



USAMRMC STRATEGIC COMMUNICATION PLAN

CLINICAL AND REHABILITATIVE MEDICINE RESEARCH PROGRAM (CRM RP)

MISSION

To implement long-term strategies to develop knowledge and materiel products to reconstruct, rehabilitate and provide definitive care for injured Service Members. Our ultimate goal is to return the Service Member to duty and restore their quality of life.

VISION

The Nation's premier medical research organization responsible for restorative care and innovations that return each injured Warfighter to full health and wellness.

BACKGROUND

During Operation Iraqi Freedom and Operation Enduring Freedom, advancements in body armor and field medical care increased survival and changed the injury profile of Service Members. Relative to previous conflicts, OIF/OEF had a higher proportion of injuries sustained to unprotected body areas, specifically the extremities (55%) and the head and neck region (30%). Many Service Members were left with complicated traumatic injuries including: traumatic brain injury, spinal cord injuries, amputations, trauma to sensory systems and severe chronic pain. These types of injuries required a change in the focus of military medical research and development programs.

The Clinical and Rehabilitative Medicine Research Program was established in 2008 to foster research and technology advances for regeneration, restoration and rehabilitation of traumatic injuries. The great successes of the Military Health System, in saving the lives of Service Members who would previously not have survived, led to a new population of Service Members with major reconstructive and

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Program emphasis is working on developing products in the areas of burn repair; compartment syndrome treatments; wound healing without scarring; limb reconstruction, regeneration, or transplantation; rehabilitation and pain management; and vision.

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rehabilitative needs. The CRMRP seeks to fill this health care gap by fostering innovative methods and technologies to care for and return these wounded Service Members to duty and help them lead productive and fulfilling lives.

The CRMRP serves a number of critical roles in the Military Health System. First, the CRMRP identifies gaps in the Military Health System's capability to provide restoration and rehabilitation of traumatic injuries. Based on the types of injuries suffered by Service Members, the CRMRP collaborates with other services, partner agencies and industry organizations to address the capability gaps by identifying and prioritizing research efforts. The CRMRP also tracks current state-of-the-art technologies, ensuring a diverse portfolio of research efforts with target focus areas that meet current medical needs. The CRMRP has four focus areas:

- **Neuromusculoskeletal Injury Rehabilitation**
 - Amputation
 - Spinal cord injuries
 - Orthopaedic injuries
 - Development of guidelines for standards of care
- **Pain Management**
 - Acute pain
 - Chronic pain
 - Establishing safety margins for pain medications
 - Developing other strategies to help patients cope with pain
 - Managing pain medication addiction
- **Regenerative Medicine**
 - Regeneration of damaged or missing tissues:
Muscle, vasculature, nerves, skin, bone
 - Hand and face transplants
- **Sensory System Traumatic Injury Restoration and Rehabilitation**
 - Visual dysfunction
 - Auditory dysfunction
 - Vestibular (balance) dysfunction

KEY THEMES AND MESSAGES

The CRMRP plans, coordinates, and monitors a research and development program, which focuses on developing definitive and rehabilitative care to provide the best medical solutions and latest technologies to wounded warriors.

The CRMRP manages a core research program conducted internally at DOD labs and medical centers and externally by organizations such as universities and industry partners.

The CRMRP coordinates efforts with the National Institutes of Health (NIH) and the Department of Veterans Affairs (VA). These efforts include AFIRM as well as advanced prosthetics research.



QUESTIONS & ANSWERS

Q *What are the CRM RP's chief accomplishments?*

A The CRM RP has funded many research efforts, to include the Armed Forces Institute of Regenerative Medicine. The efforts in the AFIRM have resulted in six face transplants and 10 hand transplants, as well as the initiation of multiple clinical trials in the field of regenerative medicine (Regenerative Medicine Portfolio). Additionally, the CRM RP funded research resulting in 10 commercially available products; four state-of-the-art prosthetics, a prosthetic pylon and a pattern recognition device that enhances control of upper extremity prostheses (Neuromusculoskeletal Injury Rehabilitation Portfolio); an epidermal harvesting system for healthy skin grafts for wound/burn sites and a scar reduction treatment (Regenerative Medicine Portfolio); and a non-surgical device for vision impairment that translates digital information into electrical stimulation for object identification (Sensory System Traumatic Injury Restoration and Rehabilitation Portfolio).

Q *What drives research objectives for the CRM RP?*

A The CRM RP's research objectives are driven by:

- Leadership through documented Capability-Based Assessment
- Secretary of Defense Priorities
- Health Service Delivery: Concept of Operations Capabilities
- Prioritized Clinical Gaps developed annually by Scientific Working Groups composed of:
 - Subject matter experts, researchers and clinicians from: Military Services (Air force, Army and Navy) and Governmental Agencies (NIH, VA, DOD Center of Excellence)
 - Members of other headquarters' research directorates and divisions

Q *What are some of the clinical gaps identified by the CRM RP not filled by current technologies and methodologies?*

A Gaps are identified for each of the CRM RP's focus areas. Listed below is a summation for each area. For more information on the clinical gaps, please see the CRM RP website: <https://crrmp.amedd.army.mil/>.

- Inability to optimally rehabilitate neuromusculoskeletal injuries to provide optimal function, reintegration and quality of life (Neuromusculoskeletal Injuries)
- Inadequate pain management strategies to diagnose, prevent and alleviate pain ranging from point-of-injury to chronic pain, while minimizing unwanted sequelae (Pain Management)



- Inability to either adequately regenerate tissue lost due to traumatic injury or to integrate artificial tissue replacements including bone, muscle, nerves, skin and vasculature (Regenerative Medicine)
- Inability to adequately restore and/or rehabilitate hearing, vision and balance after traumatic injury (Sensory Systems)

Q *What products is CRM RP-sponsored research currently developing?*

A The CRM RP anticipates development of products in the following areas:

- **Pain Management:**
 - New drugs, technologies and improved strategies for managing acute and chronic pain while reducing negative sequelae caused by pain medications
- **Burns:**
 - Engineered, off-the-shelf skin replacements
 - Biologic agents that reduce the progressive damage caused by severe burns
 - Skin graft harvesting technologies and techniques that reduce the pain and limitations of current standards of care
- **Scarring:**
 - Reducing functional detriments associated with severe scarring and contraction
 - Improving cosmetic appearance
- **Traumatic Limb and Tissue Loss:**
 - Building on advancements in neural interfaces, nanotechnology and prosthetic design to improve foot and knee prosthetics, control and tactile feedback
 - Applying neural interfaces to limb prosthetics
 - Engineered, off-the-shelf tissue scaffolds for rebuilding lost muscle and bone
- **Face/Hand/Organ Transplantation:**
 - Improving drugs and protocols to minimize transplant rejection
- **Rehabilitation:**
 - Developing exercise and fitness systems and strategies for amputee and neuromusculoskeletal injury rehabilitation
- **Sensory Systems:**
 - Improving methods for diagnosing and treating sensory injuries
 - Developing rehabilitative strategies and treatments of sensory dysfunctions due to TBI or other traumatic injuries
 - Developing retinal and prosthetic devices to restore vision



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Q *Does the CRM RP and its partners abide by animal use guidelines in its research?*

A All animal research is conducted in accordance with the Animal Welfare Act Regulations, DOD Instruction 3216.01, and procedures described in the Guide for the Care and Use of laboratory Animals. All intramural facilities are fully accredited by the Association for Assessment and Accreditation of Laboratory Animal Care International. Extramural facilities are not required to be AAALAC accredited, but in the absence of accreditation, they are required to either hold a Public Health Service Assurance or provide written assurance that all DOD-sponsored animal studies will be conducted in accordance with the guide, which is the basis for AAALAC accreditation.

Q *Do civilians or military personnel participate as subjects in the CRM RP's research?*

A Yes, human subjects participate in CRM RP-sponsored research projects. The CRM RP coordinates all human subject research through the U.S. Army Medical Research and Materiel Command's Office of Research Protections and the Human Research Protection Office to ensure that all conducted, contracted, sponsored, supported or managed research involving human subjects or human anatomical substances are conducted in accordance with federal, DOD, Army, USAMRMC and international regulatory requirements.

Q *What organizations does the CRM RP collaborate with?*

A The CRM RP partners with DOD laboratories and medical centers, DOD Congressional Special Interest Programs, the DOD Hearing Center of Excellence, the DOD Vision Center of Excellence, the DOD-VA Extremity Trauma & Amputation Center of Excellence, the Defense and Veterans Center for Integrative Pain Medicine, the National Institutes of Health, the Defense Advanced Research Projects Agency, the Veterans Administration and the AFIRM (including 30 different academic and industry partners).

Q *How do the programs at the NIH and the VA work in coordination with this program?*

A In addition to being stakeholders in and providing funding for the AFIRM, the VA is also heavily involved in the CRM RP prosthetics and amputee rehabilitation research efforts. Both the VA and NIH provide representatives to serve on the CRM RP's advisory boards, Scientific Working Groups and Program Announcement Review Panels.

Q *Does CRM RP-sponsored research involve the use of stem cells?*

A The CRM RP does fund research that uses adult stem cells derived from a variety of tissues, as well as stem cells recovered from amniotic fluid and umbilical cords.



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Q *Is the CRM RP's research transparent or publically available?*

A Research efforts funded through the AFIRM can be viewed at: www.afirm.mil. Information regarding other CRM RP-sponsored research efforts can be viewed at: <https://crrmp.amedd.army.mil/>.

Q *Where does the CRM RP receive its funding?*

A Historically, the CRM RP's research funding was provided through the U.S. Army and the Defense Health Program. Currently, the majority of the CRM RP's funding is provided through DOD Congressional Special Interest Programs.

Q *What is on the horizon for the CRM RP?*

A The CRM RP will continue to focus on research to restore Wounded Warriors to full function. Additional emphasis will be placed on neuromuscular injuries, advancing pain management, regenerative medicine and restoring vision, hearing and balance.