



# SURVIVE AND THRIVE: REQUIREMENTS FOR ARMY MEDICAL FORCES IN 2040

By: Frank J. Abbott

## ABSTRACT:

This article argues that past military failures, from Rome's defeat in the Teutoburg Forest to France at Agincourt and the U.S. Navy during Operation Drumbeat, share a common cause: the inability to adapt to a changing character of war. Today, U.S. Army medical forces face a similar inflection point. Future largescale combat will feature a transparent, sensorrich battlefield, high casualty rates, contested evacuation routes, and adversaries who may ignore the Geneva Conventions. To remain effective, medical units must be redesigned to *survive* and *thrive* in this environment. Survival requires greater mobility, reduced signatures, and credible selfdefense capabilities, including counterdrone and electronic warfare tools. Thriving demands endurance and resilience through stronger leadership, realistic simulations, Alenabled triage, autonomous evacuation platforms, and crosstraining supported by simplified medical systems. The article concludes that modernization is essential for medical forces to deliver lifesaving care under the extreme conditions of future warfare.

In 9 CE, the Roman Empire lost three legions (about 20,000 men) in four days while fighting Germanic insurgents in the Teutoburg Forest. The Romans typically fought in open terrain with cohesive units maneuvering in disciplined formations. They failed to adapt to an enemy launching hit-and-run ambushes along narrow trails with limited visibility in marshy, dense woods.

In 1415, the French were defeated at the Battle of Agincourt by a much smaller British force. The French underestimated the lethal power of the British longbow. British archers, protected from French cavalry by sharpened wooden stakes, rained volleys of arrows upon the enemy. The heavily armored French knights were easy targets as they slogged through muddy terrain. Approximately 6,000 French soldiers were killed and 2,000 were captured.

Soon after the United States entered World War II, the German Navy launched Operation Drumbeat (*Paukenschlag*), in which German submarines wreaked havoc on American merchant shipping. The U.S. Navy, placing emphasis on surface naval combat, had misjudged the German U-boat threat. There was, therefore, little doctrine or technology to conduct anti-submarine warfare. In addition, service rivalries prevented the Navy and the Army Air Force from developing a coordinated, joint

solution. During the first half of 1942, German subs sank over 400 ships, crippling Britain's war effort.

Teutoburg, Agincourt, and Drumbeat are just three examples of the consequences of failing to adapt to the changing character of war. Today, U.S. Army medical forces face a similar challenge. In a protracted, large-scale conflict against a peer adversary, sensors will be ubiquitous, creating a transparent battlefield. Casualty rates will be much higher than in counterinsurgency operations. Mass casualty incidents will be routine. Enemy forces will contest us in all domains (land, sea, air, space, and cyberspace), challenging our ability to evacuate the wounded and deliver medical supplies to the point of need. The potential for enemy use of chemical or biological weapons will be significant. Moreover, as demonstrated in the Russo-Ukrainian war, not all enemy forces will respect the Geneva Conventions; some may intentionally target medical units. Even if not deliberately targeted, collateral damage is a distinct possibility.

This future operational environment demands a new approach to battlefield medical support. We must transform our medical force structure and modernize our capabilities to address this changing character of war. This modernization effort centers on the need to *survive* and *thrive*. Listed below are the major innovations necessary.

## SURVIVE

If medical units cannot survive on the future battlefield, they may as well not deploy. Although survival is never guaranteed, there are many methods to increase one's chances. These methods fall under the categories of *mobility*, *operational security (OPSEC)*, and *self-defense*.

### Mobility

On a transparent battlefield, fixed (static) facilities are extremely vulnerable, making frequent survivability moves essential. Many of today's medical units, however, rely heavily on external transportation and require long set-up and tear-down times, sometimes measured in days rather than hours. The operational tempo will be even higher during offensive operations as forces advance into enemy-held terrain. Therefore, medical units will not just *follow* maneuver forces but must *fully integrate with them* in a highly distributed, dynamic battlefield.



Airmen offload the Hard-sided Expandable Lightweight Air Mobile Shelter from a C-5M Super Galaxy  
Source: U.S. Air Force photo by Airman 1st Class Hanna Smith

Increased mobility requires more than additional vehicles. Medical units must transition away from tent-based systems and adopt standardized mobile shelters across the Army. These shelters should be rapidly deployable by air, sea, or rail and compatible with multiple prime movers. The ability to add protective plates (futuristic lightweight armor) to shield against small arms fire and shrapnel will further increase survivability. Ideally, shelters will have self-contained power generation and/or energy storage capabilities, eliminating the need for large generators that require frequent refueling. These shelter systems should be set up and fully operational within 30 minutes and just as quickly torn down and moved. With advanced stabilization, these shelters could move with patients, eliminating the need to surge evacuation assets to enable movement.

### OPSEC

It is certainly odd to think that medical units will need to hide from enemy detection. The reality, however, is that some threats may deliberately target facilities displaying the Red Cross. In these situations, hiding from enemy sensors

will be as crucial as treating patients. The science and technology community is working to develop capabilities that allow all Army units to avoid detection by minimizing electromagnetic, visual, thermal, and acoustic signatures. All Army forces will need such camouflage; however, emissions from medical diagnostic equipment will require special attention.

### Self-Defense

In a dynamic, widely distributed battlefield, medical units may not be able to rely on military police or maneuver units for protection. Threats include enemy conventional ground forces, surrogates, and terrorists. Enemy drone swarms can conduct reconnaissance and deliver lethal ordnance. We must therefore examine what *organic* self-defense capabilities medical forces must have.

If medical units do encounter hostiles, they must be prepared with both lethal and non-lethal responses. The Geneva Conventions allow for medical personnel to use weapons in defense of themselves or their patients. As the Army advances its use of robotics and autonomous systems (RAS), it would be prudent to explore the legal and practical possibilities of using armed robots. These robots could also be equipped with non-lethal capabilities (e.g., acoustic devices, pepper spray, bean bag rounds) to deter hostile non-combatants. These options would allow medical personnel to dedicate more time to patient care.

Traditionally, electronic warfare (EW) capabilities resided with specially trained military intelligence units. As drone swarms become more common, however, EW must become "democratized." Medical units must have the ability to disrupt enemy sensors and communications links to counter unmanned aerial systems and similar threats. Subject to legal review, directed energy weapons and kinetic interceptors may also be required.

## THRIVE

As medical units increase their chances of survival on the future battlefield, they must also perform at a high level to accomplish key tasks. Thriving has two principal categories: *endurance* and *resilience*. *Endurance* is the ability to keep going under extremely difficult circumstances. *Resilience* is the ability to recover quickly from a setback. Endurance and resilience apply to individuals, teams, and units.

### Endurance

We already know many factors that are mandatory for individual and team endurance. These factors include strong leaders who foster a positive command climate; physical fitness; proper nutrition and rest; and Soldiers dedicated to upholding Army Values. Preparing for large scale combat operations (LSCO), however, requires additional measures to foster mental toughness and emotional stability.

For example, in peacetime, medical teams muster all available resources to save a life. In combat, however,

not everyone can be saved. In mass casualty situations, medical providers must determine who is expectant and make emotionally painful decisions regarding who will receive care when resources (e.g., Class VIII, time, evacuation platforms) are extremely limited. The psychological impact on medical personnel could be severe. AI-assisted triage tools could reduce moral injury and allow more focus on those who can be saved.

evacuation platforms (ground and air) could increase unit endurance, since those platforms operate without crew rest cycles and place fewer medical personnel at risk. Exoskeletons could allow surgeons and nurses to be on their feet longer with reduced fatigue. AI-assisted RAS could assist with patient monitoring, allowing medical providers to attend to more patients without sacrificing quality of care.



The Aerial Porter Exoskeleton is a piece of equipment designed to reduce strain when lifting various items.  
Source: U.S. Air Force photo by Senior Airman Cameron Otte

Medical simulations will be extremely useful in addressing this challenge. As medical Soldiers and teams perfect their skills, these simulations could introduce battlefield stressors (e.g., loss of power, nearby explosions, smoke in the operating room). Mimicking these stressors will better prepare teams for the emotional and cognitive strains of future warfare. Exposure to high-pressure scenarios can build psychological endurance, adaptability, and flexibility. Most importantly, such rigor will increase individual and team confidence.

Medical units can also increase endurance through the off-loading of physical and cognitive tasks. Autonomous

## Resilience

Whether by intentional enemy targeting or by collateral damage, some medical units will suffer losses in LSCO. Neutralized or destroyed medical units must recover quickly to continue the mission. Medical headquarters from the Theater Medical Command downward must conduct detailed planning for the reconstitution of medical units. Contingency planning should include acquiring medical supplies and equipment from local (e.g., host nation) sources until Army sustainment can replace the losses. Resilience measures also include simplifying medical devices and integrating AI tools to allow for more cross-training. Such measures would allow, for example, a pharmacist specialist (68Q) to perform radiology tasks (68P), if necessary.

## SURVIVE AND THRIVE

The future operational environment will be dynamic, transparent, and extremely lethal. We cannot assume that the Red Cross will shield medical units from harm. In this hostile environment, Army medical forces must *survive* and *thrive* to remain capable of providing the extensive medical care needed to support mission accomplishment.

### AUTHOR:

Mr. Frank J. Abbott is the Deputy Chief, Concepts Division in the Medical Future Capability Directorate of the U.S. Army Futures and Concepts Command.

### REFERENCES:

- Operational Environment 2024-2035: Large-Scale Combat Operations Assessment (Version 1.0).
- Department of Defense Directive 3000.03E, DoD Executive Agent for Non-Lethal Weapons (NLW), and NLW Policy.
- AFC Pam 71-202-12, Army Futures Command Concept for Medical 2028.
- Field Manual 4-02, Army Health System.