upon access to a supply chain of raw materials it no longer exerts direct control over. Low-quality control standards in offshore pharmaceutical supply networks occasionally result in counterfeit or contaminated medications.<sup>61</sup> The President of the U.S. signed an Executive Order to invest in the return of some domestic pharmaceutical raw-material production to mitigate the risk of supply chain disruption by competitors and adversaries in acknowledgement of this domestic shortfall.<sup>62</sup>

The U.S. Army force design process optimizes the Army Health System for reliable medical evacuation and quality treatment by organizing trained and dedicated healthcare teams. These organizations are

<sup>59</sup> (Landers 2023)

<sup>60</sup> (Walker 2013)

<sup>61</sup> (Gibson and Singh 2008)

<sup>62</sup> (Trump 2020)

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limited in depth and rely on a force generation process that take years to produce a finite number of medical personnel and cannot be outsourced to the civilian market.<sup>63</sup> Much of the Army's operational medicine inventory will deploy forward in a LSCO leaving a vacuum within the strategic support area to absorb returning casualties. The National Disaster Medical System is expected to regulate these casualties to civilian facilities for treatment if the military and Department of Veterans Affairs (VA) health systems are overwhelmed.<sup>64</sup> This patient regulation system remains untested at the scale expected in a LSCO.

The current All-Volunteer Force requires 26-weeks of basic and advanced individual training to produce apprentice-level Army Medical Department combat medics.<sup>65</sup> On the other end of the spectrum, it takes the All-Volunteer Force nine-years to develop a technically competent general surgeon from start of medical school to completion of a 5-year residency.<sup>66</sup> Neither of these examples account for the amount of time and resources required to develop recruiting and retention markets. For example, the Army Health System acquires 67% of its physicians from the Health Professions Scholarship Program (HPSP) but the incentives to participate in the program have not been updated in 15 years and the Army will likely fall short of its HPSP target for the fourth year in a row in 2023. Furthermore, DOD healthcare provider retention pay and incentives have not kept pace with civilian employment opportunities. A freshly trained Army orthopedic surgeon loses approximately \$400k in financial opportunity in the four years following residency when compared to civilian market averages.<sup>67</sup> The lack of access to the quantity and complexity of patients within the MTFs has negatively impacted the clinical readiness of many Areas of Concentration. This is a detractor for those considering whether to remain in the Army. The recent lack of adequate support staff in the MTFs has also harmed the ability of clinicians to maintain the full scope of their clinical skills and provide as much care as they potentially could with a more robust staff. It contributes to a perception that clinicians are not valued in the MHS. The inadequacy of resources to produce or retain healthcare teams today and the amount of time required to develop them puts the U.S. Army Health System at risk of mission failure if confronted with LSCO.

## Recommendations:

- Continue resourcing the U.S. Military Health System to provide a personally and professionally rewarding work environment that attracts and retains talented clinical staff while ensuring they can maintain the full scope of their clinical skills.
- Establish Army policy for consolidated responsibility, resourcing, and oversight of MSTCs.
- Establish, track, and enforce Army standards for TC3 certification to maintain leader accountability.
- Retain institutional knowledge, capacity, and infrastructure for rehabilitative and recovery care and plan for their expansion during LSCO.
- Refine and exercise military/civilian authorities and processes within the National Disaster Medical System (NDMS) at scale based on contemporary LSCO casualty estimates.
- Embed Joint Trauma System and Army Public Health with partners and allies at the onset of conflict to evaluate casualties, injury patterns, and treatment outcomes for accelerated lessons learned development and clinical practice guideline updates.
- Partner government with industry to onshore critical medical raw-material development

<sup>63</sup> (E. Duque 2021)

<sup>64</sup> (Department of Defense 2016)

<sup>65</sup> (U.S. Army 2023)

<sup>66</sup> (E. U. Duque 2023)

<sup>67</sup> (Walters 2023)

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## Conclusion:

Sustainable health service support and force health protection (together comprising the Army Health System) measures increase the survivability and morale of Soldiers and, as a result, the combat power of the U.S. Army and of the joint and combined forces with which the Army fights. Health systems and prevention measures become even more important when Soldiers are under the unrelenting physical and emotional stresses of LSCO compared to those stresses experienced during the counterinsurgency operations (COIN) of the past 22 years. That 22-year generation of Soldiers must now maintain the hard-won lessons of health system support in COIN while learning the harsh realities of excelling on a faster-paced, higher-lethality LSCO battlefield.

The next step in the Army Lessons Learned Program is to validate the Team's observations by review and analysis to convert these observations into lessons learned. Maximizing U.S. Army, joint, and combined health system support capabilities supporting LSCO requires detailed assessment of those observations focused on the first year of the Russian aggression in Ukraine and developing validated lessons learned from those observations.

In summary, preparing for Army, joint, and combined health system support in LSCO starts with assessing the impact of increased casualty numbers and restrictions to rapid evacuation, and the resulting need for prolonged casualty care. This mandates that particular attention is paid to:

1. Improving point of injury and DNBI care by first responders over an extended period.
2. Developing standardized methods and training for non-aero MEDEVAC and CASEVAC.
3. Supporting allies' and partners' efforts to improve force health protection measures and reinvigorating U.S. Army force health protection training.
4. Understanding that theater military and civilian Role 4 support will may be limited or unavailable.
5. Addressing the likelihood that treaty-guaranteed health system protections may be violated.
6. Resourcing Global Health Engagements to address validated needs of allies and partners.
7. Strengthening STANAGS and relationships with allied and partner health system support.
8. Exercising health system responses to a variety of pre- and during-LSCO issues.
9. Continuing efforts to reduce clinician shortages in a difficult recruit and retain environment.

A subsequent study should take place to reassess this report's observations / lessons learned and develop new observations. With sufficient lead time, subsequent study teams might gain access to:

1. Ukrainian and partner health system support personnel closer to the fight.
2. Objective data related to casualty numbers, treatment, evacuation, and dispositions.
3. A refined assessment of casualty prevention, mitigation, and care on the LSCO battlefield.

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#### **Tab B. Maj Gen Tim Hodgetts, United Kingdom Armed Forces Surgeon General Observations (Transcribed)**

26 September 2022  
File reference: 20220926-Med\_Lessons\_from\_Ukraine\_SG

#### **Medical Lessons for UK from the RUS-UKR War**

**BLUF:** The RUS-UKR War has seen very high numbers and severity of military and civilian casualties from modern and traditional weapon systems, offering an understanding of the effects of Warfighting at Scale. This note outlines then top-ten lessons that can be drawn from a UK Mil-Med perspective.

#### **Medical force build-up as an Indicator and Warning of RUS Intent**

1. The RUS invasion of UKR on 24 Feb 22 was preceded by a significant deployment and activity of medical capability and logistics, including establishing field hospitals close to the UKR border and generation of increased blood stocks. These indicators offer a valuable warning of intent and should be monitored for future potential conflict areas.

#### **CASEVAC and MEDEVAC**

2. **CASEVAC at scale.** UKR has transported very large numbers of casualties by medical trains, clearing medical facilities near the conflict in the East towards increasing levels of permissiveness, medical capability and capacity in the West of UKR. Traditional medical evacuation assets and processes are quickly overmatched in Warfighting at Scale and require novel approaches to meet a very high demand.
3. **Multi-national approach.** Whether within a NATO construct or otherwise, Warfighting at Scale in Europe requires a high degree of cooperation and coordination within and between partner nations, as casualties flow away from conflict zones towards areas of greater safety, capability and capacity. Existing Civ-Mil and Mil-Mil relationships should be strengthened through dialogue and realistic exercises.
4. **Ground MEDEVAC platforms.** High levels of combat casualties within a contested environment have reaffirmed the requirement for an appropriate mix of armoured, protected and non-protected ambulance platforms. UK Defence must rapidly achieve a medium-long term solution to replace the current in-service platforms.





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## Medical Capability and Logistics

5. **CBRN.** The RUS-UKR war has shown a credible threat stream of escalation to include chemical and tactical-nuclear weapons. To support Warfighting at Scale, Defence must adequately resource the ability to prevent, detect and treat CBRN threats.
6. **Medical stockpiles and non-lethal aid.** Defence can sustain 10 intensive care patients for 1 week with current stockpile levels. Noting that during conflict, civilian healthcare will compete for the same medical supply sources, military medical stockpiles must be increased to support Warfighting at Scale. Equally, supply of medical materiel as non-lethal aid in support of an ally has proven complex and challenging; better rehearsal and clarification of funding lines and coordination mechanisms is required.

## Civil-Military coordination and collaboration in Warfighting at Scale

7. **Acceptance of casualty rates.** Casualty rates in UKR have been up to ten times higher than a 'bad day in Helmand', and for a sustained period of months. Political and public acceptance of the human cost of conflict at this scale must continue to be considered.
8. **Civilian NHS role in delivering Role 4.** HERRICK/ TELIC campaigns saw Reception Arrangements for MoD Patients (RAMP) focused on a single centre of excellence in Birmingham. This approach would be overmatched by very high casualty numbers. The UKR-RUS conflict has highlighting the importance of Civ-Mil medical coordination.

## Utility of the 'Red Cross'

9. **Protection or target?** Evidence shows that RUS targeting has shown little respect for medical facilities protected under the Geneva Conventions\*. It is possible the Red Cross serves more as aiming mark than protective symbol. The concept of medical facilities having special protective status should be reviewed, with potential implications for personnel, tactics and equipment of UK medical capability.

## UK and NATO medical capability risk

10. **Capacity shortfall.** Current UK military medical support is configured to deliver high capability care to relatively low numbers of casualties. Warfighting at Scale similar to the RUS-UKR conflict would deliver casualties at a rate that would rapidly overwhelm DMS capacity. The recent DOC audit of the OMS also identifies this risk. The DMS must have the capacity to support Warfighting at Scale.

Major General Tim Hodgetts OBE OStJ<sup>68</sup>  
Surgeon General

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\*See recent paper by Canadian Armed Forces at Journal of Military, Veteran and Family Health (utpjournals.press)

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<sup>68</sup> (Hodgetts, UK Surgeon General / NATO COMEDS Chairman 2023)

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**Tab E. Terms of Reference**

|            |                                                                                                        |
|------------|--------------------------------------------------------------------------------------------------------|
| ADO        | Active-Duty Operational Support, Reserve Component                                                     |
| AFU        | Armed Forces of Ukraine                                                                                |
| APS        | Army Prepositioned Stocks                                                                              |
| CASEVAC    | casualty evacuation                                                                                    |
| CCP        | casualty collection point                                                                              |
| COIN       | counter-insurgency                                                                                     |
| CONUS      | contiguous U.S.                                                                                        |
| DHA        | Defense Health Agency                                                                                  |
| DNBI       | disease and non-battle injury                                                                          |
| DOTMLPF-P  | Doctrine, Organization, Training, Materiel, Leadership and Education, Personnel, Facilities and Policy |
| EU         | European Union                                                                                         |
| GHE        | global health engagement                                                                               |
| IDCC       | International Donor Coordination Centre                                                                |
| JMD        | joint manning document                                                                                 |
| JMTG-U     | Joint Multi-national Training Group-Ukraine                                                            |
| LRMC       | Landstuhl Regional Medical Center                                                                      |
| LSCO       | large-scale combat operations                                                                          |
| MEDCOM     | U.S. Army Medical Command                                                                              |
| MEDEVAC    | medical evacuation                                                                                     |
| MEDLOG     | medical logistics                                                                                      |
| METL       | mission essential task list                                                                            |
| MoH        | Ministry of Health                                                                                     |
| MDR        | multi-drug resistant                                                                                   |
| MMC/EMC    | Multinational Medical Coordination Center/European Medical Command                                     |
| MTF        | medical treatment facility                                                                             |
| MTOE       | modified tables of organization and equipment                                                          |
| NATO       | North Atlantic Treaty Organization                                                                     |
| NDMS       | national disaster medical system                                                                       |
| NGO        | non-governmental organization                                                                          |
| OPLAN      | operation plan                                                                                         |
| OCONUS     | outside the contiguous U.S.                                                                            |
| PD         | Presidential Drawdown                                                                                  |
| RFF        | request for forces                                                                                     |
| SAG-U      | Security Assistance Group-Ukraine                                                                      |
| STANAG     | Standardization Agreement                                                                              |
| TC3        | tactical combat casualty care                                                                          |
| UKR        | Ukraine                                                                                                |
| USAHCA     | U.S. Army Health Contracting Agency                                                                    |
| USAREUR-AF | U.S. Army Europe and Africa                                                                            |





U.S. Army military dog handlers, medics, and Armed Forces of Ukraine K-9 teams from KFOR, Regional Command - East, participate in a K-9 Tactical Combat Casualty Care, or K-9 TCCC, live course, Camp Bondsteel, Kosovo, Dec. 3, 2021. The K-9 TCCC, conducted in partnership with the 64th Medical Detachment Veterinary Services out of Baumholder Germany, allows participants to apply knowledge, skills and actions required to save the lives of injured, military working dogs. (U.S. Army photo by SSG Barbara Pendli)



