

Research to Improve the  
Lives of Veterans Who Served  
in Afghanistan & Iraq



DISCOVERY — INNOVATION — ADVANCEMENT

## AFGHANISTAN & IRAQ

VA's Research and Development program has a comprehensive research agenda to address the deployment-related health issues of the newest generation of veterans—those returning from Operation Enduring Freedom and Operation Iraqi Freedom (OEF/OIF).



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## A Message to Our Veterans



## Research Agenda

VA's Office of Research and Development has a comprehensive research agenda to address the deployment-related health issues of the newest generation of veterans—those returning from Operation Enduring Freedom and Operation Iraqi Freedom (OEF/OIF). VA researchers are working to develop new treatments and tools for clinicians to ease the physical and psychological pain of returning soldiers, improve access to health care services, and accelerate discoveries of new and innovative ways to evaluate and treat OEF/OIF veterans' needs.

This research will also benefit veterans of other military conflicts and improve the lives of civilians suffering from disability due to injury or disease. In addition, the VA Office of Research and Development works collaboratively with other organizations, such as the Department of Defense (DoD) and the National Institutes of Health (NIH), to advance research aimed at improving the health and care of all generations of veterans.

As the largest integrated health care system in the country, the Veterans Health Administration (VHA), part of the Department of Veterans Affairs (VA), provides health care to more than five million veterans each year.

VA is committed to providing the best care possible to all veterans, including our newest generation of veterans – the men and women returning from combat in Afghanistan and Iraq.

VA's Office of Research and Development is honored to support these efforts through cutting-edge research aimed at improving the health and quality of life of our nation's veterans. Many of the brave men and women who served and were injured in Operation Enduring Freedom and Operation Iraqi Freedom (OEF/OIF) are returning home with complex medical conditions such as traumatic brain injury (TBI), limb amputations, and burns. Furthermore, due to improved body armor and exceptional medical care provided on the battlefield, many soldiers are surviving major blast-related injuries and will require long-term, specialized care here at home. For some of the new veterans, readjustment to civilian life and mental health challenges such as post-traumatic stress disorder (PTSD) and depression may be critical issues.

VA's Office of Research and Development is dedicated to conducting research that will advance the care for all veterans. The urgent health care needs of our military returning from conflicts in Afghanistan and Iraq are a top research priority. This booklet provides an overview of deployment-related health issues and highlights research advances that improve the health care of returning OEF/OIF veterans.

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## Collaborations

In an effort to provide the highest quality and most cost-effective specialized care for returning OEF/OIF service members, VA Research and Development collaborates with other programs within the Veterans Health Administration and with other federal agencies, including DoD and NIH.

**Below are just a few examples of collaborative work.**

- VA researchers are collaborating with clinical staff at the four regional VA Polytrauma Rehabilitation Centers, which provide specialized rehabilitation treatment, to expand clinical expertise in polytrauma and blast-related injuries throughout VA and between VA and DoD. Research projects include evaluation of a pain assessment tool and work to improve family support and provider-family communication during an injured service member's stay in the Polytrauma Rehabilitation Center.
- DoD, NIH, and VA researchers are collaborating to develop a family intervention program with spouses of service members being treated for traumatic limb loss or traumatic brain injury. This project was designed to teach spouses techniques in alternative and complementary medicine that have been shown to lessen anxiety and pain levels and allow for reduced use of pain medication.
- VA, in collaboration with the National Institute of Mental Health and DoD, issued a call for collaborative research focusing on combat-related mental disorders and stress reactions involving active-duty or recently separated National Guard and Reserve troops from OEF/OIF. Funding has begun for projects to screen, assess, and provide direct care (that is, early intervention, prevention, treatment, rehabilitation, and maintenance) to groups and individuals who are at risk because of their combat exposures or who have been diagnosed with PTSD.
- DoD-VA projects will examine the short- and long-term benefits of advanced regional anesthesia techniques for pain control following combat-related traumatic injuries to extremities. This research could result in a significant reduction in pain and disability. Moreover, early pain intervention on the battlefield could reduce the incidence and severity of associated mental health disorders.

VA's Research and Development program will continue to discover new knowledge and create innovations that will advance the health and care of veterans and the nation.

# Our New Generation of Veterans



## Polytrauma

Many of the wounded soldiers returning from the OEF/OIF conflicts are victims of car bombs or improvised explosive devices (IEDs) that cause severe injuries to several parts of the body. These multiple complex injuries are called polytrauma. Polytrauma can include injuries to internal organs, limb loss, vision loss, hearing loss, paralysis, chronic pain, burns, and psychological disorders.

**To help address these critical needs, VA researchers are working to:**

- Improve coordination of care for veterans with multiple injuries.
- Identify subtle indicators of potentially significant problems caused by head trauma, such as disordered perception and judgment.
- Repair the injured brain, spinal cord, and other organs, and protect them from further damage.
- Advance technologies such as hearing and vision implants and computerized or robotic prostheses.
- Develop strategies that will reduce the burden for family members of injured veterans.

## Mental Health

VA researchers developed a screening tool for depression for use in primary care settings. The tool has been adopted in other healthcare systems in the U.S. and in the United Kingdom.

JAMA. 2006;295(24):2874-2881.



Military personnel face many psychological challenges during their tours of duty that can make it difficult to readjust to life back home. As many as one in three soldiers may seek or need mental health care after returning from duty in Afghanistan or Iraq. Soldiers may experience symptoms of psychological distress, "readjustment disorders," or more serious problems such as post-traumatic stress disorder (PTSD). Depression and anxiety are fairly common, and returning soldiers, especially younger veterans, may turn to alcohol or drugs in an attempt to deal with their psychological distress. Use of alcohol or drugs can exacerbate these mental and emotional disorders.

**VA researchers are working to improve mental health care by:**

- Developing methods to screen for mental health problems because early recognition and treatment results in better patient outcomes.
- Leading the way in conducting studies on both drug and psychosocial/behavioral therapies.
- Studying treatment for women veterans, who may experience trauma differently than male veterans.

## Post-Traumatic Stress Disorder

VA researchers have found that prazosin, an inexpensive generic drug already used by millions of Americans for high blood pressure and prostate problems, improves sleep and reduces nightmares for veterans with PTSD. A larger trial to confirm the drug's effectiveness is underway.

Biological Psychiatry. 2007; 1(8):929-934.

PTSD is a special form of anxiety disorder that may occur after a person experiences or witnesses a traumatic event, such as military combat, natural disasters, serious accidents, or physical or sexual assault. Many soldiers diagnosed with PTSD respond well to standard treatment, but others do not. Research is critical to better understand this disorder so that effective preventive strategies and treatments are developed and available for everyone.



#### Some key research questions include:

- What determines which individuals will develop PTSD?
- How can we correctly identify those at risk for PTSD and determine the most effective interventions?
- Can we identify biological markers that might help guide psychological evaluation, treatment selection, and outcomes?

#### To help answer these critical questions, VA researchers are:

- Testing whether computer-simulated, “virtual reality” combat environments can enhance the effectiveness of prolonged exposure therapy.
- Developing new ways to provide care to veterans living far from VA medical facilities, such as the delivery of health information and services via telephone, the Internet, and videoconferencing.
- Striving to ensure that evidence-based, state-of-the-art care is available to all veterans with PTSD by quickly moving scientific breakthroughs from the laboratory into patient care.

## Traumatic Brain Injury

VA researchers demonstrated that the intravenous infusion of bone marrow stem cells taken from adults can protect against brain trauma. This has major implications for an early intervention in veterans with brain trauma and spinal cord injury.

*Neuroscience*. 2005; 136(1):161-8.

Traumatic brain injury (TBI) is a general diagnosis covering a wide range of injuries to the brain that can occur during combat. These injuries can result in physical symptoms such as vision impairment, dizziness, and headache, as well as cognitive and emotional problems such as memory impairment, inattention, poor judgment, anxiety, and depression. VA investigators are conducting cutting-edge research to help return maximum function to veterans with TBI.

#### Important areas that VA researchers are investigating include:

- Developing and testing comprehensive rehabilitation strategies.
- Searching for ways to improve memory and attention and protect brain cells from injury.
- Testing new drugs for treating traumatic brain injuries.
- Helping veterans with TBI to regain a measure of independence—for example, by using a driving simulator to evaluate veterans’ driving ability or provide driver retraining.

## Spinal Cord Injury

A neuromotor prosthesis (NMP) is a brain-computer interface that helps replace or restore lost movement in paralyzed patients. The technology uses a miniaturized array of electrodes that pick up brain signals and sends them to a computer for decoding. VA researchers and others recently demonstrated that an NMP could enable a paralyzed patient to operate an artificial hand, robotic arm, computer, or television by using only his thoughts.

*Nature*. 2006; 442(7099):164-171.

VA has the largest network of care for spinal cord injury (SCI) in the nation and provides primary and specialty care at 23 regional SCI centers. VA leads the health care profession in

defining new methods of rehabilitation through SCI research and engineering. For example, VA researchers identified a molecular basis for “phantom pain,” a phenomenon in which patients experience the sensation of pain in a limb that has lost all feeling, as in SCI, or in a limb that is no longer there, as in amputation. This discovery has enabled a better understanding of phantom pain and may eventually lead to new methods of pain relief.





**Currently, VA researchers are conducting important SCI studies that are:**

- Testing tiny stimulators implanted into breathing muscles of veterans with SCI that will help avoid respiratory complications, the leading cause of death in SCI patients.
- Developing systems that deliver low-level, computer-controlled electric current to the muscles, which may allow individuals with incomplete SCI to once again walk and maneuver in their environments.
- Developing new pain treatments.

## Amputation and Prosthetics

Currently available prostheses for transtibial (below the knee) amputees do not help promote normal walking; in fact, their “passive” design can result in balance difficulties and slow walking. A team partly funded by VA has addressed this problem by developing a powered ankle-foot prosthesis that promises to help restore amputees’ ability to walk normally. A preliminary study involving three transtibial amputees confirmed the benefits of the new prototype: the patients expended less energy during walking, had fewer balance problems, and walked 15 percent faster.

Approximately 6 percent of wounded soldiers returning from Iraq are amputees. The number of veterans accessing VA health care for prosthetics, sensory aids, and related services has increased by more than 70 percent since 2000. VA’s Research and Development program currently supports a broad research portfolio related to amputation and prosthetics.

**VA researchers are:**

- Implementing cutting-edge technology using microelectronics and microchips (very small electronic components), as well as robotics, to create lighter, more functional prostheses that look, feel, and respond more like real arms and legs.

- Collaborating with Brown University and the Massachusetts Institute of Technology to develop a “biohybrid” limb that will combine regenerated tissue, lengthened bone, implanted sensors to allow the limb to be controlled by the user’s brain signals, and new anchoring techniques to reduce the discomfort associated with current prostheses.
- Partnering with the Department of Defense (DoD) to improve prosthetic designs, define standards of function, and conduct outcome studies.

## Burns

Many burn injuries result in the loss of fingers and thumb. VA researchers are developing a state-of-the-art prosthetic for people who still have a wrist but have lost their fingers and thumb due to burns or other injuries.

US Medicine. June 2006. [www.usmedicine.com](http://www.usmedicine.com)

Severe burns cause excruciating pain and debilitation. VA is further expanding its research focus on burn injury to advance knowledge in this area of growing importance.

**VA researchers are:**

- Exploring new approaches to pain treatment that will help veterans continue rehabilitation and achieve maximum restored function.
- Working on a five-finger prosthesis to help restore function to those who have lost fingers as a result of severe burns.
- Working on the jointly outlined VA and DoD research agenda on burns to address priority areas such as managing burn scar contractures (tightening of muscle, tendons, ligaments, or skin that prevents normal movement), fostering successful psychological adjustment, and establishing reliable outcome measures to guide clinical care.



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