

# Military Burn Research Program

## Strategic Plan

### INTRODUCTION

The Congressionally Directed Medical Research Programs (CDMRP) represents a unique partnership among the U.S. Congress, the military, and the public to fund innovative and impactful medical research in targeted program areas.

In 2015, an ad hoc committee of the National Academies of Sciences, Engineering, and Medicine was assembled to evaluate the CDMRP's two-tier review process and its coordination of research priorities with the National Institutes of Health (NIH) and the Department of Veterans Affairs (VA). As part of their final report,<sup>1</sup> the committee recommended that each CDMRP program "... develop a strategic plan that identifies and evaluates research foci, benchmarks for success, and investment opportunities for 3–5 years into the future," and that these strategic plans "should specify the mission of the program, coordination activities with other organizations, research priorities, how those priorities will be addressed by future award mechanisms, how research outcomes will be tracked, and how outcomes will inform future research initiatives."

In response to these recommendations, this document presents the current strategy for the CDMRP's Military Burn Research Program (MBRP). The MBRP Strategic Plan identifies the high-impact research goals most important to its stakeholders while providing a framework that is adaptable to changes in the medical research environment to address those goals. This plan has been formulated to provide greater clarity of the program's goals over time to the public and other stakeholders. Funding for the MBRP is congressionally appropriated on an annual basis; therefore, there is no guarantee of future funding. The MBRP Strategic Plan will be reviewed during the program's annual Vision Setting meeting and updated as necessary.

### RESEARCH AND FUNDING ENVIRONMENT

Today's medical research environment is dynamic with respect to both civilian and military burn research. In 2016, the American Burn Association (ABA) estimated an average of 30,000 burn injuries in the United States that required hospitalization that were cared for at the 4500 acute care hospitals around the country<sup>2</sup>. In the United States the top 3 civilian causes of burn injuries are fire/flame, scald, and contact. Military burns are often devastating and more severe than burns obtained in the civilian setting. Burns have comprised some 5-20% of the casualties sustained in post-World War II conflicts<sup>3</sup>. The majority of combat burns result from explosive device detonation, leading to a greater Injury Severity Score, an increase in inhalation injuries, and a larger, full-thickness burn size. In addition to burns, Service Members may also suffer from fractures, amputations, smoke inhalation, and head injuries at the same time. This traumatic assault adds additional burden to the body's innate immune response and, thus, increases the likelihood of infections and organ damage.

Treatment of debilitating burn injuries is rather complex. In addition to the more obvious treatment to the burn site, burn injuries often occur simultaneously with other severe traumatic injuries, known as polytrauma. Care must also be provided to support the patient throughout the continuum of care for all sustained trauma as well as any physiological and psychosocial factors that may delay healing or return to duty. As the military prepares for future combat scenarios that will require care to move closer to the point of injury or in a prolonged field care scenario, the MBRP plans to provide funding to support research that will develop and validate new and existing technologies, techniques, interventions, and treatment paradigms to accommodate this military need.





**VISION:** Deliver the best burn trauma care to improve health and performance outcomes in support of the warfighter

**MISSION:** Identify and address gaps in burn trauma care through military focused translational research

The MBRP was initiated in 2011 to address combat-related and trauma-induced burn injuries, as well as to improve health and performance outcomes for Service members and the general public. Since Fiscal Year 2011 (FY11) a total of \$62 million (M) has been appropriated to the program by Congress (Table 1).

Funding for research comes from a variety of sources and through a variety of programs. Many are funded by the government through NIH, VA, DOD, and other government and non-government organizations. The MBRP takes into account the entire research funding landscape and works with its partners to ensure research efforts are complimentary without being duplicative. This continuous assessment of the research landscape allows the program to effectively respond to changes to maximize the value and impact of MBRP-funded research.

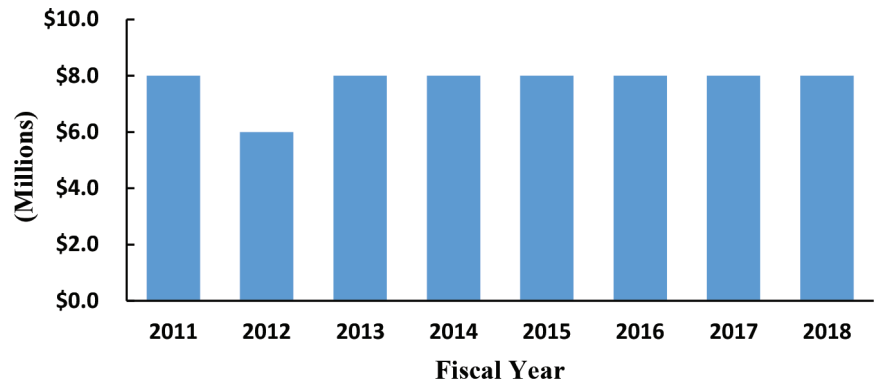
The below list represents a small sampling of the commitment that non-DOD research funders make to burn-related research:

- The NIH has funded approximately \$196M, from 2008-2015, in burn-related projects with a large portion being sponsored through the National Institute of General Medical Sciences (NIGMS) and the National Institute of Allergy and Infectious Diseases (NIAID).
- The Department of Veterans Affairs also funds burn-related intramural research within their Office of Research and Development.
- The ABA offers its members grant and fellowship opportunities to advance the educational and research needs of burn care professionals.
- The Burn Institute has provided over one million dollars to fund vital burn research and to purchase specialized equipment for patients.

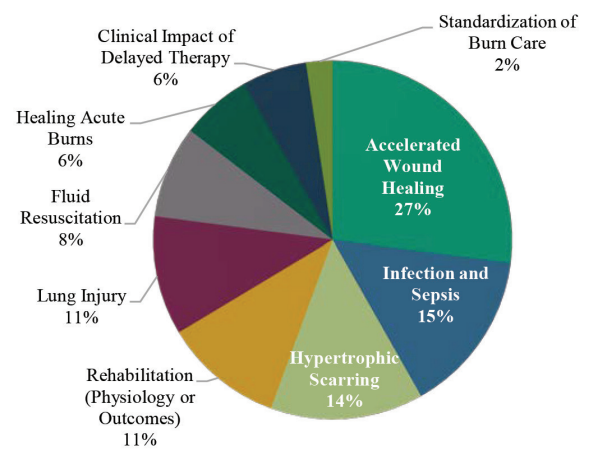
Since 2011, the MBRP has funded 36 research projects which can be broadly categorized into nine topic areas (Figure 1). Due in part to the relatively mature nature of the research field and more immediate need for advanced solutions, the MBRP invested approximately 27% of its appropriated funds to support projects related to Accelerated Wound Healing, which includes a focus on physiological factors, acute burns, and wound healing failure. A large portion of MBRP appropriations have also supported research efforts in Infection and Sepsis (15%) and Hypertrophic Scarring (14%), focusing on treatment and prevention. The remaining 44% of the MBRP investments include additional topic areas along the continuum of care in Fluid Resuscitation, Lung Injury, Healing Acute Burns, Rehabilitation, Clinical Impact of Delayed Healing and Standardization of Burn Care.

MBRP-funded projects have resulted in the advancement of novel therapies to treat burn wounds while impacting the current standard of care for treating Service members, Veterans, and the general public. Several of the projects advancing therapies have provided new avenues for treating scar size using lasers, reducing respiratory distress using repeated stem cell applications, demonstrated the benefits of Vitamin E in increasing pulmonary function in burn patients, and navigated the use of Omega 3 fish skin technology as temporary

## MBRP Yearly Appropriations



**Table 1. Congressional Appropriation to the MBRP by Fiscal Year**



**Figure 1. Overall Program Investment by Topic Area for the MBRP, FY11-FY17**



coverage for full thickness burns. The MBRP is also impacting standards of care for burn patients by supporting the development of new applications and clinical practice guidelines for the use of extracorporeal life support devices to reduce the onset of acute respiratory distress syndrome, establishing standards for treating patients with greater risk for hyperthermia, treatments for improving pulmonary function following burn and smoke inhalation, and the creation of a checklist for the assessment of intensive care patient condition and treatment priorities.

## STRATEGIC DIRECTION

The MBRP overarching strategic goal is to advance new burn care techniques to clinical practice and to address capability gaps for treating combat burn injuries from the point of injury to treatment at stateside Military Burn Centers and Military Treatment Facilities to improve survival, recovery, and rehabilitation for military burn patients. In order to keep abreast of the ever-changing research landscape and clinical environment (both for the military and civilians), program staff solicit input from experts in several disciplines and across the Service branches. The MBRP Programmatic Panel, composed of representatives from the military services, other government entities, and clinical practice, regularly assess the current research environment related to the short- and long-term care of military burn patients, and also discuss emerging technological developments in the field. In addition to non-DoD research efforts as noted above, the Program routinely monitors research initiatives and outcomes of DOD-supported projects by the Combat Casualty Care Research Program (CCCRP/JPC-6), Armed Forces Institute of Regenerative Medicine (AFIRM), Biomedical Advanced Research and Development Authority (BARDA), Infectious Disease Clinical Research Program (IDCRP), and many others. This strategic assessment of the research environment allows the MBRP to coordinate research funding and priorities across organizations, eliminate research duplication, and ensure that efforts are complimentary in order to best address knowledge and capability gaps.

The military burn field has benefitted from many successes, however, many challenges still exist that drive the research funded by the Program. Key challenges in military medicine as it relates to the burn care include advanced wound healing technologies that significantly minimize scarring, improved burn care at the point of injury, development of temperature management technologies in acute care, advances in resuscitation, organ support, anti-microbial protections, and many others. The research field's ability to address these challenges has a direct impact on the readiness of the US military, the rehabilitation and reintegration of our Veterans, and the clinical care of patients in the general public.

## STRATEGIC GOALS AND PRIORITIES

MBRP Programmatic Panel members worked collaboratively to identify unanswered research questions in the burn field in order to develop a multi-year strategic investment plan for the Program that aligns with the vision, mission, and congressional intent of the MBRP. This strategic plan provides a framework under which the short- and long-term investments will be made, contingent upon the availability of future appropriations. The Programmatic Panel will revisit the plan annually to review the state of the science, military priorities, and clinical needs; ensure that the topic areas and capability gaps are still relevant; and refine the plan as necessary.

The MBRP established four priorities around which it will build its funding efforts in the next 5+ years:

- Development of interventions or therapies that can help, accelerate, or optimize wound healing.
- Development or refinement of interventions or technologies that will enable non-burn specialists, such as a field medic/corpsman/paramedic, to provide good burn care closer to the point of injury allowing for better long-term outcomes.
- Development of therapeutic interventions that can help treat debilitating scars and prevent contractures.
- Advancement of standard of care practices through conduct of high impact clinical trials.

Future priorities of the MBRP include research topics that are contingent on the success of research and interventions being developed by others in and outside of the burn field. The MBRP will continue to monitor outcomes of these related fields in order to determine the Program's role in assessing the epidemiology of burn injuries to better identify the gaps in knowledge and care for burn patients, driving clinically focused research to assess the safety and efficacy of existing burn treatments, and supporting high impact clinical trials to advance the standard of burn care.



## INVESTMENT STRATEGY

The MBRP plans to continue its commitment in funding exploratory research, clinical studies and trials, and expansions on prior/early stage research investments via funding opportunity announcements offered by the program. To date, the MBRP has supported projects through the Burn Injuries Research Award mechanism to increase the body of knowledge and knowledge products available to professionals and practitioners in health, medical science, and related fields. In addition, the MBRP Clinical Trial Award mechanism, first offered in FY17, supports efforts to improve functional outcomes, and assess clinical efficacy and safety of different treatment modalities. These funding allocations and award mechanisms solicited by the MBRP will continue to be reflective of the types of research (basic, translational, or clinical) based on the needs of the field and the amount of funds appropriated to the program by Congress. This investment strategy will be re-evaluated and updated as necessary during the program's regular Vision Setting meeting.

## MEASURING PROGRESS

MBRP-funded research projects have provided key research insights in advancing therapies and impacting standards of practice. The Program will continue to measure its success in the short- and long-term based on its impact in the aforementioned topic areas. The number of research publications, patents, and translated products (for both commercial and field use) resultant from MBRP-funded research and their impact on standard of care practices will also be captured and will serve as a useful metric to assess progress made by the MBRP in addressing the needs of the burn care community.

**Short-term outcomes (3-5 years):** measurable by evaluating the amount of funding invested in each strategic goal and tracking contributions to the scientific and clinical community to include publications, patents, products, and clinical trials, which will vary based on the stage of the research project.

**Long-term outcomes (6+ years):** measurable through proportion of funded investigators receiving additional awards to continue successful research, production of commercialized products, and changes in standard of care (e.g., evidence supporting specific treatment recommendations), decreased case fatality rates, and quality of life.

## REFERENCES

1. *Evaluation of the Congressionally Directed Medical Research Programs Review Process*. 2016. National Academies of Sciences, Engineering, and Medicine. National Academies Press. Washington, DC
2. American Burn Association. (2016). Burn incidence and treatment in the United States: 2016. Retrieved from <http://ameriburn.org/who-we-are/media/burn-incidence-fact-sheet/>
3. Kauvar, D. S., Wade, C. E., & Baer, D. G. (2009). Burn hazards of the deployed environment in wartime: Epidemiology of noncombat burns from ongoing United States military operations. *Journal of the American College of Surgeons*, 209(4), 453e460.