

**This booklet contains fact sheets on the following areas of research within the Department of Veterans Affairs Research and Development program:**

- Cancer Research at VA
- Cardiovascular Disease Research at VA
- Diabetes Research at VA
- VA Research to Achieve Equitable Care for Veterans
- Hearing Loss Research at VA
- Pain Management Research at VA
- Parkinson's Disease Research at VA
- VA Research to Restore Veterans' Abilities
- Posttraumatic Stress Disorder (PTSD) Research at VA
- Spinal Cord Injury (SCI) Research at VA
- Traumatic Brain Injury (TBI) Research at VA
- Vision Research at VA
- Women's Health Research at VA

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The Department of Veterans Affairs (VA) research program supports improved methods of diagnosing and treating cancer that have directly improved the lives of Veterans and other Americans with the disease.

VA Research is uniquely capable of studying cancer because of the program's position within an exceptional national integrated health care system for Veterans with a state-of-the-art system of electronic medical records. The special opportunity to conduct research in addition to providing patient care attracts highly qualified experts to VA, strengthening the Department's ability to simultaneously conduct leading-edge research and provide top-notch patient care.

One of VA's research objectives in treating cancer is to improve the ability to diagnose colon cancer, which affects about 150,000 Americans each year. Colon cancer can be cured if diagnosed early, yet one-third of patients who develop colon cancer will die from the disease.

An innovative study at the VA Palo Alto (Calif.) Health Care System has contributed significantly to the understanding of colon cancer and its ability to be detected through colonoscopy. Traditionally, doctors have searched for potentially cancerous polyps—abnormal growths that protrude from the lining of the colon. However, the VA study suggests that difficult-to-detect *flat* abnormal growths are more common in U.S. patients than previously thought and are much more likely to be cancerous than are polyps.

“These flat lesions were thought to only be an Asian-Japanese phenomenon,” says Tonya Kaltenbach, MD, a physician-researcher at Palo Alto. “We wanted to know if this same flat lesion exists in the American population.” About 10 percent of patients in their VA population had the growths, the investigators found.

The Palo Alto researchers collaborated on the study with many groups outside of VA—most notably, a group of doctors at the National Cancer Center in Japan, who taught the VA team techniques used to detect flat growths.

In another important VA cancer study, researchers at the Miami VA Medical Center, led by Nobel Laureate Andrew Schally, PhD, are developing therapies for endocrine cancers they hope will replace existing chemotherapies.

Other important VA cancer studies include:

- Studies exploring the cancer-fighting potential of natural compounds such as crocetin, which is derived from the spice saffron, and antioxidants called proanthocyanidins.
- Testing an experimental immunotherapy against prostate cancer, which introduces a gene for prostate-specific antigen (PSA) into the body and triggers the immune system to kill prostate cancer cells.
- Learning that physicians rarely responded empathetically to lung cancer patients' concerns about mortality, symptoms, or treatment options.

Cancer research throughout the VA system has benefited thousands of patients. One is Aaron Bruchard, a Veteran who served in the Army from 1954 to 1958 and joined a VA prostate cancer study after learning in 2005 that he had an advanced stage of the disease. “It gives me hope that I’m going to live longer,” he said. For more information on how VA research is improving Veterans’ lives, go to [www.research.va.gov](http://www.research.va.gov).



*Discovery and Collaboration for Exceptional Health Care*

Cardiovascular disease, which describes conditions ranging from high blood pressure to heart attacks and strokes, is the number one killer of Americans and the leading cause of hospitalization in the VA health care system.

Department of Veterans Affairs (VA) researchers in the field of cardiovascular disease are conducting groundbreaking studies ranging from lab experiments of heart disease to large, multisite clinical trials involving thousands of patients. Investigators evaluate existing treatments for cardiovascular diseases and develop new ones, while also probing the conditions' genetic and lifestyle causes.

Among VA's notable recent research efforts in this field is a study demonstrating that patients can effectively monitor themselves for the effects of the anti-clotting drug warfarin. Another study demonstrated that even low doses of a natural antioxidant called resveratrol, found in grape skins, preserved the heart and musculoskeletal system of middle-aged mice.

VA is also developing an innovative prosthetic graft, for use after certain kinds of heart surgery, which releases the body chemical nitric oxide to promote healthy blood vessels and improve post-surgery healing.

For those who have had a stroke—a condition that can affect movement, speech, vision, and other functions and is the number one cause of disability among Veterans as well as Americans generally—VA researchers are developing new rehabilitation methods.

“My team is mainly looking at the phase after the acute treatment of stroke,” says George Wittenberg, MD, PhD, a neurologist-researcher with the Baltimore VA Medical Center. “We hope to get people to move better, to be more mobile, and in general to be in better health with a higher quality of life.”

In another Baltimore VA study, MIT-designed robots allow patients to regain function by assisting only as much as needed while patients repeat stroke-impaired movements. Before he participated in this type of VA robot study, Veteran Alan Wright's hand was fixed in a clenched position and his fingers tired quickly from any movement. Now, Wright says, “I can move them and move them and move them and no problem.”

Treadmills, like robots, are a critical rehabilitative tool used to better Veterans' lives after stroke. In six months on the treadmill, aerobic exercise helped stroke patients increase their walking speed by about 30 percent and improve their cardiovascular fitness by up to 40 percent, according to Richard Macko, MD, a neurologist-researcher who heads the Maryland Exercise and Robotics Center of Excellence at the Baltimore VA Medical Center.

Says David Evans, a Veteran who participated in a VA treadmill study after having a stroke, "It helped me a lot. I've got most of my mobility back." Of the program that helped him reclaim his independence, Evans adds, "When I got to the point where I needed some help, VA's hand was out. They helped me get back to where I am today."

Finally, a study of 127 veterans at four VA sites found that repetitive, guided movement can result in improvement in stroke patients even years after the event. Both robots and therapists were able to improve movement, everyday function, and quality of life for study patients who received specific therapy for their stroke-damaged limbs.

For more information on how VA research is improving Veterans' lives, go to [www.research.va.gov](http://www.research.va.gov).



Group visits, telemedicine, peer counseling, and Internet-based education and case management are among the innovative strategies Department of Veterans Affairs (VA) researchers are studying to increase access to care and improve the health outcomes of Veterans and others with diabetes.

VA researchers are seeking better ways to prevent and treat diabetes, especially in special populations including the elderly, minorities, those with amputations or spinal cord injuries, and those with kidney or heart disease.

Diabetes is a serious chronic disease in which the body cannot produce or properly use insulin. The disease affects about 16 million Americans, including more than 800,000 Veterans receiving care from VA.

Much of VA's research focuses on controlling the risk of cardiovascular disease in patients with type 2 diabetes, which is by far the most common type. For example, researchers at the Atlanta VA Medical Center are working to stave off progression of the condition before it reaches a full-blown stage. "I think (this project has) extended my life," says Veteran Roger Parton, a participant in this research study.

In another important area of diabetes-related study—vision health—VA and its research partners have demonstrated that Veterans could be accurately tested for an eye disease called diabetic retinopathy using a method not requiring eye dilation. This new, efficient, and accurate eye test is helping reduce the risk of blindness in Veterans with diabetes throughout VA's health care system and the program is now being expanded to evaluate some other important causes of vision loss.

In yet another study that changed the face of diabetes care, researchers at the Miami VA Medical Center looked at whether glucose control affected the rate of cardiovascular disease in those with the disease. This seven-year trial found little reduction in the risk of stroke, heart attack, and other cardiovascular complications, compared with standard treatment. In light of the results of this study and others, major health organizations such as the American Diabetes Association issued new treatment guidance for doctors and patients.

Additional recent advances in VA diabetes research include:

- Promising studies on the connection between insulin resistance—the hallmark of type 2 diabetes—and Alzheimer's disease.

- A determination that, in some people, chromosome 12p is a likely site of genes associated with high triglycerides (a condition closely linked to diabetes, as well as obesity and heart disease).
- Studies finding that walking on a treadmill can prevent and even reverse diabetes in chronic stroke patients.

“This kind of diabetes research is advancing the type of care we’re able to give Veterans,” notes Jennifer Marks, MD, chief of endocrinology at the Miami VA Medical Center and the VA Diabetes Trial’s principal investigator. “The care we provide gets better because of research.” For additional information on diabetes for Veterans, their families, and providers, go to [www1.va.gov/diabetes](http://www1.va.gov/diabetes). For more information on how VA research is improving Veterans’ lives, go to [www.research.va.gov](http://www.research.va.gov).





*Discovery and Collaboration for Exceptional Health Care*

Are different groups of people treated equally by their health care providers? The Department of Veterans Affairs (VA) Office of Research and Development works to answer this question for the 7.8 million Veterans currently enrolled to receive VA health care. In addition, the Office attempts to determine why any discrepancies in care exist, and to achieve equity in health care access and outcomes for all VA patients.

“Our enduring commitment is to provide equitable health care and achieve the best health outcomes possible for all the Veterans we serve,” says Joel Kupersmith, MD, VA’s Chief Research and Development Officer. VA’s commitment to achieving equity in health and care applies to all traditionally underserved populations— including racial and ethnic minorities and also rural and homeless Veterans.

For Veterans living in rural settings, for example, VA has developed a robust telehealth program that provides health services using technologies such as the telephone, Internet, videoconferencing, e-mail, text messaging, and digital photography.

“Our studies of telehealth methods provide treatment that is accessible to all groups,” says Leonard Egede, MD, director of VA’s Center for Disease Prevention and Health Interventions for Diverse Populations at the Charleston (S.C.) VA Medical Center. Albert Dean, a Veteran who received treatment for depression through a VA telehealth program, says, “Being part of a study has helped me tremendously.”

VA Research recently completed a study of the use of health care services among American Indian and Alaska Native women who served in the military and are eligible for health care from both the Veterans Health Administration (VHA) and the Indian Health Service (IHS). The two systems have developed specialized and complementary expertise, the authors concluded, with VHA supplementing the IHS care provided to these Veterans.

Another series of studies, conducted at the Center for Health Equity Research and Promotion (CHERP), a program based at the Philadelphia VA Medical Center, have been looking at incentive-based programs for weight loss.

“Trying to improve weight among Veterans is a very important health priority,” says CHERP researcher Kevin Volpp, MD, PhD, who points out that 71 percent of Americans are overweight or obese, and that obesity is associated with higher rates of heart disease, diabetes, osteoarthritis, pain problems, and high blood pressure.

Veteran Carolyn Rice participated in a CHERP weight loss study with a “deposit incentive.” Participants paid in between \$1 and \$3 a day—they doubled their money if they lost a goal amount of weight, forfeited the money if they didn’t. “I’ve lost weight and when you lose weight, it makes you feel better,” she says.

In the longer term, the goals of the CHERP weight loss studies are to develop sustainable approaches for reducing the rate of obesity and smoking among Veterans. “If we’re able to do that, it will have a huge impact on the health of the Veterans we serve,” Volpp says.

VA’s research in care discrepancies extends to many additional topics including joint replacement, osteoarthritis management, diabetes control, hepatitis C treatment, pain management, and end-of-life care. Whatever topic is being studied, however, the goal is the same: ensuring that care in the VA system is invariably top-notch. For more information about VA health care, go to <http://www1.va.gov/health>. For more information about how VA improving Veterans’ lives, go to [www.research.va.gov](http://www.research.va.gov).



*Discovery and Collaboration for Exceptional Health Care*

Hearing loss affects some 28 million Americans and is the number one service-connected disability in the Department of Veterans Affairs (VA) health care system. Tinnitus is a potentially debilitating condition that often accompanies hearing loss and involves ringing, whistling, or other noises in the ears.

VA researchers, engineers, and clinicians are studying ways to prevent, diagnose, and treat hearing loss, and are addressing a wide range of technological, medical, rehabilitative, and social issues associated with tinnitus.

VA has established a designated Center of Excellence for these issues, the National Center for Rehabilitative Auditory Research (NCRAR) in Portland, Ore. At this center, researchers focus their attention exclusively on hearing loss and associated conditions. The program often collaborates on studies with universities, private industry, foundations, and the Department of Defense.

VA researchers are starting to learn the varied effects of exposure to a blast, a common cause of hearing loss in Veterans that can result in brain-based hearing loss even when there is no obvious injury. A blast can compromise not only the ear itself, but also the ear-brain connection.

At the NCRAR, investigators work to improve this connection by re-teaching the brains of affected Veterans to hear. The researchers can test the ear-brain connection with a device called an “anechoic chamber,” which creates a pure environment for testing hearing, as well as with brain imaging and other techniques.

VA researchers are also evaluating changes in the ear's cochlea that precede the onset of permanent noise-induced hearing loss. Such early detection could allow doctors and patients to take precautionary steps to avoid actual hearing loss.

To help Veterans with tinnitus, VA researchers are comparing different treatments in order to develop a comprehensive program to manage the condition. One such treatment involves the use of a special hearing aid that generates low-level white noise.

Research participant Linda Howell summarizes the importance of these studies; “If people like me don’t do the research studies, then we can’t have improvement. Once people

are not able to hear, communication's gone.” For more information on how VA research is improving Veterans' lives, go to [www.research.va.gov](http://www.research.va.gov).



*Discovery and Collaboration for Exceptional Health Care*

Pain is one of the most common reasons Americans consult a physician, and it is cited as the most common symptom in U.S. servicemembers returning from combat. The Department of Veterans Affairs (VA) is developing powerful new approaches to alleviate Veterans' pain, which may result from spinal cord injury, burns, amputations, traumatic brain injury, cancer, arthritis, or other conditions. VA's pain management program, which has existed for more than three decades, is a leader in pain research and care.

"Pain is a multidimensional problem," says Robert Kerns, PhD, VA's National Program Director for Pain Management. "For most Veterans, pain is the proverbial tip of the iceberg. Our research is designed to better address not only their pain, but to help them improve their functioning and overall quality of life."

VA's pain research program covers a remarkably wide range of topics, from drug discovery to alternative treatments to the impact of pain on daily function and quality of life. In three studies that represent VA's diverse research approaches on this issue, one VA research team has looked at whether yoga can help in pain reduction; another team is testing a high-tech approach for delivering a pain-relieving gene to the nervous system; and a third is examining changes at the cellular and molecular levels for clues about what causes pain and how to treat it.

At the West Haven (Conn.) VA Medical Center, where Dr. Kerns' center is located, researchers are working on novel pain coping strategies. Dr. James Bosco is a Veteran who participated in a VA research study for the pain he experienced after a car accident. When asked about his level of pain before joining the study, Bosco recalls telling his VA doctor: "I don't care if I live or die—that's how bad it is."

In the study, which focused on patients with chronic low back pain and other muscular-skeletal pain conditions, Bosco learned how to help manage his own pain by refocusing his thoughts. Such psychological interventions can play an important role in the management of some types of pain, says Kerns, whose team's pain care models have had a major impact on pain management worldwide. "I think we've had a significant impact in VA, at other hospitals in the United States, and even internationally," he says.

Of the program in which he participated, Bosco says, “I think it’s changed my life.” For Veterans in pain who are unable to attend VA facilities—because they live in rural areas or for another reason—Kerns and his team are evaluating innovative treatment models, including Internet-based treatments, to offer help to all Veterans who need it.

Other VA researchers are focusing on:

- *Transcranial magnetic stimulation (TMS)*. Researchers are analyzing past studies to determine the effectiveness of TMS in treating various kinds of pain.
- *Pain assessment in primary care*. Investigators have developed a new tool for improved pain assessment, which asks patients to rate their pain intensity and the degree to which pain interferes with their lives.

Clinicians, health care administrators, and researchers interested in VA’s pain management program should visit VA’s pain management site at [www1.va.gov/Pain\\_Management](http://www1.va.gov/Pain_Management). For more information on how VA research is improving Veterans’ lives, go to [www.va.gov/research](http://www.va.gov/research).



*Discovery and Collaboration for Exceptional Health Care*

The Department of Veterans Affairs (VA) treats at least 40,000 Veterans each year who have Parkinson's disease, a debilitating central nervous system disorder that can cause muscle rigidity, delayed movement, poor balance, and tremors.

At six Centers of Excellence around the nation, VA's world-class researchers focus exclusively on Parkinson's disease, and integrate their findings into patient care. Today, VA investigators are learning about the biochemical pathways involving dopamine—a brain chemical associated with Parkinson's disease—and are testing a variety of treatment approaches to the illness, including medication, surgery, and electrical stimulation.

"Parkinson's disease is a very physically, emotionally, and psychologically disabling disease," says Penny Hogarth, MD, an investigator with the Center of Excellence in Portland, Ore. "Anything we can do to delay its onset—or better yet, prevent its onset—would be a good thing for American Veterans and for older Americans everywhere."

Parkinson's disease forced Veteran Dr. Charles Toland to retire from his career as an obstetrician-gynecologist more than 20 years ago, when his symptoms stymied his ability to perform surgery. Toland recently participated in a multicenter VA study of an approach called deep brain stimulation, in which a pacemaker-like device sends pulses to electrodes implanted in the brain to uncover sites in the brain that might be targets for Parkinson's treatment.

VA and National Institutes of Health researchers have found that deep brain stimulation such as this is riskier than the "best medical therapy" now available with drugs, but that the procedure may hold significant benefits for patients who no longer respond well to medication alone.

Experts with VA's Parkinson's disease Centers of Excellence are constantly working from diverse perspectives on other new ways to defeat Parkinson's disease. For examples, researchers are looking at various potential drug therapies; the impact of psychiatric problems associated with Parkinson's; ways of managing "nonmotor fluctuations" such as anxiety, slow thinking, and fatigue; and the possible relationship of an impaired sense of smell to the disease.

Other examples of recent VA advances in Parkinson's disease research include:

- A protein called beta-catenin, which plays a key role in transforming precursor cells in the brain into dopamine neurons. This finding may boost the effectiveness of other therapies under development.
- The discovery that patients with Parkinson's and their health care providers who communicated by videophone for follow-up care have a high rate of satisfaction with their care.
- Learning that a group of genes that help control the body's immune response, known as the human leukocyte antigen system, may figure in the development of Parkinson's disease.

Toland credits the study in which he participated with greatly boosting his quality of life—by reducing his tremors and allowing him to sing in the church choir, for example. Toland's wife, Sharon, says, "I think there's a lot of hope for research in a disease like Parkinson's. I'm looking forward to even more research coming down the line."

For more information about VA Research's work to revolutionize Parkinson's disease care for Veterans, go to [www.parkinsons.va.gov](http://www.parkinsons.va.gov). For more information on how VA research is improving Veterans' lives, go to [www.research.va.gov](http://www.research.va.gov).





## VA Research to Restore Veterans' Abilities

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*Discovery and Collaboration for Exceptional Health Care*

Restoring injured Veterans to their greatest possible functional capacity in their families, communities, and work places is a primary mission of the Department of Veterans Affairs (VA) Office of Research and Development (ORD). For those who have lost limbs from combat traumas, or complications from diabetes, or other causes, VA researchers are designing and building lighter, more lifelike prostheses.

Today's VA researchers are using leading-edge technologies such as robotics, tissue engineering, and nanotechnology to build better prostheses for the 21<sup>st</sup> century and are studying ways to best match available prosthetic components to the needs of individual amputees.

One huge leap forward in the field of prosthetics is the launch of a three-year VA "optimization study" of an advanced prosthetic arm developed by DEKA Integrated Solutions through funding from the Defense Advanced Research Projects Agency (DARPA). This revolutionary arm is programmed with various hand grasps to allow users to perform a wide range of tasks, from picking up a key to using power tools.

Users can raise, twist, and bend the arm, and even raise it overhead, almost as they would a natural arm. The eight-pound DEKA arm also has a device called a "tactor" that sits on the user's skin and vibrates to signal the strength of the grasp.

"The DEKA arm is a high-tech example of how VA researchers are continually modernizing the materials and design of artificial limbs to meet Veterans' lifestyle and medical needs," says Joel Kupersmith, MD, VA's Chief Research and Development Officer.

Frederick Downs Jr., director of VA's Prosthetic and Sensory Aids Service who lost his left arm during combat in Vietnam, says he was "brought to tears" recently when the DEKA arm allowed him to smoothly bring a water bottle to his mouth and drink.

In the VA study, participants with upper-limb amputations will be custom-fitted with the arm, use it for two weeks, and provide feedback to guide further refinements. The optimization study is the first large-scale clinical trial to play an integral part in the final design and development of a prosthetic device.

DARPA program manager Army Col. Geoffrey Ling says, “DARPA is fulfilling our pact to our soldiers by working to develop upper body limb replacements that allow people to perform arm and hand tasks with the strength and dexterity of the natural limb.”

A modern prosthesis allows Luke Cassidy, a Veteran who lost his left foot and right toe in Operation Iraqi Freedom, to maintain his active lifestyle and a normal relationship with his young children. “I felt that I wasn’t going to be able to function and be able to do ‘dad’ things with them,” he says.

With a prosthesis matched to his needs, the Veteran can now coach softball and his mindset has changed, he says, to “Okay, I can do this.”

A futuristic tack is being taken by researchers at the Center for Restorative and Regenerative Medicine, a collaboration among VA, Brown University, and MIT. Researchers at the center are working to merge biological and nonbiological materials into high-tech “biohybrid” limbs. The effort includes investigators with expertise in orthopedics, tissue engineering, neurotechnology, prosthetic design, and rehabilitation. One Center project involves a brain-computer interface that may allow people to control devices, including artificial limbs, using only their thoughts.

But VA prosthetics research doesn’t stop at state-of-the-art limbs. Prosthetics also include wigs, eyeglasses, hearing aids, wheelchairs, GPS devices to help individuals with brain injuries become mobile, and adaptive equipment for cars and homes—“everything that’s necessary to help Veterans regain their mobility and independence,” says Downs.

For additional information on prosthetics and sensory aids at VA, go to [www.prosthetics.va.gov](http://www.prosthetics.va.gov). For more information on how VA research is improving Veterans’ lives, go to [www.research.va.gov](http://www.research.va.gov).



Posttraumatic stress disorder (PTSD) is a psychiatric condition that can affect people who have experienced life-threatening events such as combat or a personal assault. Common symptoms in those with PTSD include flashbacks, nightmares, depression, and social withdrawal, as well as physical health changes. A recent VA study suggests that about 13 percent of Veterans returning from Iraq and Afghanistan have been diagnosed with the disorder.

VA Research supports numerous studies designed to understand, treat, and prevent PTSD. These studies range from investigations of the genetic or biochemical underpinnings of the disease to evaluations of new or existing treatments, including large multisite clinical trials. The National Center for PTSD is a VA consortium of research centers focusing solely on the condition.

Some VA studies have improved Veterans' lives through psychotherapeutic approaches to treat their PTSD symptoms. In one study, VA researchers showed that prolonged exposure therapy—in which therapists help patients recall their trauma under controlled conditions—was effective in reducing PTSD symptoms in women Veterans who experienced sexual trauma in the military.

“My quality of life has improved 200-fold,” says Jennifer Olds, a Veteran of the first Gulf War who participated in the study. “The research opportunity really made a significant impact on my ability to get through life.”

To complement psychotherapeutic techniques for treating PTSD, researchers sometimes use computer-simulated “virtual reality” to recreate a Veteran’s memories of traumatic events.

“We believe this has very exciting potential to treat people very quickly and in a way that makes them less vulnerable to relapse,” explains Chris Crowe, PhD, a researcher and psychologist with the Atlanta VA Medical Center.

In addition to studying psychological and virtual reality approaches to treating PTSD, VA researchers are conducting biomedical laboratory research to understand the brain

changes associated with the condition. Investigators have identified proteins closely related with PTSD that may ultimately serve as markers to help in its prediction and prevention.

Among the many additional areas VA's PTSD researchers are focusing on are:

- *"Natural language processing" technology.* As part of a larger VA project using this technology, PTSD researchers are examining whether free text—such as notes entered by doctors, nurses, or other clinicians—can help clarify the way in which the disorder progresses and how symptoms may vary from one patient to the next.
- *Risperidone.* VA investigators are studying the clinical usefulness of the drug risperidone in Veterans with chronic PTSD who have not responded to antidepressants, which are considered the first-line drugs for PTSD treatment.
- *Links between PTSD and other diseases.* Two recent VA studies have shown links between PTSD and other medical issues. One large study showed that those with a mental health condition, especially PTSD, tend to have more physical ailments than others in their age group. A second study showed a roughly doubled link for dementia among older Veterans with PTSD.

The vital strides that VA researchers are making from these varied perspectives ultimately promise to support not only enhanced treatments for Veterans, but also for Americans in general who live through a traumatic event.

For additional information on VA and posttraumatic stress disorder, go to the National Center for PTSD website at [www.ptsd.va.gov](http://www.ptsd.va.gov). For more information on how VA research is improving Veterans' lives, go to [www.research.va.gov](http://www.research.va.gov).



The Department of Veterans Affairs (VA) operates the nation's largest network for the care of spinal cord injury (SCI). Last year, VA treated more than 25,000 Veterans with the condition. VA's research program leads all others in defining new methods of treatment and rehabilitation for Veterans with SCI, and information from VA studies ultimately could help all 250,000 Americans with spinal cord injuries.

VA researchers are studying the biological processes involved in SCI and are working on adaptive technologies to help Veterans with SCI perform daily activities. VA researchers are also working to reduce SCI-associated pain and to prevent the medical complications, such as respiratory problems, that often develop as a result of spinal cord injury.

At the Center for Neuroscience and Regeneration Research (CNRR), whose headquarters is at the West Haven, Conn., VA Medical Center, diverse aspects of SCI and its treatment are being considered, including:

- *Biological Processes in SCI.* Researchers are studying ways to restore function and treat chronic pain after spinal cord injury. Using state-of-the-art technology, they are analyzing relevant molecules in SCI to unravel the biological processes involved in spinal cord damage and to determine how that damage might heal.
- *Steroids for Acute Treatment.* Investigators are exploring whether the steroid drug oxandrolone—which has been used for decades to promote muscle regrowth in conditions that cause weight loss—is useful as an acute treatment for spinal cord injury.
- *Standardized Pain Assessment.* An international group on pain assessment in SCI, chaired by a VA investigator, recently developed a standardized measure of pain for practitioners to use to ease collaboration among medical centers worldwide.
- *Veterans' Needs.* Researchers have conducted surveys to learn about the particular needs of Veterans returning from Iraq and Afghanistan with SCI. Among the findings were that these new Veterans often had additional conditions such as traumatic brain injury, posttraumatic stress disorder, and fractures that required intensive care. In many cases, these additional conditions delayed SCI rehabilitation.

- *Satisfying Employment.* A vocational rehabilitation project helps Veterans with spinal cord injuries get—and keep—satisfying jobs. Research shows that Veterans employed after a disability “tend to be healthier and happier,” says VA psychologist and researcher Thomas Dixon.
- *Cell Transplantation.* West Haven researchers are developing imaging techniques to track the survival of transplanted cells and to show how nerve fibers grow inside live organisms. They are also testing the use of adult stem cells for spinal cord regeneration and are working to restore the waxy insulation around damaged axons (the long, spindly part of the neuron that connects with other neurons to transmit impulses from the brain.)

“We believe that the goal of a cure for spinal cord injury is now a realistic objective,” says Stephen Waxman, MD, PhD, CNRR's director and recipient of the 2009 William S. Middleton Award, VA's highest honor for biomedical research.

In the near term, patients can experience smaller successes such as moving their arms or using their hands, according to Alberto Martinez-Arizala, MD, chief of the spinal cord unit at the Miami VA Medical Center. According to Martinez-Arizala, “these gains represent a world of independence to a person with spinal cord injury.”

You can learn more about VA's efforts on behalf of Veterans with spinal cord injuries at [www.sci.va.gov](http://www.sci.va.gov). For more information on how VA research is improving Veterans' lives, go to [www.research.va.gov](http://www.research.va.gov).



*Discovery and Collaboration for Exceptional Health Care*

Nearly a million Veterans may be coping with severe visual impairment, according to a recent Department of Veterans Affairs (VA) estimate. In older Veterans, major causes of vision loss include age-related macular degeneration, glaucoma, cataracts, stroke, and diabetic retinopathy. Among the newest generation of war Veterans, blast-related brain injuries can be followed by vision problems such as blurred vision, double vision, sensitivity to light, and difficulty reading.

VA's research projects in the exciting domain of vision restoration cover the whole spectrum of Veterans' needs. In addition to developing vision-restoring treatments, VA investigators are designing and improving assistive devices for those with visual impairments and developing more accurate and efficient methods of vision testing.

“The more success we have in our research, the more likely it is that Veterans can keep their own life, do the tasks, do the hobbies that they like to do,” says Ronald Schuchard, PhD, a researcher at the Palo Alto Health Care System. “Being able to play golf, to play cards, to do the things that we all love to do in our every day lives—you don't miss them until you can't do them, and then you really miss them.”

Recently, VA vision research has included important studies of:

- *Innovative vision treatments.* For those with age-related macular degeneration or retinitis pigmentosa, VA researchers are working on retinal chips for implantation in the eye that would give Veterans enough functional vision to get around and independently accomplish everyday activities. VA researchers also have found that the antioxidant lutein improved several symptoms of age-related macular degeneration.
- *Vision and traumatic brain injury.* A study in Veterans with moderate to severe TBI and others with mild TBI looked at traumatic brain injury's association with vision problems. VA experts are also studying vision disorders in Veterans with posttraumatic stress disorder (PTSD), and in those with a combination of PTSD and mild TBI, to try and understand any associations between those issues and vision problems.
- *Cognitive impairment and rehabilitation.* A recent study suggests that, because of problems with verbal fluency and memory, older adults with macular degeneration may require special strategies for low-vision rehabilitation.

- *New Technologies to Help the Blind Navigate:* A VA-funded group of researchers associated with the Baltimore VA Medical Center and the University of Maryland is designing a computer vision system to bridge the limits, including levels of accuracy and the ability to work indoors, of the talking handheld GPS units many blind people now use to help them navigate. Eventually the system may be used for money recognition, finding lost objects, and even facial recognition.
- *Interdisciplinary team model for low vision service delivery:* The Hines VAMC in Chicago is coordinating a multi-site clinical trial for low vision Veterans that will determine if the Interdisciplinary Team Model of low vision service delivery (services provided by optometrist and low vision therapist including: low vision examination, low vision therapy to improve use of remaining vision and low vision devices, structured homework to practice use of low vision devices and provision of low vision devices) is more effective in improving their visual reading ability.

To focus specifically on early detection and treatment of potentially blinding conditions and injuries, a new Center for the Prevention and Treatment of Visual Loss has been established at the Iowa City VA Medical Center. The center's research team will test new ways to detect early signs of disease progression and response to treatment; develop therapies that involve natural proteins called growth factors; and explore the use of telemedicine for diagnosis and monitoring.

For more information about VA's vision research programs and how VA research is improving Veterans' lives, go to [www.research.va.gov](http://www.research.va.gov).



For more than a decade, the Department of Veterans Affairs (VA) has made women's gender-specific health care needs a major priority. VA researchers are looking at a broad range of health conditions related to women Veterans, including chronic diseases, reproductive health, cancer, mental health issues, military occupational hazards, and amputations.

Today, there are more than 1.8 million women Veterans, and their percentage of the total number of America's Veterans is increasing. VA's research on women's health issues helps improve its ability to care for women Veterans of all eras.

Elizabeth Yano, PhD, Deputy Director and Senior Scientist at the VA Greater Los Angeles Health Services Research and Development (HSR&D) Center of Excellence for the Study of Healthcare Provider Behavior, offers a special invitation to women Veterans to visit VA: "You served our country, so now it's time for us to serve you," says Yano.

VA offers comprehensive, high-quality primary health care services and many other dedicated programs for women Veterans, and offers a special sensitivity to their unique health care needs.

Among the goals of VA's ongoing research initiatives in women's health are to develop improved therapeutic strategies for health issues important to women; to enhance the specialized skills of primary care providers who treat women Veterans; and to create the best possible health care strategies to deal with family and reproductive issues, including preventive measures to avoid birth defects in children of women Veterans.

Recent VA studies in women's health have looked at:

- *The long-term health outcomes of Vietnam service.* VA researchers are studying lifetime and current incidence of conditions including PTSD, depression, diabetes, heart disease, and disability in women who served our nation in uniform during the Vietnam era. This study is the most comprehensive ever undertaken on the long-term health outcomes of women Veterans who served during this time.
- *Immunization rates among older women Veterans.* A VA research team learned that older men were more likely than older women to receive immunizations against

influenza and pneumonia. The researchers said that older female Veterans might benefit from educational outreach on this topic.

- *Metabolic syndrome and cognitive risk.* In a study of nearly 5,000 post-menopausal women in 25 countries, a research team including VA investigators found that older women with metabolic syndrome (a combination of medical conditions that can include high blood pressure and type 2 diabetes) have a substantially increased risk of cognitive impairment.
- *Prevalence of Military Sexual Trauma.* A VA study looked at the records of more than 125,000 Veterans who received VA primary care or mental health services between 2001 and 2007, and found that 15 percent of women and .7 percent of men reported military sexual trauma. Both women and men who screened positive for military sexual trauma were more likely to be diagnosed with a mental health condition.

Jennifer Olds served on active duty in the U.S. Army from 1990 to 1992, during Operations Desert Shield and Desert Storm. She participated in another landmark VA study, the largest randomized clinical trial ever undertaken involving women Veterans with PTSD. The study compared two therapeutic approaches for treatment of the disorder.

“I found that this experience encouraged many changes in me,” Olds says. “Today I am able to do things that I have not been able to do in a long time.”

Deborah Gano is one of about a quarter million women who now receive world-class health care from VA. “I’m able to come here for all my health care, and that’s an awesome thing,” she says.

To find your nearest VA health care facility, visit [www.va.gov/landing2\\_locations.htm](http://www.va.gov/landing2_locations.htm). For information on VA programs and services for women Veterans, go to [www.va.gov/womenvet](http://www.va.gov/womenvet). For more information on how VA Research is improving Veterans’ lives, go to [www.research.va.gov](http://www.research.va.gov).