



ARMY MEDICAL MODERNIZATION STRATEGY

MAY 2022

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MESSAGE FROM THE COMMANDER

I am pleased to present the Army Medical Modernization Strategy. This strategy articulates how the Army Health System (AHS) will fundamentally transform into a semi-autonomous, integrated, networked capability that enables multi-domain operations (MDO). This change is neither superficial nor incremental; it is transformational to the very foundation of Army Medicine. The approach will completely align with, and fully support, the Army's recently released Army Modernization Strategy 2035 (AMS). This will ensure the AHS remains relevant in a broader sphere of potential military applications.

The AHS' current acquisition and modernization processes are antiquated and unable to keep pace with the current threat environment. Since the last transformation with Air Land Battle over 40 years ago, Army medicine has continuously placed new technology on top of existing doctrine. This is no longer adequate. Modernization must be baked in, not bolted on; evolving doctrine to the pace of proven technologies and treatment modalities

Utilizing a threat-informed roadmap goes beyond merely designing and laying new medical tools on top of existing doctrine and formations. It guides how we reinvent the Army's Medical Department to deliver relevant value to the Army. The primary aim is to reimagine and redesign medical capabilities and formations across the entire DOTMLPF-P. This will allow previously "stovepiped" medical entities to converge into one powerful, resilient, joint military-medical enterprise. This strategy also ensures that the Army's biomedical investments continue to be synchronized and integrated with medical modernization and readiness, as well as current and future warfighting requirements.

The AMMS optimizes warfighter performance and unit readiness through improved integration, efficiency, and efficacy of medical mission-critical capabilities across all domains. The future, on a macro level, is one where our medical capability, capacity and proficiencies are dramatically increased, while manpower, materiel, and costs are dramatically decreased.

The Department of Defense (DoD) medical community is undergoing significant reform. This document aims to unify the medical modernization enterprise and guide requirements, priorities, and direction of the Army's medical modernization efforts critical to enable the Army 2040 and beyond. The Army must modernize its medical formations and capabilities as medical reform efforts continue across the greater DoD medical enterprise.

James M. Richardson
Lieutenant General, USA Commanding



FOREWORD FROM THE SURGEON GENERAL OF THE ARMY

“ We do not want to get to 2035 to find we have fallen behind. We want to aim ahead of the competition and not behind it. ”

- General John "Mike" Murray, Former Commanding General of Army Futures Command

Army Medicine remains in synch with the Army vision and strategy; it will not find itself left behind in 2035. To remain relevant to the Army and to the Joint Force, Army Medicine needs a roadmap to guide, with one voice, a relevant path that enables the Army to fight and win in the future battlefield and most importantly save lives.

To this end, the greatest validation of The Surgeon General's role as the Army's medical integrator and synchronizer is that the Army has the right medical capabilities for global conflict against a peer or near-peer adversary. These capabilities provide the Army the confidence and assurance that it can deter conflict and if it needs to fight, it will have the premier medical care that it needs and maintains the national will to win in the crucible of conflict.

While the Department of Defense (DoD) Military Health System (MHS) undergoes significant reform the Army has pivoted its focus to modernizing itself as a multi-domain force. Army Medicine will remain engaged with reform efforts while seizing

this opportunity to modernize Army Medicine for the future. The Army must modernize its medical formations and capabilities simultaneously during medical reform efforts to meet Army and Joint Force capability and readiness requirements for 2035.

Threat informed, this document optimizes and guides how we synchronize Army Medicine to deliver relevant force multiplication for the Army. The primary aim is to integrate reimagined and redesigned medical capabilities and formations to Army modernization efforts. This change is transformational to the very foundation of Army Medicine. Our approach will completely align with, and fully support, the Army's recently released Army Modernization Strategy 2035 (AMS).

We may not be right – and that is okay – but we need a plan now to guide our thinking, our resourcing, and our decision-making for future success. This document does that and also offers a way of thinking about the future...about “what could be”. Explore it, challenge it, and help us think harder about the future medical environment we face.

Army Medicine is Army Strong.. Forge the Future... One Team

Raymond S. Dingle
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The Surgeon General and
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ARMY MEDICAL MODERNIZATION STRATEGY



The Future Operational Environment will force us to think differently and seek opportunities in nontraditional space. If we do not imagine large and reach deep, we will not be successful in future battlefields.

General John "Mike" Murray
*Former Commanding General
of Army Futures Command*

The Army Medical Modernization Strategy (AMMS) articulates how the Army Health System (AHS) will fundamentally transform into a semi-autonomous, integrated, networked capability designed to conserve the fighting strength of the Operational Force conducting multi-domain operations (MDO) in 2035 and beyond. This change is neither superficial nor incremental; it is transformational to the very foundation of Army Medicine. The approach will completely align with, and fully support, the Army's recently released Army Modernization Strategy 2035 (AMS), ensuring the AHS remains relevant in a broader sphere of potential military applications.

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Utilizing a threat-informed roadmap goes beyond merely designing and laying new medical tools on top of existing doctrine and formations. It guides how we reinvent the Army's Medical Department to deliver relevant value to the Army. The primary aim is to reimagine and redesign medical capabilities, formations and our people across the entire DOTMLPF-P. This will allow previously stove-piped medical entities to converge into one powerful, resilient, joint military-medical enterprise. This strategy also ensures that the Army's biomedical investments continue to be responsive to medical modernization and readiness, as well as to current and future warfighting requirements.

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ARMY MEDICAL MODERNIZATION FRAMEWORK

The end state of the 2022 AMMS¹ is a fundamentally transformed and **modernized Army Health System – focused on formations, capabilities and people – that enables Multi-Domain Operations (MDO)** as part of an integrated, adaptive, responsive, and resilient Joint Medical Force through 2035 and beyond. This AMMS will ensure the Army has a well-trained medical force, organized and integrated into effective warfighting formations, with modern medical systems and sufficient capacity, strategically positioned and able to leverage national-level capabilities and authorities to support any conflict, on any battlefield, anywhere in the world.

To achieve this end state by 2035, the AHS will modernize **how we support, what we support with, and who we are**. This approach nests with the AMS and the People First Strategy and integrates the elements of recruiting, doctrine, organizations, training, materiel, leader development and education, personnel, facilities, and policy (DOTMLPF-P) within the Army and the Joint Force, alongside US allies and partners. **How we support** centers on new formations, and is the realm of doctrine, organizations, and training that will allow the Army to maintain high survivability rates in an environment of potentially rapid accumulation of casualties. **What we support with** centers on new capabilities and is characterized by materiel development, equipment modernization, and procurement, guided by the Army's medical integration into the Cross Functional Teams, the Army materiel modernization priorities, as well as ongoing efforts with Project Convergence – The Army's contribution to Combined Joint All-Domain Command and Control (CJADC2). These new capabilities must also allow for continued operations in degraded or limited network/cyberspace environments. **Who we are** centers on our people, and encompasses our leader development, education, recruiting, retention, and 21st century talent management to deliver the key weapon system and differentiator in the AHS- Our people. The interdependence of our medical elements will require corresponding updates to global force posture, facilities, governance and policies to ensure the Army's modernization efforts remain synchronized over time with the rest of the Joint Force. As the AHS looks forward to

¹ Nested with the 2018 Army Strategy, Army's Supporting Concept for Medical 2028, the Joint Concept for Health Services (JCHS 2.0, DRAFT v0.9, 2021), Joint Warfighting Concept 1.0 (2021), Army Campaign Plan (ACP, 2021), and Army Medicine Campaign Plan (DRAFT 0.X, 2021)

Army 2040, future concepts will also help inform experimentation and what future versions of the AMMS must address.

Cohesive integration of AHS systems into battlefield networks through a system of systems approach will require increased coordination with diverse battlefield governance.

Given the Joint nature of warfare, common data standards and message formats will inform the development of a continuous, seamless link between administrative and tactical systems through the continuum of DoD, VA, civilian hospitals, and coalition partners.

The DoD also realigned elements of the joint healthcare enterprise, shifting the responsibility of fixed Military Treatment Facilities (MTFs) operations to the Defense Health Agency (DHA), resulting in a disaggregation of the AHS across the Army. This transfer allows AHS to decouple from its day-to-day labor-intensive management of a complex Global Healthcare System, allowing it to refocus on the warfighter and other concentrated efforts of warfare.

Together, the realignment of the medical enterprise prioritizing requirements & capability gaps and associated investments, combined with improved and continuous feedback with the operating force, are the means through which the AHS will execute AMMS with AFC.

The Army Medical Modernization Strategy Framework

END STATE: A fundamentally transformed and modernized Army Health System that enables the Army to fight and win as part of the Join Force.



Figure 1. The Army Medical Modernization Framework



THE STRATEGIC ENVIRONMENT: RENEWED GREAT POWER COMPETITION IN THE INFORMATION AGE (AMS 2021)

The Interim National Security Strategic Guidance (March 2021) states that the nation, "must renew its enduring advantages so that we can meet today's challenges from a position of strength." As our adversaries work on ways to inflict greater harm, faster, the Army medical enterprise must anticipate the challenges posed by our adversaries' increasingly lethal capabilities, and rapidly develop solutions that preserve combat power on future battlefields.

The Future Operational Environment 2035-2050 describes how conflict is not the only kind of future contestation for which the Army must prepare. Our nation's adversaries will seek to achieve their strategic aims short of conflict through layered standoff in the political, socioeconomic, environmental, and biological realms. These methods are designed to create domestic unrest and separate the U.S. from our international partners and allies.

Should conflict ensue, our adversary will employ multiple layers of standoff in every warfighting domain—land, sea, air, space and cyberspace—to separate U.S. forces from our allies in time, space, and function to defeat us.

Just as cyberspace is a relatively new warfighting domain, many would say, the most important is the human domain, as warfare is essentially a human endeavor. For centuries, commanders have gained a decisive advantage through the seizure or retention of key physical terrain. While this imperative is likely to remain constant in the land domain, optimization of individual performance is critical in seizing the initiative within the human domain. The levers to optimize the human domain will be discovered at the intersection of seemingly diverse elements of one's ecosystem, where science, technology and humanity cross.

China is rapidly modernizing its capabilities and is projected within this decade to surpass Russia as our most capable threat. China and Russia continue to advance development on new weapons and technologies that will offer a new array of options to increase influence, enhance 21st century power, and inflict injury. Other factors to consider on the battlefield include novel diseases, demographics, urbanization, non-fossil fuels, and access to usable water.

Global environmental change is a threat that must be considered as a part of the Army's strategy going forward. Climate change will produce novel endemic diseases, release dormant microorganisms, increase regional competition for potable water, redistribute endemic diseases, and increase regional competition in a navigable Arctic region. Soldiers must be prepared to live and fight at environmental and temperature extremes. Threats will require increased force health protection, early detection, rapid analysis, and innovative solutions to preserve commanders' combat power.

The impact of the COVID-19 pandemic revalidated the importance of infectious disease planning and prevention. Slow release of information and preventable community spread increased the human cost over time. Our adversaries will seek opportunities to leverage boutique viruses that have greater transmissibility, morbidity, and mortality than what we've seen with the many COVID-19 variants. Prevention, detection, diagnosis and treatment will play a large role in the Army's ability to protect itself from weaponized or naturally occurring infectious diseases.



ASSUMPTIONS

This strategy is based on seven key assumptions. Changes in these assumptions could affect the Army's strategic approach to medical modernization.

1

The future operating environment will be exponentially more dispersed, kinetic, and fast-paced than seen in any previous point in history.

2

The future operating environment (FOE) will complicate healthcare delivery with a dynamic array of medical challenges resulting from disease non-battle injuries (DNBI), new chemical and biological toxic threats; radiological hazards; and bio-engineered threats.

3

Future threat capabilities will generate larger numbers of casualties in a short period of time throughout the depth and breadth of an expanded area of responsibility (AOR). Additional novel illnesses and injuries are likely.

4

The Army will be challenged to maintain modernization resources (capital, personnel, and infrastructure).

5

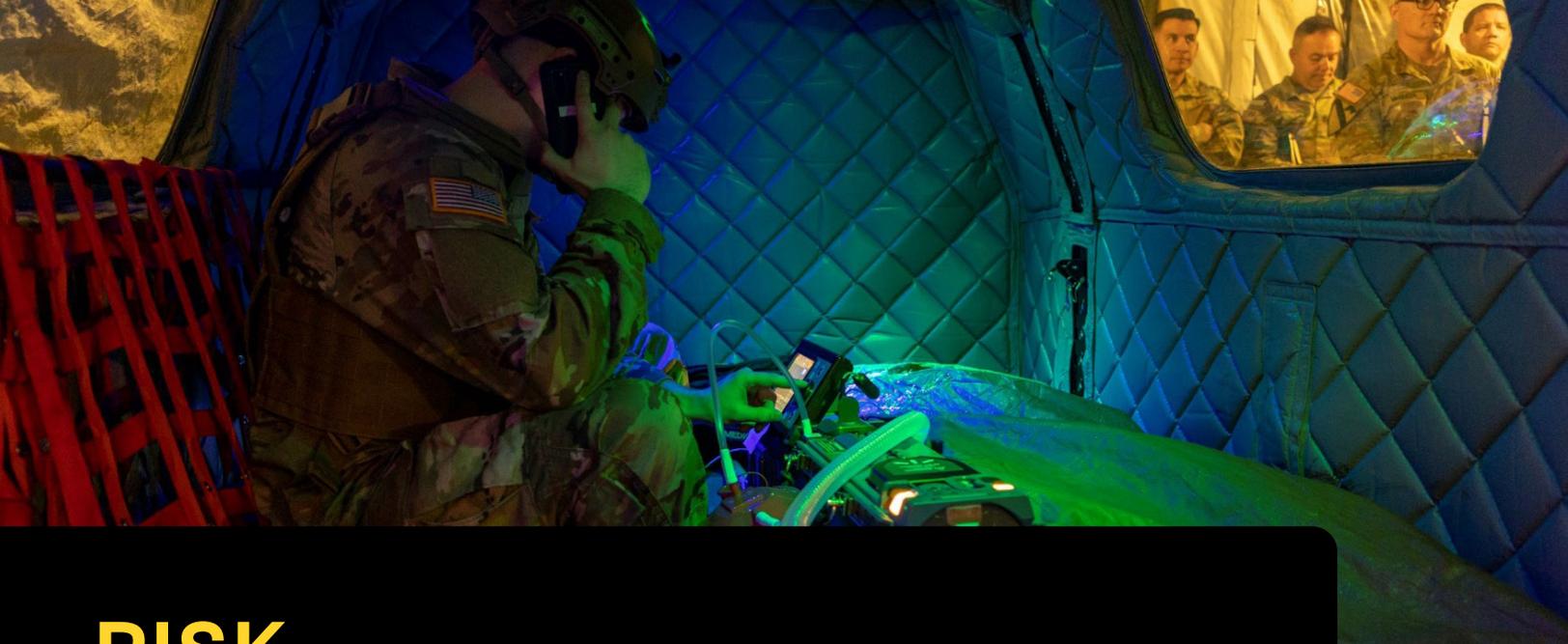
Medical and non-medical technological advancements will mature in time to make significant improvements to Army medical capabilities by 2035.

6

The Army will retain Title 10 authority and the ability to effectively align modernization resources according to established Army medical modernization priorities.

7

DoD medical reform efforts will not hinder Army medical modernization efforts.



RISK



Failure to modernize the AHS could result in increased mortality and suffering in future battlefields, greatly reducing operational freedom of maneuver and early culmination across the range of military operations.

Without strategic direction, there is risk of not having a relevant medical force capable and ready to encounter new or novel kinetic, environmental or biological threats on the future battlefield. A lack of focus on the medical readiness and optimized human performance of our Soldiers could result in an Army ill-equipped to handle the physical and cognitive stresses of multi-domain operations. Failure to underpin medical modernization efforts with capabilities that allow for continued operations in degraded or loss network/cyberspace environments presents risk to mission and risk to force. Finally, the potential for rapid accumulation of casualties on the battlefield immediately stressing the capability and capacity of organic medical assets will likely have negative effects on the Nation's will to fight.



THE STRATEGIC APPROACH: MAINTAINING OUR PRIORITIES AND GENERATING MOMENTUM

The AMMS supports the priorities outlined in the 2018 Army Strategy and 2021 AMS through integration into the Army Futures Command (AFC) Cross Functional Teams.

The AHS has always put People First. Medical modernization will continue that priority while generating irreversible momentum to ensure our people are trained, sustained, and better postured to survive in combat. In addition to AFC, key Army stakeholders of the medical modernization enterprise include:



1. **Headquarters, Department of the Army (HQDA)**, provides strategic guidance and direction, develops Army policies, prioritizes resources, and sets the strategic direction for the Army.



2. **OTSG/MEDCOM**: The Surgeon General (TSG)/MEDCOM Commander integrates and synchronizes Army medical efforts and advises Army Senior Leaders across all force modernization time horizons. OTSG/MEDCOM is responsible for Army medical readiness, manning, recruiting, leading and FM integrator space.



3. **Assistant Secretary of the Army (Acquisition, Logistics and Technology) and the Defense Health Agency** are the supported organizations for materiel acquisition. The U.S. Army Medical Research and Development Command, under the authorities of the ASAALT/Army Acquisition Executive and/or the DHA Component Acquisition Executive, is responsible for the delivery of medical modernization efforts to the warfighter.



4. **Army Futures Command (AFC)** is the supported command for Force Design and requirement development, including the design of the medical force structure in support of Army 2030 and with direct support from Combined Arms Center (CAC) and its subordinate Centers of Excellence (CoE). The Medical Capability Development Integration Directorate (CDID), under the direction of AFC Futures and Concepts Center (FCC), develops operational concepts, determines medical gaps, and then leads experiments and exercises with all war fighting functions to determine which requirements are needed in the future force. The Integration division ensures the medical capabilities and force design

updates developed during experimentation are implemented across the Army Health System (AHS) and engrained in Doctrine, Organization, Training, Materiel, Leadership Development, Personnel, and Facilities (DOTMLPF) domains. MED CDID ultimately ensures AHS has the ability to man, train, and equip ready medical forces that can be fully integrated into the Army, Combined and Joint Warfighter units to maintain the battlefield supremacy of our Soldiers and the formations in which they fight. ICW AFC, MRDC will continue to conduct medical research for the Army.



5. **Training and Doctrine Command (TRADOC)**, reorganized to include the Medical Center of Excellence (MEDCoE) as the functional and branch proponent for the AHS and lead for doctrine development, development of operating force organization products, training, leader development, education and acquiring and developing people.



6. **Army Materiel Command (AMC)**, reorganized to include Installation Management Command and the Army's Medical Logistics Command, will execute the modernization of facilities, to include hospitals and SRP sites – the Army's medical readiness power projection platforms – to meet the requirements for training, sustaining, and projecting a medically ready future force.



7. **U.S. Army Forces Command (FORSCOM)** plays a key role as the Service force provider by enabling the Army to test, experiment, and draw on the insights of the operational force, while balancing readiness requirements for current operations and contingencies.



8. **U.S. Army Special Operations Command (USASOC)** plays a key role as the Army Special Operations (ARSOF) force provider by enabling the Army to test, experiment, and draw on the insights of the ARSOF operational force, while balancing readiness requirements for current operations and contingencies. USASOC also serves as the functional and branch proponent for ARSOF and is the lead for ARSOF doctrine development, development of ARSOF operating force organization products, ARSOF training, ARSOF leader development, ARSOF education and acquiring and developing ARSOF personnel.



9. **National Guard and Army Reserves**, play a key role as force provider of the medical force, since they account for almost 70% of all of the medical capabilities within the Army. The Army is not able to have a modernized, MDO ready medical force without foundational integration and synchronization of a medical modernization plan that prioritizes the Reserve Component (RC). Historically, modernization of the RC has happened after the Active Component (AC) is fielded. Going forward. The Army must ensure the time-lines for distribution and training are on par with the AC for integration and synchronization of medical modernization to meet the medical needs of MDO.



10. **Defense Health Agency (DHA)**, assumed authority, direction, and control of all MTFs and research, development and acquisition, providing the primary medical readiness mission to Soldiers, as well as being the combat supporting agency to Combatant Commands.

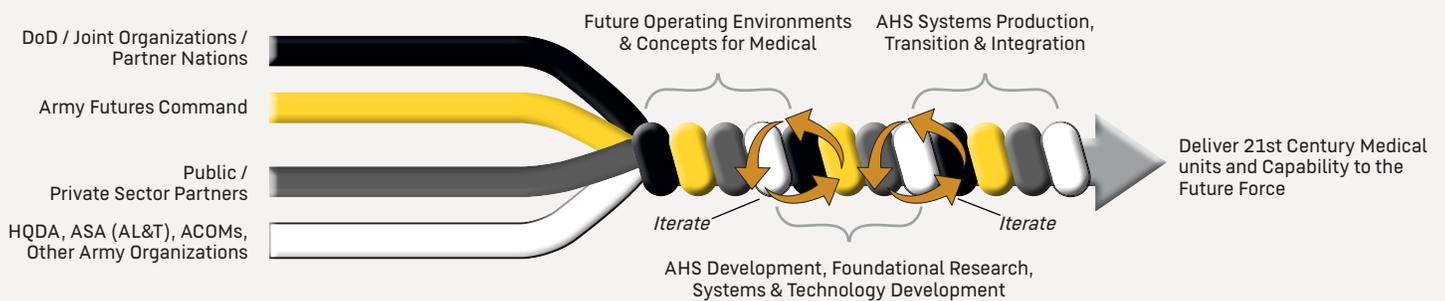


Figure 2. Integrating Medical Modernization Across the Army



HOW WE SUPPORT

MULTI-DOMAIN OPERATIONS

To support the Joint Force commander's ability to solve the problem of layered standoff, the AHS must provide a full range of capabilities to Army Forces to deter, compete and if required rapidly transition to armed conflict. The AHS will achieve this medical support through modernized operational capabilities and multi-domain capable formations that are strategically positioned and able to leverage national-level capabilities and authorities. To deter and compete in time, geography, and function, the AHS will empower commanders at echelon with medical aspects of command and control, enable the operational forces, provide medical support forward to enable semi-independent operations, optimize evacuation and maximize return to duty.

Key to completing this mission will be advanced medical command and control systems integrated with the JADC2 architecture. For this, the AHS will use medical convergence, an integrated network akin to the Army's MDO tenet of convergence: to see casualties in the battlefield first, determine the right provider/medical capability to triage, treat or evacuate, and get the right C2 to decide and act at the speed of relevance. To achieve success through command and control in an information and network contested environment, the AHS will have to be capable of integrated command and control vertically, horizontally, and digitally across and among the company to theater level. Medical command and control will use integrated and synchronized plans conformed to maneuver and sustainment operations while maintaining near real-time and integrated medical common operating picture as part of the future all-domain battlespace visualization capability. This will set requisite situational awareness to enable the operational force through the use of "care webs" across a joint operational

area. "Care webs" are the synchronized, integrated and networked strategic, joint, coalition, multinational and host nation medical assets in a given area of operation. AHS will also become predictive in nature, leveraging AI-enabled decision making tools for patient regulating to observe casualty flows, monitor resources available, and make evacuation recommendations to retain the greatest combat power far-forward. Finally, AHS will enable the operational force through proactive Force Health Protection monitoring, detection and action to minimize Disease, Non-Battle Injuries (DNBI) - the number one historical degrader of combat power.

The primary mission of the AHS must be to strengthen, maintain, or return combat power to formations, enabling maneuver commanders to maintain operational tempo, consolidate gains, and achieve the mission. The AHS must modernize to operate semi-independently and at the pace of combat, reducing the burden of casualties on maneuver commanders without degrading their awareness.

The speed, range and potential of semi- or fully autonomous air and ground evacuation systems will likely be offset by the lethality of the future operating environment to those systems and the expanded battlespace requirements. It will be imperative to leverage periods of time where standoff is reduced or eliminated to increase survivability and improve medical evacuation across the depth and breadth of the battlefield. Unmanned aerial systems and unmanned ground vehicles will autonomously transport casualties, execute medical resupply, and conduct applicable operational public health tasks. Medical resupply, medical evacuation, and casualty evacuation will leverage autonomous and semi-autonomous vehicle technology.

Expanding clinical capability forward on the battlefield is an essential Army capability by 2035. Through a combination of the increased technology forward and a revolutionary first aid kit, the Army will increase the capacity and capability of the individual Soldier, while increasing the training of the Combat Medic to a more versatile Enhanced Medic. The Enhanced Medic will be specifically trained in prolonged field care at the EMT Advance level. AHS will also seek to enhance knowledge and development of intellectual skills of the Enhanced Medic and care capability forward through the integration of virtual augmentation, telemedicine, artificial intelligence, and robotics. Increasing the level of capability of the non-Medic soldier to the level of a Combat Lifesaver or even Medic level training will increase capacity to manage minor medical issues identified through triage will enable the Enhanced Medic to focus their skills where most needed. Additionally, identifying MOSs that can potentially be cross-trained to the level of a Medic in addition to their primary medical MOS will maximize capabilities through echelon and facilitate patient treatment more efficiently.

MULTI-DOMAIN FORMATIONS

By 2035, the AHS will transform its organizations into modernized, tailorable and scalable MDO-capable formations that are strategically positioned and able to leverage national-level capabilities and authorities. The AHS MDO force will combine tailored integrated formations of networked manned and unmanned platforms, sustainment, communications, intelligence, and protection capabilities from the individual to theater. The AHS must have the flexibility and capability to quickly adapt to novel injuries and threats in the future operating environment. The ability to establish "care webs" that allow for vertical, horizontal, and digital synchronization and integration for the care of the wounded, ill and injured will be critical to ensure the AHS provides the quickest, most efficient and appropriate care to our soldiers on the battlefield and beyond. Joint, Coalition, and Host Nation "care webs" will be supported by care chains, maximizing and integrating the medical evacuation and treatment capabilities of all partners from point of injury to rehabilitative care. CONUS and OCONUS rehabilitative care is an integral component of the AHS and provides supportive and sustainable platforms with vital advance medical capability and capacity. During MDO, DHA's medical formations/facilities and CONUS-based hospitalization capacity will be instrumental to the Joint Force continuum of care. The development of a universal digital medical record will

enable secure access to patient medical information and transmit patient triage and care record safely from POI through definitive care. This will enable agile and efficient treatment tracking throughout the care chain and ensure continuity of care for the soldier. Standardized data that is universally accessible across the continuum of care will enhance the ability of the medical system to utilize Artificial Intelligence to identify injury and treatment trends, DNBI patterns and unit readiness to enable senior leaders the ability to allocate appropriate resources to maintain battlefield advantage.

Medical multi-domain formations will leverage advanced robotics, AI, and optionally-manned systems with humans' in- or on-the-loop to enable decision making to inform advanced clinical care and prioritize evacuation. These technologically advanced systems will move casualties to the medic, aid the medic in treatment and movement of casualties, or serve as an evacuation platform with autonomous or human-provided care. Autonomous capabilities will provide modular, scalable and tailorable evacuation and/or treatment packages to allow for the spectrum of care from treating working dogs, to damage control surgery, emergency airway management, damage control resuscitation to dental reconstruction. These vehicles will be configured for semi-autonomous operations by relying on alternative fuels and to reduce the logistical burdens and footprint required of 20th century field hospital capabilities.

The utilization of robotics and drones will help mitigate the "first mile" problem the Army faces, which is, "medical capability in a highly dispersed, denied, degraded and contaminated environment?" Robotics and drones will enable protected and predictive logistics of the CLVIII commodity allowing for rapid deployment of low-weight items, unburdening the sustainment community to focus on other classes of supply that require more robust transportation requirements.

The Army will leverage and develop new technologies such as AI and semiautonomous systems to expand the capability and capacity of Soldiers on the battlefield. This will be accomplished through augmented reality care and telehealth-enabled mentorship through systems like the Integrated Visual Augmentation Systems (IVAS) platform. This will further enable AHS capabilities to extend and maintain life in prolonged care setting where resources will be scarce, and modalities will change based on the extended periods of care.





WHAT WE SUPPORT WITH



The AHS must integrate with Army modernization efforts to develop capabilities that use more effective power solutions, autonomous re-supply, next generation material and packaging and other new technologies in support of the Army Climate Strategy. This will unencumber the Maneuver and Sustainment enterprises when casualties are mounting and lines of communication are contested. Integration into the Cross Functional Teams, the Army's top modernization priorities, will drive materiel development for the medical MDO capable force. Integrating into initial platform development will ensure medical equities are accounted and planned in all future development efforts.

- Next Generation Combat Vehicle's medical evacuation and treatment variants with increased speed and survivability will enable freedom of maneuver for the Joint Force.
- Future Vertical Lift's Aeromedical Evacuation variants with increased maneuverability, endurance and survivability will greatly increase the AHS operational reach and effectiveness of clearing the battlefield.
- Network's efforts to modernize Army network technologies will enable the AHS to provide command and control across the globe. Operationally, the AHS will converge data across medical capabilities by integrating into the network. This will allow all sensors, the best provider/capability and right command and control node to provide relevant information to the point of need, and maintain a medical common situational understanding within MDO.
- Soldier Lethality and Synthetic Training Environment efforts will greatly enhance the AHS primary weapon system—the medical care provider—improving cognitive abilities, survivability, adaptability, and resiliency.

System of Systems (SoS) integration is key for the AHS. The goal is for medical modernization solutions to be part of the SoS architecture across the relevant Army modernization efforts. This will prevent medical-only solutions that potentially risk operational relevancy, sustainability and interoperability.

Additionally, the Army will leverage gains made in the civilian sector and through the Synthetic Training Environment Cross-Functional Team to develop medical trainers that

increase the realism and authenticity of simulated medical tasks in a combat environment. These training tools will help make providers more proficient in austere, contested or resource-constrained environments.

MATERIEL

The Army must continue to pursue and/or develop medical products and modernize equipment that reduce the size, weight, cube, power requirements and cost per Soldier compared to 2020. Some of these technological breakthroughs could include Dehydrated IV bags/medical-grade water created at the point-of-need, airway management, and advanced blood and blood products like shelf stable synthetic blood. Additionally, flexibility in acquisition and development processes will enhance our ability to identify and treat novel injuries generated by new threat technologies such as directed energy or novel DNBI vectors.

AI-enabled monitoring capability with Soldier Sensor monitoring throughout operations will enable rapid assessment and efficient utilization of resources at point-of-injury with organic medical assets. This capability will support triage - provide recommended treatment protocol for life, limb and eyesight - and coordinate evacuation plans to the appropriate nodes in the "care web". This will provide the most effective care for return to duty or stabilization for further evacuation.

Through the Soldier Lethality initiatives, the IVAS will transform patient care at night, and allow tie-ins to digital health to allow for AI/Human Assist and talk-through of complex treatment protocols. Enhanced technology and advanced networking capabilities will enable rapid treatment followed by unmanned

or semi-autonomous CASEVAC/MEDEVAC to the appropriate healthcare node. Mobile, agile advanced treatment on the move, aided by predictive technology for informing medical functions (MEDLOG, Public Health/Force Health Protection, evacuation) will dramatically reduce the incidence of preventable death on the battlefield.

Materiel development will assist in achieving the goals of medical readiness in human performance optimization, prevention of illness and injury, psychological health and infectious disease prevention. Optimizing human performance will improve performance in extreme environments. Prevention of illness and injury will reduce musculoskeletal injury while developing vaccines, prophylactic drugs, and health sensors. Prevention also must include maximizing definitive pre-deployment dental treatment. Rapid diagnostics will facilitate return to duty, prevention/treatment of combat wound infections, pain management, blood products, burn care, and neurotrauma. Semi-autonomous and smart sensing technologies will aid in the development of airway management solutions that optimize outcomes of patients with battlefield trauma.

Lastly, a critical piece of medical equipment on the battlefield is the first aid kit issued to every Soldier. To increase the chance of survival of every Soldier in the "Platinum 10" minutes, the Army will have to transform the individual first aid kit to increase the medical capability and capacity of each individual Soldier. For this, the new first aid kit will leverage lightweight advanced medical products that in combination with AI enabled and virtually assisted interventions will increase every Soldier's ability to provide care in the battlefield.





WHO WE ARE

The Army medical community will transform through 2035 to be a more adaptable medical force capable of harnessing, integrating, and utilizing future technology on the battlefield to save Soldiers. The complexities of MDO will demand that our Soldiers possess the requisite knowledge, skills and attributes to perform the AHS mission. To achieve this, the medical force will educate, train and develop to be joint-interoperable—interchangeable when required—to meet the Joint Force Commander's requirements.

The AHS will recruit and retain the most talented medical personnel who will evolve and develop the cutting edge of these technologies. This will be done by developing AI-enabled recruiting systems to find talent across the nation. New agile recruiting options will offer pathways for civilian and military service. Service requirements will amend Service standards to ensure focus is on talent recruitment and retention.

By 2035, AHS medical professionals will achieve proficiency through a combination of advanced simulated platforms. Simulated platforms will fundamentally change clinical proficiency from "brick-and-mortar" facilities to advanced simulated training environments. Combining these skills with assignments within DHA's medical facilities or Army/Joint provided sustainment-training platforms will ensure use of modernized capabilities. Additionally, medical personnel will require realistic training center rotations and other premier training exercises such as Global Medic. This will optimally integrate medical forces while conducting MDO.

The rapid pace of advancements and high casualties expected in MDO will require the Army to develop medical expertise and skills faster than today's standard. Surgeons, with increased training, enhanced simulations, and robust AI enabled feedback will reduce

their training time. The goal is to reduce this training time by 50%, which today averages 12-14 years (undergraduate, graduate and general surgery residency).

The Army's medical forces will still need to plan, integrate, and synchronize with our National Guard and Army Reserve counterparts as they will continue to provide approximately 70% of the Army's total medical capability on the battlefield. Leveraging these assets and efficiently managing their annual training opportunities will be essential to the Army's future success.

Members of the Army medical enterprise are the architects and integrators of the medical component to human performance. The medical modernization enterprise will help Soldiers adapt to the reliance and interdependence of the machine-human interface. The Army will leverage the best capabilities to ensure the physical/cognitive interface with non-biological systems. Medical research will contribute to the body of knowledge on the medical safety and psychological impact of how machines adapt and compensate for the decreased cognitive load of the human-on-the-loop (human involvement to check process and verify accuracy) due to stress, fatigue, or other environmental considerations. Through AI advancements, the Army will measure not just individual health, but also objective measures of a collective and cohesive unit's health. This will be accomplished and improved through wearable trackers (physical, cognitive, emotional) and personal training (beyond simple physical readiness training). Human performance will be managed and tailored through the adoption of optimally manned platforms working in concert for manned-unmanned/leader-follower teaming. Key will be to develop human trust with these machines teaming efforts.



CRITICAL ENABLERS

PRIORITIZED RESEARCH AND DEVELOPMENT

Research and development of medical solutions will be instrumental to the success of this strategy with a heavy focus on nesting with the Army Medical Modernization Concept (AMMC). The AMMC exquisitely identifies capability gaps and aligns Science and Technology (S&T) efforts. Acceleration of current scientific research and technology in these areas will result in future material solutions critical to conserving the fighting strength of an MDO-capable force by 2030. The technologies described in this section are intended to mitigate critical gaps derived from the examination of the required capabilities regarding the ability to empower commanders at echelon with medical aspects of C2, enable the operational forces, enable semi-independent operations by providing medical support forward, and optimize evacuation and maximize RTD. The AHS must persistently coordinate technology research and development with efforts across the Army Modernization Enterprise. This will minimize duplicity of effort and ensuring complete integration with developing technologies in areas such as predictive MEDLOG support; lighter, efficient power supply; electrification; alternative fuels; networks; DNBI vaccines and treatment modalities; wearable sensors; and an Artificial Intelligence/ Machine Learning-enabled, tailorable Medical Common Operating Picture (MEDCOP) to commanders at echelon.

However, continuous evolution of novel medical threats, and the concurrent capability gaps they create, requires the AHS to look beyond the 2030 and begin to invest in the research of disruptive technologies (technologies that drastically change how we will operate) and treatment modalities. The AHS must prioritize, develop and capitalize on rapid advancements in medical innovation and disruptive technologies. This will be accomplished through coordination and cooperation with Academia, Industry, and Joint partners as well as integration to other Army research efforts as described above. This layered and integrated approach to research and development coupled with internal disruptive medical research and development in six priority areas will set the foundation for medical modernization.



The six AHS disruptive research priority areas are human intelligence, bio and human enhancement technology (BHET), bio-AI-biotechnology, synthetic biology, additive manufacturing, and quantum technology. These areas directly nest with the AMMC and address both required capabilities and capability gaps. We must realign and focus resources in these areas to ensure that the AHS will keep pace with operational advancements and expand treatment modalities to support the future force. Figure 3 below briefly describes these research areas and Enclosure 1 details how these areas nest with the required capabilities and gaps of the AMMC.

Humanistic Intelligence. Advancements in AI/ML will require enhanced research to explore humanistic intelligence. Humanistic intelligence is the seamless integration of psycho-social-techno systems supporting enhanced human-machine teaming and synergistic behaviors.

Bio and Human Enhancement Technologies (BHET).

Biotechnologies use organisms, tissues, cells or molecular components derived from living things, to act on living things; or, act by intervening in the workings of cells or the molecular components of cells, including their genetic material. BHET are biomedical interventions that improve human form or functioning in excess of what is necessary to restore or sustain health. Manipulation of our biological environment and human enhancement goes back to the earliest days of humankind. However, BHET are expected to be available over the next 20 years. These technologies span the spectrum of biological sciences including:

- Genetic manipulation [e.g., Clustered Regularly Interspaced Short Palindromic Repeats (CRISPR) technology - a simple yet powerful tool for editing genomes]. This allows researchers to easily alter DNA sequences to develop novel pathogens or medical countermeasures
- Manufacturing methods exploiting biological processes
- Human enhancement via integrated robotics (e.g., exoskeletons or replacement parts)
- Neural interfaces; enhanced vision; socio-technical symbiosis with AI and autonomous systems
- Pharmacological approaches to cognitive and physical enhancement
- Increased virtualization of the socio-cognitive environment supporting the development of new social, information and organizational structures
- New bio-sensors and bio-informatics, which will increase our understanding of socio-cognitive, physiological, economic and neurological behaviors to improve operational performance and resilience, as well as increase the effectiveness of non-kinetic targeting

Data-AI-Biotechnology. Data-AI-Biotechnology is AI, in-concert with Big Data and Synthetic Biology. It will contribute to the design of new drugs, purposeful genetic modifications, direct manipulation of biochemical reactions, and living sensors. Data-AI-Biotechnology can:

- Investigate new ways to help the force through quality of life, behavioral health, readiness, resilience, and prevention of training injuries.
- Measure psychological resilience as an indicator to performance/survivability in combat.
- Develop transport systems for seriously injured people using AI.

Synthetic biology. This is a wide ranging area that in future iterations of aligning capability gaps to S&T will provide more focus. Examples include synthetic blood and/or blood products, novel burn treatments, etc. Research in this area provides an arsenal of new tools to gain medical advantages across the spectrum of care.

Additive manufacturing is critical for the generation of healthcare delivery and biomedical applications. Battlefield medicine seeks to address this capability gap through two integrated research thrusts such as pharmacy-on-demand and biologically-derived medicines-on-demand.

Quantum technology and computing could revolutionize the detection and treatment of chronic and infectious diseases with significant opportunities for military medicine application across the spectrum of care. Speed kills on the battlefield and quantum computing will provide leaders the ability to make informed decisions faster.

GOVERNANCE AND PROCESSES

The Army, in conjunction with DHA/OSD must generate a medical governance structure that effectively delivers an effective, integrated and synchronized MHS to produce a medically ready and ready medical force. As reform efforts continue, the Army will require effective governance efforts with both the Joint Force and the DHA. Within the Army, governance will need to be structured, disciplined, and a codified process that includes the major commands supporting modernization, these include the OTSG/MEDCOM, TRADOC/MEDCoE, AFC and DHA/MRDC.

TRAINING READINESS AND EXPERIMENTATION

To keep the competitive advantage, increase proficiency, and remain on the leading edge of technological advances, the AHS must transform the way it trains Soldiers and units in support of MDO. The MEDCoE produces a separate AHS training strategy that will define the strategic approach to nest training with the Regionally Aligned Readiness and Modernization Model (ReARMM) and incorporate DOTMLPF-P solutions to maintain the advantages gained as medical advancements continue. As the AHS modernizes “how we support,” “what we support with,” and “who we are,” the medical community training strategy will adapt to enable modernization efforts. The Army medical proponent will continue to address the individual and collective wartime critical skills requirements to ensure a ready medical force is provided to commanders. Implementation and integration of modern training models for MOS, AOC, and unit critical tasks across all domains will enhance the Soldier basic skills and unit readiness to overcome challenges and help bridge training gaps encountered throughout the medical enterprise.

The AHS will continue to assess the strategic environment through wargaming and experimentation combined with rapid and iterative capability assessments. Medical assets at echelons above brigade/division will be involved in combat training centers and warfighting exercises, providing essential operational feedback. The AHS will utilize these lessons learned to refine the design of the future MDO-ready medical force. Integration into the development of Synthetic Training Environments to improve medical assessment during all phases of an operation will inform both the medical and operational commanders to become predictive in conducting medical development and assessment of the battlefield in conjunction with operational planning. This seamless integration will enable medical support throughout all phases of MDO and enable faster, more efficient utilization of resources.

FACILITIES AND INSTALLATIONS

Medical modernization efforts will be dependent on superior DoD R&D infrastructure. Infrastructure risk increases if the Army does not modernize facilities at pace with new medical systems and formations. Modernized facilities provide the supporting infrastructure to fully capitalize on new technologies. The Army will include medical requirements into its plan for upgrades and changes to maintenance facilities, motor pools, network infrastructure, administrative facilities, housing, barracks, secure facilities, training facilities, ranges, maneuver land and airspace, and utilities to keep pace with other modernization efforts and mitigate this risk. Another key infrastructure to medical modernization efforts will be DHA's medical infrastructure that provides the sustainment platform for medical professionals.

POLICIES AND AUTHORITIES

Medical modernization for MDO requires an ongoing reassessment of existing policies and authorities across three broad areas: medical ethics, Geneva Conventions and recruiting/retention. The medical ethics for autonomous evacuation and care will require new laws and policies. Reassessment of the Geneva Convention will be necessary in the future large-scale conflicts. As we pursue maximizing human performance and innovate with future medical training advancements, medical modernization will need to consider new policies and authorities for recruiting and retention.

GLOBAL HEALTH

As part of civil-military operations, Army will continue to conduct and broaden its strategic and operational global health engagements and initiatives by leveraging technologies to reach and communicate with cultures and locations that historically have been difficult to reach due to geographic, cultural or communication barriers. Global health allows access leading to presence then to influence but also influence leads to access then to presence. This works in the competition phase both pre- and post-conflict phases. As our capabilities and technologies expand, these engagements will also allow us to collect on different environmental factors, identify traits that make environments livable, and evolve our training and processes to mimic those behaviors and traits that make the Army adaptable, predictive, participatory, anticipatory, and resilient. Global health initiatives increase overall medical capacity and interoperability with our unified action partners, ultimately helping set the theater for the Joint Force.

The State Partnership Program should be targeted. The States have developed military partnerships between their National Guard and that of various nations across the globe. With these bonds already forged, emphasizing and developing strategic and operational global health engagements may allow us to expand and collect on different environmental factors, identify traits that make environments and increase overall medical capacity and interoperability with our unified action partners.



RESOURCING



As the Army continues to find savings through reform initiatives, the AHS will be highly dependent on consistent, predictable funding. Effectively aligning resources to Army medical priority efforts is key to delivering the right medical capability in 2030. Medical modernization will face resourcing challenges in how it will program for requirements in the future PPBE process as the medical community continues reform efforts. Medical modernization efforts will be dependent on sufficient and sustainable funding levels both by DHA, as well as across all components of Army and Army Medicine. This will drive the Army to have an agile resourcing system that balances ownership, governance and influence. Meanwhile, the Army will continue to take a deliberate approach to sustaining medical equipment. This entails assessing our capability needs, acquisition programs, and existing systems to determine the most economical sustainment approach. In many cases, it will result in forgoing additional incremental upgrades to legacy systems. The Army will also divest select legacy medical programs to support modernization priorities. However, throughout this divestiture process, the Army must maintain medical training opportunities and advance the critical medical core and wartime competencies.



CONCLUSION

The AMMS provides the vital roadmap to fundamentally **transform** and **modernize** the Army Health System.

The Army's goal is to have a ready, modernized, responsive and relevant medical force capable of conserving the fighting strength of the Operational Force in 2035. The AMMS also nests with the 2018 Army Strategy, Army Modernization Strategy, and the Army Medical Modernization Concept setting the foundation for a relevant, modernized and ready medical force capable of supporting Multi-Domain Operations (MDO) as part of an integrated Joint Force. The AMMS aligns, supports, and integrates with the Army's Modernization Strategy. It synchronizes foundational change across the Army's medical enterprise and formulates a single framework for the AHS requirements, prioritization and resourcing for planning and programming. The AMMS will help drive future generations of Army medical capabilities to be more relevant, focused, agile, and adaptive, at each battlefield echelon. To reduce risk to the future fighting force, the Army must ensure requisite resources underpin this strategy. The development of a holistic, thorough implementation plan driven by this strategy and nested with the AMMC will push the Army Health System squarely into the twenty-first century, prevent early culmination of Joint Force operations while ensuring Army and Joint forces meet national objectives.

