

Why Military Medical Research?

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The challenging circumstances that confronted military caregivers during the years of war in Afghanistan and Iraq established the imperative for military-oriented medical research. The burden of injury and illness resulting from this long period of combat operations, and the unique clinical and logistical considerations it engendered provide a compelling rationale for requirement-driven, well-coordinated medical research. Also referred to as “gap” driven and programmed, military trauma research is specifically aimed at providing readily deployable solutions to reduce morbidity and mortality from war-related injury.

From a strategic standpoint, the approach taken by military medical research is quite different from that sponsored by other federal research agencies, which typically fund investigator-initiated studies of interest to the scientific community, irrespective of the urgency of the question to society. Importantly, neither these agencies nor private foundations dedicate funding to injury research of the type or severity that can be anticipated in modern warfare including terrorism. Military research has been shown effective in reducing the case fatality rate during combat and has established itself as the centerpiece of the military’s continuously learning health system.^{1,2} It has also generated numerous advances that are being translated to improving civilian trauma care.³ The following paragraphs of this preface and the articles in this supplement provide examples that serve to emphatically answer the question, “Why military medical research?”

Between 2005 and 2013, the fatality rate for service personnel injured in Afghanistan decreased by 50% while the severity of injury was increasing.^{1,2} The reason for this unprecedented achievement is multifactorial, but two factors stand out. At the height of the wars in Afghanistan and Iraq, the military health system made (1) significant investments in requirement-driven, programmed trauma research, and (2) an extraordinary effort to codify a trauma system that identified emerging needs for research, and rapidly translated results from military research into best clinical practices. The first element was comprised of programmatic research performed by the individual services (Army, Navy, and Air Force) and through the Joint-service, Defense Health Program. The sec-

ond was the Joint Trauma System or JTS, which has developed into the Department of Defense’s (DoD) “go-to” entity for real-time process improvement to optimize survival and recovery of the warfighter. The swift translation of evidence from military research through the JTS to the battlefield represents a “first” in military medical history.

Recently formalized as a Defense Center of Excellence (DCoE), the JTS maintains the DoD Trauma Registry, which is the largest repository of combat injury and trauma management information in history.^{2,4} In this capacity, the JTS and the process it supports serve as a fitting “bedside” to generate many of the clinical questions that need answers from military medical and trauma research. Many experts refer to the various DCoEs as the “bookends” to medical research (Fig. 1). In this context, the JTS’s ability to identify relevant clinical gaps is the left-side bookend and the more than 30 evidence-based clinical practice guidelines maintained by the JTS are a fitting and right-side bookend.⁵ Although this association continues to evolve, the relationship between the nation’s Combat Casualty Care Research Program and the JTS is a compelling model with research bridging the chasm that would otherwise exist between clinical needs and relevant evidence to advance military trauma practice.

The other factor intertwined with military research is the sustaining educational and academic value of America’s Medical School, the Uniformed Services University of the Health Sciences (USUHS), the nation’s leadership academy for military health. Without the academic support provided by faculty and graduates from the USUHS, military research would be hollow. As depicted in Figure 1, the military-unique “Joint from the beginning” educational and academic excellence promulgated by USUHS provides the foundation for military research and its clinical bookends. Likewise, without sustained research investments, USUHS would be significantly constrained in advancing the field. Working together, the various DCoEs and USUHS comprise the elements of what the Institute of Medicine has referred to as a “continuously learning health system.”⁶ From the standpoint of combat-related injury, the benefits of this partnership are clear, but it is equally apt for other areas of health care, including infectious diseases, traumatic brain injury, rehabilitation, and psychological health. Underlying all of these activities is a robust military health system that has captured the wartime experience, integrated it with a medical research program and translated the experience and research into more effective care for warfighters and ultimately the American public.^{3,7-9}

The final answer as to “Why military research?” becomes clearer as our nation approaches the terminal stages of war in Afghanistan. As reports of violent acts on U.S. soil become

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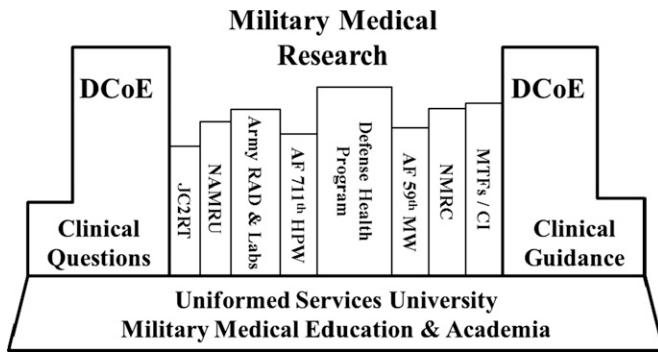


FIGURE 1. Military medical research with DCoE functioning as bookends. In this model, the DCoE (left) provides clinical input as to military-related gaps and requirements, but also receives the output of research and is responsible for integrating it into evidence-based clinical practice. The military-unique academic and educational properties of the USUHS provide the foundation for these activities (JC2RT = Joint Combat Casualty Research Team, NAMRU = Naval Medical Research Unit, RAD = Research Area Directorates, AF = Air Force, HPW = Human Performance Wing, MW = Medical Wing, NAMRC = Naval Medical Research Center, MTF = Medical Treatment Facility, CI = Clinical Investigation).

more frequent, so do reports on the translation of advances in military trauma care to the civilian community.^{3,7-9} Many of the results stemming from military research have not only contributed to the survival and recovery of U.S. service personnel but also victims injured in civilian settings. Similar to the military experience, the need for improvements in hemorrhage control, resuscitation, en route care, and damage control surgery in the civilian setting are being propelled by reports of mass shootings, stabbings, and use of explosive devices. These events generate surges of casualties with injuries resembling those the military's health system has learned to manage in an optimized manner.⁸ Although civilian health care is not the main objective of military research, American medicine and surgery rapidly advance when lessons learned on the battlefield are translated to civilian contexts. This was true after World War II and the wars in Korea and Vietnam. It will also be true after the wars in Afghanistan and Iraq. This is particularly real in the field of trauma care where little if any dedicated federal research funding exists outside that provided by the military.

In summary, military medical research is a vital national security strategy in responding to the unique needs of the injured U.S. service personnel in current and future combat scenarios. Military research bridges the gap between the "bookends" of the DCoEs and is a centerpiece of the military's continuously learning health system. Military research is based on the academic foundation at the USUHS and enhances the quality of study and education at that institution. Finally, as a matter of homeland security, many findings stemming from military research enhance the resiliency and response of the civilian population. For these reasons, the answer is "yes" to military research; not as a reactive strategy, but "yes" as a deliberate and sustained investment advancing care for service personnel and civilian communities alike.

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