JANUARY 2010

RESEARCH ADVANCES

DISCOVERY — INNOVATION — ADVANCEMENT

Afghanistan/Iraq

Women's Health

Prosthetics/Amputations

Mental Health

Tramatic Brain Injury

Obesity

Post-traumatic Stress Disorder (PTSD)

Alzheimer's Disease

Depression

Personalized Medicine

Vision Loss

Parkinson's Disease

Cancer

Diabetes

Osteoarthritis

Pain Management

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Hepatitis C

Mental Health

Kidney Disease

Substance Abuse

Hearing Loss

Infectious Diseases

Spinal Cord Injury

Veterans Health Administration

Research Development

Improving Veterans' Lives — www.research.va.gov

"VA's Research and Development program is an essential part of our mission to provide cutting-edge health care to our nation's Veterans. As we seek to transform VA, three fundamental attributes mark the starting point for framing a 21st-Century Organization: people-centric, results-driven, and forward-looking; these attributes require continued and increased emphasis on discovery, innovation, and best practices."

– Eric K. Shinseki, *Secretary, Department of Veterans Affairs*

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For more information about VA research,
please visit the web at: **www.research.va.gov**

VA Research & Development Program:

Improving Veterans' Lives through Innovation & Discovery

For more than 85 years, the Veterans Affairs (VA) Research and Development program has been improving Veterans' lives. VA Research is unique in that it is the only research program focused entirely on conducting groundbreaking research to meet the full spectrum of Veterans' medical needs. The program benefits from being part of a comprehensive health care system with state-of-the art electronic medical records. Through this dynamic combination, VA Research has become an acclaimed model for conducting superior bench-to-bedside research. The program is positioned to attract the best and brightest investigators, most of whom also work as VA clinicians, and is able to promote the quick translation of research findings into advances in care.

Offers a promise for a brighter tomorrow – Veteran-centric at its core, the program identifies needs in the treatment setting and brings them through the research process to application in as few steps as possible. In addition to improving Veterans' lives, VA Research improves the lives of Veterans' families and caregivers, and ultimately many others in the nation who benefit from VA's research advancements. One Veteran has said of the program, "Sometimes it works miracles."

Serves as a model of research excellence – Designed to take full advantage of its unique position within an integrated health care system with state-of-the art electronic health records, VA Research is able to foster the development of patient-centered evidence for clinical care decision-making and serves as a model for conducting superior bench-to-bedside research.

Attracts exceptional investigators – The distinctive opportunity to conduct top-quality, pioneering research in an integrated health care system and also provide patient care draws the highest-caliber investigators to the program. VA investigators have won three Nobel prizes, six Lasker awards, and numerous other distinctions.

Fosters dynamic collaborations – While realizing the advantages of an intramural research program, the VA research program embraces its close affiliations with academic institutions and fosters strong collaborations with federal agencies such as the Department of Defense and the National Institutes of Health, private industry sponsors, patient-advocacy organizations, and disease-focused nonprofits. These partnerships allow VA Research to leverage resources, accelerate the translation of research findings into care, and strengthen the program's impact on the health of Veterans and the nation.

Priority Areas for Research

Examples of deployment-related priority areas:

- Traumatic brain injury
- Polytrauma
- Post-deployment mental health
- Prosthetics and amputation care
- Spinal cord injury
- Hearing and vision loss
- Pain management

Examples of priority areas related to Veterans' ongoing health needs:

- Neurodegenerative diseases
- Mental health
- Diabetes
- Heart disease
- Vision and hearing loss
- Substance abuse
- Access to care

Improving Veterans' Lives

"The future of medicine is determined by life-saving and enriching advancements brought about by research. VA Research has contributed to many of the medical treatments and diagnostic tools in use today, such as the cardiac pacemaker, CT scan, and high-performance artificial limbs. By spearheading research that directly advances the medical care of Veterans, the VA Research and Development program has become an acclaimed model for conducting superior bench-to-bedside research."

– Joel Kupersmith, MD, *Chief Research & Development Officer, Department of Veterans Affairs*

Examples of VA Research Advances

The purpose of VA Research is to advance the health care and overall well-being of Veterans, with benefits to the entire nation, through innovation and discovery. The following examples illustrate some of the activities through which VA researchers have been accomplishing this goal:

- Using cutting-edge technology such as robotics and nanotechnology to create lighter, more functional prostheses that look, feel, and respond more like natural arms and legs.
- Gaining new knowledge of the biological roots of posttraumatic stress disorder and developing and evaluating effective PTSD treatments.
- Learning how to deliver low-level, computer-controlled electric currents to weakened or paralyzed muscles to allow people with incomplete spinal cord injury to once again walk and perform other everyday functions.
- Exploring new approaches to pain treatment that will help Veterans with burn injuries to persevere through rehabilitation and make optimal progress toward regaining function.
- Developing a system that decodes brain waves and translates them into computer commands to allow quadriplegics to perform daily tasks like using email or TV.
- Establishing a pharmacogenomics analysis laboratory to help advance personalized medicine for Veterans.
- Identifying genes associated with Alzheimer's disease and diabetes.
- Pioneering new home-dialysis techniques.
- Developing and testing the nicotine patch and other therapies to help smokers quit.
- Conducting research that has helped to increase pneumonia and influenza vaccination rates for Veterans with spinal cord injury.
- Using animal models of Alzheimer's disease to identify promising new targets for early-detection tests and new drug therapies.

Afghanistan/Iraq

VA's Office of Research and Development has implemented a comprehensive research agenda to address the deployment-related health issues of the newest generation of Veterans—those returning from Operations Enduring Freedom and Iraqi Freedom (OEF/OIF). In addition to exploring new treatments for traumatic brain injury and other complex blast-related injuries, VA researchers are examining ways to improve the delivery of health care services for these Veterans.

Examples of VA Research Advances

VA, DoD aim to improve burn outcomes – Researchers from VA and the Department of Defense are working together to examine long-term outcomes among OEF/OIF Veterans with serious burn injuries. The researchers, based at the San Antonio VA and Brooke Army Medical Center, will assess patients at discharge from the hospital and then yearly for four years. They'll administer a wide array of questionnaires covering physical, psychological and social issues, with the aim of improving care and services for this population of Veterans.

Study suggests rise in wars' mental toll – Among nearly 290,000 veterans of operations Enduring Freedom and Iraqi Freedom who used VA health care for the first time between April 2002 and March 2008, 37 percent received a mental-health diagnosis. That was the main result of a recently published database study by a team with VA and the University of California, San Francisco. An earlier study by the same group looked at nearly 104,000 OEF/OIF veterans first seen in VA between 2001 and 2005 and found that 25 percent received at least one mental health diagnosis.

Consortium will study PTSD, brain injury – A psychiatrist with VA and the University of California, San Diego, is leading a $60-million, five-year, multisite consortium funded by the Psychological Health and Traumatic Brain Injury Research Program of the Department of Defense to study PTSD and traumatic brain injury. The research effort will pay special attention to the interaction between the two conditions.

Facts About Deployment Health

The changing nature of warfare poses new challenges to VA's health care system. Due to improved body armor and battlefield medicine, many troops are surviving injuries that in the past would have been fatal. These soldiers, however, are returning home with complex, multiple injuries. These "polytrauma" cases often include brain and spinal cord injuries, vision and hearing loss, nerve damage, burns, amputations, musculoskeletal injuries, infections, and emotional adjustment problems. As of the end of 2008, VA had treated 641 OEF/OIF Veterans who were injured in theater as inpatients at its four main polytrauma clinics. The VA polytrauma system of care also includes network sites and support teams around the nation (www.polytrauma.va.gov).

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Alzheimer's Disease

Areas of focus for VA research on Alzheimer's disease include finding potential drug therapies for prevention and treatment, exploring the genetic and environmental causes of the disease, and studying the best ways to provide long-term care. Additionally, VA researchers are working to better understand the connection between Alzheimer's and other chronic diseases, such as diabetes.

Examples of VA Research Advances

New center aims to refine brain-scan methods – A team at the San Francisco VA, led by Dr. Michael Weiner, has received a $6.04 million grant from the National Institutes of Health to develop new ways to examine the brain through magnetic resonance imaging (MRI). The award is funding a "Biomedical Technology Research Center" focused on improving several MRI methods. Among the end goals: to better diagnose and track neurodegenerative diseases such as Alzheimer's.

Improving home safety – Researchers at the Bedford (Mass.) VA and Boston University are working to improve home safety for those with Alzheimer's disease and their caregivers. A preliminary study focused on which types of home modifications are practical and effective for families. The findings were translated into a 25-page, illustrated, simple-language guide. Now, the booklet is being tested with 160 families to see if it boosts implementation of the safety tips and—more importantly—reduces the risk of accidents and injuries.

Protein reverses Alzheimer's in animal models – Memory loss, brain cell degeneration, and cell death were prevented or reversed in animal models of Alzheimer's disease after treatment with a naturally occurring protein called brain-derived neurotrophic factor. The researchers, led by Dr. Mark Tuszynski of VA and the University of California, San Diego, say the results "provide a rationale for exploring clinical translation to humans."

Facts About Alzheimer's Disease

One of the most common forms of dementia is Alzheimer's disease, a progressive neurodegenerative condition. In this biological disease of the brain, deterioration occurs in nerve cells and parts of the brain controlling thought, memory, and language. As the disease progresses, symptoms range from mild forgetfulness to serious impairment and inability to perform everyday tasks. Alzheimer's is estimated to affect some 4.5 million Americans, and this figure is expected to triple by 2050. About five percent of men and women ages 65 to 74 have the disease, and nearly 50 percent of those age 85 and older may be affected. The annual direct and indirect costs of caring for Americans with the disease are estimated to be around $100 billion.

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Cancer

VA has a broad array of research on cancers common in the Veteran population. These include diseases such as prostate, lung, colorectal, bladder, kidney, pancreatic, esophageal and breast cancer, as well as lymphomas and melanomas. VA researchers conduct lab experiments aimed at discovering the molecular and genetic mechanisms involved in cancer; epidemiologic studies looking at the causes of disease; clinical trials to evaluate new or existing drugs and other treatments; and studies focused on improving end-of-life care.

Examples of VA Research Advances

Natural compounds show promise in lab studies – In a recent study led by Dr. Sushanta Banerjee at the Kansas City (Mo.) VA, the compound crocetin—derived from the spice saffron, which has a long history of medicinal use in traditional cultures—was effective in thwarting tumor growth both in cell cultures and in mice that had been injected with human pancreatic cancer cells. In studies at the Birmingham (Ala.) VA lab of Dr. Santosh Katiyar, proanthocyadins—antioxidants found in grape seeds, pine bark and other natural sources—halted the spread of lung cancer in cell cultures and mice. The experiments at both sites are among numerous VA research projects exploring the potential of natural compounds as cancer-fighters.

Improving physicians' empathy, communication – Researchers with VA and the University of Rochester found that in consultations with patients with lung cancer, physicians rarely responded empathetically to patients' concerns about mortality, symptoms or treatment options. The work was based on 20 recorded or transcribed visits. The findings jibe with those from past research involving oncologists, surgeons, and other doctors, and may help guide efforts to improve physician training.

Prostate cancer therapy being tested – A team with VA and the University of Iowa, led by Dr. David Lubaroff, is testing an experimental immunotherapy against prostate cancer. A phase 2 clinical trial now under way is enrolling men who have had their prostate removed or treated with intensive radiation, but whose cancer has spread in the body. The therapy works by introducing into the body a gene for prostate-specific antigen (PSA). The immune system responds by killing prostate cancer cells, which in these patients are the only cells making PSA.

Facts About Cancer

Cancer is a general term that includes more than 200 different diseases. In all forms of cancer, cells in the body grow and multiply abnormally, eventually taking over and destroying normal tissue. Many factors can combine to increase the risk of cancer. These range from family history and genetic makeup to poor diet and exposure to radiation, air pollution and other toxins. The three main types of cancer are leukemias and lymphomas, involving the blood and related tissues; carcinomas, which occur in the skin, glands, and certain organs; and sarcomas, which involve muscles and connective tissue. Common cancer symptoms include weight loss, fatigue, and pain.

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Cardiovascular Disease

Areas of focus for VA research on cardiovascular disease include evaluating and developing new treatments, probing the genetic and lifestyle causes of cardiovascular disease, and developing new rehabilitation methods, especially for stroke. Studies range from biomedical lab experiments on animal models of heart disease to large, multisite clinical trials involving thousands of patients.

Examples of VA Research Advances

Prosthetic graft for bypass surgery – A team led by VA physician-researcher Dr. Melina Kibbe in Chicago is developing a prosthetic vascular graft that releases nitric oxide, a body chemical that promotes healthy blood vessels and improves healing after vascular surgery. Synthetic prosthetic grafts are used by surgeons when a patient's own veins are not available to reroute blood flow in bypass operations. If the device being developed in Dr. Kibbe's lab proves successful in humans, it would be used in place of a standard prosthetic graft and could help boost patient outcomes after procedures such as bypass surgery or balloon angioplasty and stenting. The lab is also exploring other therapies that release nitric oxide, such as gels and wraps that could be applied to arteries.

Self-monitoring of anti-clot drug has benefits – A VA trial involving nearly 3,000 Veterans has provided evidence to help guide doctors in managing patients taking the drug warfarin to prevent blood clots. The drug usually requires frequent blood tests and close monitoring by a physician to get the dose just right. But easy-to-use blood analyzers now allow patients to monitor their own clotting rate at home. The study found no difference in outcomes such as stroke or bleeding between patients who monitored themselves at home and those who visited the clinic. Moreover, self-testing appeared to boost patients' satisfaction with warfarin therapy.

Grape compound may help heart – A VA scientist and colleagues found that even low doses of the natural antioxidant resveratrol—found in grape skins—preserved the heart and musculoskeletal system in middle-aged mice.

Facts About Cardiovascular Disease

Cardiovascular disease, which includes coronary heart disease (chest pain or acute heart attack), congestive heart failure, high blood pressure, stroke, and congenital heart defects, is America's number one killer and the leading cause of hospitalization in the VA health care system. A stroke involves the sudden death of brain cells due to a lack of oxygen, caused when blood flow to the brain is impaired by the blockage or rupture of an artery. Each year, more than 15,000 Veterans are hospitalized for stroke. The after-effects range from mild or moderate loss of function to severe disability. In recent years, research has demonstrated that therapy can help restore lost function to stroke survivors even after many years.

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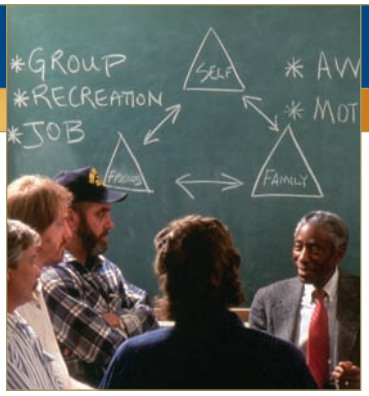

Depression

As part of a comprehensive research agenda aimed at advancing the care of Veterans with depression, VA researchers are developing, testing, and implementing new models of primary care; studying ways to improve outcomes among Veterans affected by depression along with other conditions, such as heart disease, diabetes, or hepatitis C; and exploring the genetic and molecular roots of the condition, with the goal of developing more effective medications.

Examples of VA Research Advances

Managing depression in those with heart failure – A new study led by Dr. John Rumsfeld at the Denver VA is testing a new model of heart-failure care. The key is multidisciplinary teams that include primary care doctors, cardiologists, and psychiatrists. Careful management of depression is a key part of the project, since research has suggested that depression may aggravate or bring on heart disease.

Identifying higher-risk periods for suicide – A team with VA and the University of Michigan at Ann Arbor studied the records of nearly 888,000 Veterans who were treated for depression between 1999 and 2004. The goal was to tease out from the data whether there are periods of greater risk for suicide. The study found that patients were at the highest risk following psychiatric hospitalizations and after starting antidepressant therapy. (It was not clear whether medication raised the risk or was just a marker for more severe illness.) Veterans aged 61 to 80 had the highest risk of any age group. VA has a comprehensive suicide-prevention campaign, including a hotline at 800-273-TALK.

Depression common in kidney disease – Doctors know depression is common among patients with end-stage renal failure who are on dialysis. But is it equally common in those with milder forms of kidney disease? The answer is yes, according to a study at the Dallas VA and University of Texas Southwestern Medical Center. Medical interviews with 272 patients with varying stages of chronic kidney disease revealed a 20-percent prevalence rate, regardless of disease stage.

Facts About Depression

Depression is one of the most common and costly mental disorders. Depression costs the U.S. an estimated $66 billion per year, which includes both direct health care costs and indirect costs, such as lost work days. Veterans with depression account for slightly more than 14 percent of total VA health care costs. While there are effective pharmacologic treatments and psychotherapies for depression, studies show that the condition is under-diagnosed. An untreated episode of depression may last several months, and most people with depression experience repeated episodes over their lifetime.

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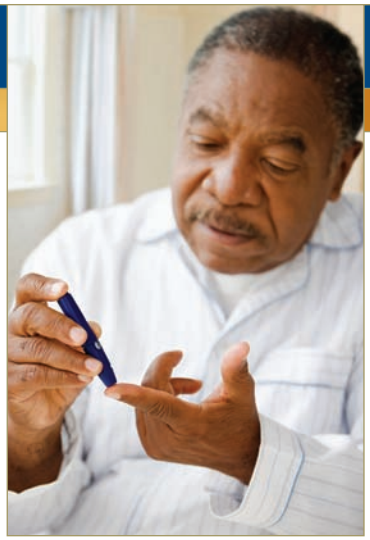

Diabetes

VA researchers are studying innovative strategies and technologies—including group visits, telemedicine, peer counseling, and Internet-based education and case management—to enhance access to diabetes care and improve outcomes for patients. In addition, VA researchers are seeking to develop better ways to prevent or treat diabetes, particularly in special populations such as the elderly, amputees, minorities, spinal cord injured Veterans, and people with kidney or heart disease.

Examples of VA Research Advances

The insulin-Alzheimer's link – Dr. Suzanne Craft of the Geriatric Research, Education, and Clinical Center at the Puget Sound (Wash.) VA was among 25 leading scientists and physicians featured in the spring 2009 HBO production "The Alzheimer's Project." Craft's research focuses on the connection between insulin resistance—the hallmark of type 2 diabetes—and Alzheimer's disease. In one study, Craft and colleagues found that a nose spray delivering insulin could acutely improve memory in Alzheimer's patients, but only in those who lack a gene called APOE e4.

Homing in on genes tied to diabetes – A team with VA and the University of Texas Health Sciences Center analyzed genetic information from 294 Mexican-American families with a high incidence of diabetes. They determined that chromosome 12p is a likely site of genes associated with high triglycerides, a condition that is part of "metabolic syndrome" and closely linked to diabetes, obesity, and heart disease.

Exercise found to thwart diabetes in stroke patients – Clinical studies at the Baltimore VA and University of Maryland have found that walking on a treadmill can prevent and even reverse diabetes in chronic stroke patients. Investigators at the site are also doing lab research to learn more about the biochemical pathways involved in insulin resistance, diabetes, and stroke.

Facts About Diabetes

Diabetes is a chronic disease in which the body can not produce or properly use insulin, the hormone needed by the body to change food sugar into energy. About a quarter of the Veterans receiving care from VA have diabetes, and an even greater number are at risk due to overweight or obesity. Of the estimated 16 million Americans with the condition, more than 90 percent have type 2, or non-insulin-dependent, diabetes. While it has been long known that type 2 diabetes runs in families and that certain populations (e.g., Hispanics and Native Americans) are at a higher risk, it was not until recent advances in genetics were made that researchers began to investigate the link between specific genes and diabetes.

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Hearing Loss

VA researchers, engineers, and clinicians are studying ways to prevent, diagnose, and treat hearing loss, addressing a wide range of technological, medical, rehabilitative, and social issues. One group of VA researchers is working to develop and implement a new diagnostic test for tinnitus, a potentially debilitating condition that commonly accompanies hearing loss and involves ringing, whistling, or other noises in the ears.

Examples of VA Research Advances

VA partners with Army on study of blast effects – VA's National Center for Rehabilitative Auditory Research (NCRAR) is collaborating with Walter Reed Army Medical Center to study central auditory processing—how the brain interprets incoming sounds—in soldiers who have been exposed to blasts. In addition to auditory tests, the researchers will analyze medical records, details of the blast exposure, scores on overall tests of brain function, posttraumatic stress disorder measures, and other health data.

Detection of noise-induced hearing loss – VA researchers are developing new, more sensitive methods to detect changes in the cochlea that occur before the onset of permanent noise-induced hearing loss. The methods are designed to identify problems that would not show up in standard audiometric tests. Early detection may provide the opportunity for military healthcare providers to implement precautionary procedures more effectively, preventing hearing loss among troops exposed to high levels of noise.

Treating tinnitus – A study at four VA audiology clinics has been comparing different tinnitus treatments. The treatments all feature some variation of sound therapy and educational counseling. One treatment, for example, involves special hearing aids that generate low-level white noise, which appears to help the condition. In related work, Dr. Jim Henry at the NCRAR is leading an effort to develop a stepwise approach to assessing and treating tinnitus. The method involves five levels of care, starting with appropriate referrals from primary care doctors and specialists, followed by audiologic evaluations that carefully distinguish between problems due to tinnitus and those stemming from hearing loss.

Facts About Hearing Loss

Hearing loss affects some 28 million Americans, including more than half of those over age 65. The most common cause of hearing loss is exposure to harmful levels of noise, either in military or civilian environments. Other possible causes are allergies, infections, drugs, genetics, or simply aging. Some hearing loss can be reversed through surgery or medication. In other cases, hearing loss is permanent but can be helped through the use of hearing aids. Noise-induced hearing loss is among the most common disabilities affecting Veterans. VA pays more than $1.2 billion annually in compensation costs for hearing loss and tinnitus.

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Hepatitis C

VA research on hepatitis C includes clinical trials of treatments, epidemiologic studies, investigations into the biological mechanisms of infection, and studies on improving quality of life for patients with this condition. A particular focus for VA researchers is improving the care of Veterans who are infected with both the hepatitis C virus and HIV.

Examples of VA Research Advances

Hepatitis C, PTSD, and telehealth – VA researchers in Boston are testing a telehealth intervention for Veterans who have both posttraumatic stress disorder (PTSD) and hepatitis C. PTSD is linked with poor self-care and non-compliance with drug regimens, so these hepatitis C patients may be at higher medical risk. The study involves 70 Veterans. Half are receiving counseling in person, the other half by telephone. The study is looking at factors such as self-care, emotional distress, motivation to participate in treatment, and overall quality of life over six months. The researchers are also comparing the two approaches for cost-effectiveness.

Identifying barriers to treatment – VA investigators in Pittsburgh and Seattle are exploring why many Veterans with hepatitis C do not initiate or complete the evaluations needed to begin antiviral treatment. The study is tracking Veterans referred by their primary care doctors to gastroenterologists for treatment of their hepatitis C. The researchers are carefully examining which factors that may be affecting patients' willingness or ability to move ahead with antiviral therapy. The study includes in-depth interviews focused on patients' knowledge and understanding of the disease and its treatment, as well as issues such as trust and communication in the patient-doctor relationship.

VA website on care, research – Log on to VA's special website on hepatitis C (www.hepatitis.va.gov) to find general information about the condition as well as an overview of VA's efforts in this area. Included are descriptions of VA research sites with special hepatitis C programs: Minneapolis, San Francisco, Seattle/Portland, and West Haven.

Facts About Hepatitis C

The liver disease hepatitis C is caused by the hepatitis C virus. It is spread through contact with infected blood or contaminated IV needles, razors, tattoo tools, or other items. Hepatitis C is particularly prevalent among Veterans, especially those who received blood transfusions prior to 1992. Between 4 and 17 percent of Veterans are infected, compared with 2 percent in the non-Veteran population. Most people with hepatitis C do not have any signs or symptoms of the disease for decades. By the time the disease is diagnosed, there can be significant damage to the liver, leading to complications such as liver cancer and sometimes resulting in death. Treatments using the protein interferon can be effective, but potential side effects such as mood disorders must be managed carefully.

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Infectious Disease

One of the earliest contributions of VA researchers to medical science was the establishment of effective treatments for tuberculosis, back in the 1930s and 1940s. Since then, VA scientists have helped advance the understanding, prevention, and treatment of numerous infectious diseases, ranging from the common cold to major public-health threats such as AIDS.

Examples of VA Research Advances

MRSA targeted as part of study on electronic health records – As part of a larger VA project aimed at allowing researchers, clinicians, and managers to make better use of free text in VA's electronic medical record, one study is focusing on methicillin-resistant Staphylococcus aureus, or MRSA. The tough-to-treat germ has long been the nemesis of infection-control experts in hospitals worldwide. It causes tens of thousands of serious infections each year in the U.S. alone. The new study aims to capture more MRSA-relevant information in the electronic medical record, beyond standard coded data, so surveillance and control can be improved.

Making flu drugs go further – A group at the Palo Alto VA is collaborating with researchers at VA's Clinical Research Pharmacy Coordinating Center in Albuquerque to develop a sustained-release version of a drug—probenecid—that can be given along with the antiviral drug oseltamivir (sold as Tamiflu) to prolong its flu-fighting effects. An earlier trial found the drug combination safe and feasible, but patients had to take probenecid capsules four times a day. The goal now is to make the regimen easier. If validated in further clinical trials, it could be a value strategy in future flu outbreaks.

HIV therapy linked to low bone density – An international team including researchers at the Washington, DC, VA hospital found that continuous antiretroviral therapy—an aggressive form of treatment for HIV—decreases bone mineral density more than intermittent therapy. Researchers are working to understand whether the effects on bone are due to drug treatment, the virus itself, or other factors.

Facts About Infectious Diseases

Infectious diseases are generally classified according to the source of the infection. The major types are viral, bacterial, parasitic, and fungal. In the VA health care system, two viral diseases of special concern are HIV-AIDS and hepatitis C. VA maintains special websites devoted to these conditions: www.hiv.va.gov and www.hepatitis.va.gov. VA investigators are studying these and a wide range of other infectious diseases and working toward developing effective new preventive strategies, vaccines, and drugs. In recent years, bioterror—the use of bacteria, viruses, or toxins to harm people—has become a concern for public health officials, and VA hospitals take part in a national program called BioSense to help track and investigate suspected bioterror events.

Kidney Disease

VA has a comprehensive research portfolio aimed at preventing and slowing the progression of chronic kidney disease and advancing the treatment of kidney failure. There are many causes of chronic kidney disease, but the two main causes—accounting for up to two-thirds of cases—are diabetes and high blood pressure. VA research on these two conditions may thus help reduce the prevalence of chronic kidney disease in the veteran population.

Examples of VA Research Advances

Artificial kidney will offer 'dialysis on the go' – A new device called an AWAK—short for "Automated Wearable Artificial Kidney"—may enable patients with kidney failure to undergo continuous treatment without being hooked up to a stationary dialysis machine. This portable artificial kidney would be the first wearable model based on peritoneal dialysis—a process that requires no transfer of blood outside the body. The AWAK, invented by two VA kidney specialists, is expected to be ready for clinical trials by 2010.

No survival benefit from B vitamins – Patients with chronic kidney disease are at high risk for hardening and narrowing of the arteries, and prior studies have identified the amino acid homocysteine as a risk factor for these conditions. But a recent study involving more than 2,000 veterans with advanced chronic kidney disease found that lowering homocysteine through high doses of folic acid and other B vitamins did not reduce the rate of death or cardiovascular events. The authors speculated that "possibly the underlying burden of disease was too great for a measurable benefit" from lowering the amino acid.

Tracking heart risk in patients with kidney disease – VA researchers are exploring how the progression of heart disease in those with chronic kidney disease is affected by various cardiovascular risk factors. They are looking at traditional risk factors such as diabetes and high blood pressure and newer ones such as homocysteine, C-reactive protein and lipoprotein (a), the roles of which are still under investigation. The study will use an innovative ultrasound method that measures the thickness of the inner lining of neck arteries as a marker of how much artery-clogging plaque exists in the whole body.

Facts about Chronic Kidney Disease

The kidneys are a pair of bean-shaped, fist-sized organs located on either side of the spinal column. Kidneys perform life-sustaining functions that keep the rest of the body in balance, such as helping to remove waste and excess fluid from the body, regulating water and minerals in the blood, and releasing vital hormones. As kidney disease worsens, complications such as high blood pressure, arteriosclerosis, anemia, weak bones, and nerve damage can develop. If the disease progresses to kidney failure, when the kidneys shut down, dialysis or a kidney transplant is needed to maintain life. Currently, some 26 million adults in the U.S. have chronic kidney disease.

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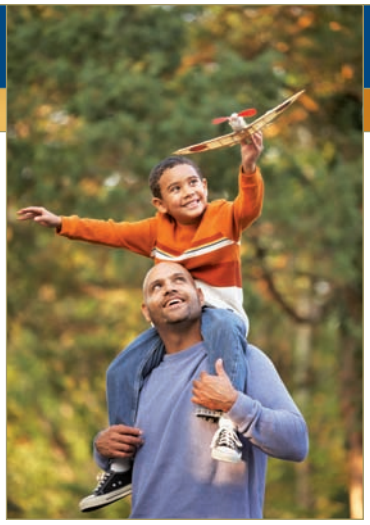
Mental Health



Major areas of focus for VA research on mental health include substance abuse, posttraumatic stress disorder (PTSD), adjustment and anxiety disorders, depression, bipolar disorder, and schizophrenia. Researchers are studying and testing new drug therapies, enhancing collaborative care models in the primary care setting, and further improving access to mental health care through telehealth and other innovative approaches.

Examples of VA Research Advances

'ESP' report on suicide prevention – A recent report from VA's Evidence Synthesis Program (ESP), "Strategies for Suicide Prevention in Veterans," analyzes which suicide-prevention strategies—for example, hotlines, outreach programs, peer counseling, treatment coordination programs, new counseling approaches—are backed by the strongest evidence and show the most promise for Veterans. It also outlines key questions to consider in future research. The report is available at www.hsrd.research.va.gov/publications.esp.

Drug risk for seniors – Many older people have multiple prescriptions for drugs that act on the central nervous system, such as tranquilizers, antidepressants, or painkillers. But little research has looked at the risks from combined use of these drugs. Two recent studies by VA investigators in Pittsburgh and collaborators were among the first to examine this question. One study linked higher total daily doses of these drugs to recurrent falls. The other found that combined use of the drugs, especially at higher doses, may be tied to cognitive decline. The authors say clinicians should use the lowest possible combined doses of these medications, particularly when treating pain and psychiatric illness that occur together.

'Spouse Battlemind'– A team at the Memphis VA has been funded by the Department of Defense to adapt and expand the Spouse Battlemind program, designed to ease the transition home after deployments and prevent mental health problems. The new VA study will test a telephone-based version of the program. The focus will be on education, support, and skills-building.

Facts About Mental Health

Mental health conditions such as schizophrenia, depression, and anxiety are common in the United States, with more than a quarter of Americans suffering from a diagnosable mental disorder in any given year. Mental health is a major focus for VA's healthcare system. A recent health survey of 1.5 million Veterans enrolled in VA health care found that more than a third had at least one mental health diagnosis. Depression was the most common diagnosis, followed by anxiety disorders —including PTSD—and schizophrenia. Schizophrenia alone affects some 100,000 VA patients and accounts for nearly 12 percent of VA's total health care costs.

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Obesity

VA research on obesity focuses on areas such as examining the biological mechanisms involved in weight gain and weight loss; comparing the safety and effectiveness of various obesity treatments; and identifying the best strategies to promote exercise and healthy eating among Veterans, thus preventing overweight and obesity in the first place. These efforts complement VA's "MOVE!" program, a national weight-management and exercise program designed by the VA National Center for Health Promotion and Disease Prevention.

Examples of VA Research Advances

Caloric restriction slows aging in primates – VA scientists and colleagues found that restricting caloric intake to about 30 percent of normal can slow aging and prevent disease in primates. Caloric restriction had shown similar effects in countless animal studies, but never in primates. The researchers, led by Dr. Richard Weindruch of the Madison VA and University of Wisconsin, reported findings from a 20-year study that involved, at one point, 76 rhesus monkeys. At the 20-year mark, half of the regular-diet monkeys survived, versus 80 percent of those eating fewer calories. Caloric restriction reduced the incidence of diabetes, cancer, cardiovascular disease, and brain atrophy.

Obesity and prostate cancer – A team with VA and Duke University Medical Center challenged past study findings suggesting that obesity is associated with a lower risk for prostate cancer. They analyzed 441 prostate biopsies and found, after adjusting for certain clinical characteristics, that obesity was actually associated with a 98-percent higher risk. In a related study, the group found that compared with normal-weight men, obese men have prostate tumors that are larger and faster-growing.

High rate of metabolic syndrome – Researchers at the VA Northern California Health Care System analyzed body mass index (in lieu of abdominal obesity), blood pressure, and other clinical factors among 51,000 Veterans who had filled any prescription in the system during a one-year period. At least a quarter of the Veterans had metabolic syndrome, a group of risk factors linked to cardiovascular disease and other conditions.

Facts About Obesity

Obesity has skyrocketed in the past four decades and reached epidemic proportions. Two out of three Americans are overweight, and nearly one out of three is obese. The problem may be even more severe among those who turn to VA for their health care, with one study finding that 68 percent of these Veterans were overweight and 37 percent obese. This trend has major implications for American health care, since obesity increases the risk of heart disease, high blood pressure, diabetes, arthritis, and other diseases.

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Osteoarthritis

VA researchers are working to understand the biological causes of cartilage degeneration and are testing new drugs and other medical and rehabilitative treatments for osteoarthritis. Among the VA sites conducting important work in this area is the Bone and Joint Rehabilitation Center of Excellence, based at the Palo Alto, Calif., VA Medical Center.

Examples of VA Research Advances

Hyaluronic acid found effective for ankle arthritis – A study at the Miami VA Medical Center found that injections of a natural liquid called sodium hyaluronate, also known as hyaluronic acid, may be a safe and effective option to treat ankle pain caused by osteoarthritis. The therapy, which helps lubricate and cushion the joints, has been in use for knee osteoarthritis for several years—mainly for those who still need relief after trying drugs, exercise, or physical therapy. Researchers are increasingly exploring its potential benefits for other joints affected by osteoarthritis.

Racial disparities in joint replacement – Researchers at VA's Center for Health Equity Research and Promotion are studying how to best target educational materials about knee replacements to African American patients. African Americans are up to five times less likely than whites to undergo the procedure. In a study involving up to 600 older African American Veterans in Pittsburgh and Cleveland, the researchers are testing whether an educational video plus counseling helps close the racial gap in the use of the procedure.

Improving self-care – Researchers at the Durham VA and Duke University are conducting the Self-Management of Osteoarthritis in Veterans Study to test whether providing special educational materials and following up with monthly telephone support can help patients with arthritis reduce their pain levels. The study will include 519 Veterans with osteoarthritis of the hip or knee.

Facts About Osteoarthritis

Osteoarthritis, or degenerative joint disease, is the most common form of arthritis. It affects up to 20 million Americans, most of them elderly. Symptoms include pain, stiffness, and swelling in the joints. Scientists once thought the disease resulted simply from "wear and tear" on the joints; now they are exploring a complex web of biological factors that may contribute to cartilage breakdown. Increased attention in recent years to the adverse side effects of some pain relievers has underscored the urgency of research on the prevention of arthritis and alternative treatments for pain symptoms.

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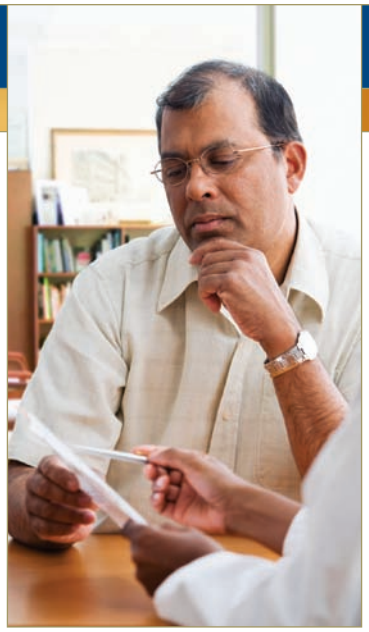
Pain Management



VA is working to develop new approaches to alleviate Veterans' pain, which may result from spinal cord injury, burns, amputations, traumatic brain injury, cancer, arthritis, or any number of other conditions. VA's research portfolio in this area covers a remarkably wide range of topics, from drug discovery to alternative treatments such as yoga or massage. VA investigators are also leaders in studying the impact of pain on daily function and quality of life.

Examples of VA Research Advances

Transcranial magnetic stimulation – A team with VA and the University of California, San Diego, analyzed data from past studies on the use of transcranial magnetic stimulation (TMS) to treat nerve pain. The treatment, developed in Europe in the 1980s and used mainly for mental conditions, was approved last year in the U.S. to treat depression. It has also been tested in a small number of clinical trials as a pain treatment. Looking at data on 149 patients, the VA study found that TMS was most effective when pain originated in the trigeminal nerve, which is linked to facial pain. In these cases, the therapy helped about a third of patients. It helped about 15 percent of patients with pain related to spinal cord injury, and only 1.5 percent of those with peripheral nerve pain.

Assessing pain in primary care – Researchers with VA's Center on Implementing Evidence-Based Practice in Indianapolis have developed a brief three-point measure that asks patients about pain intensity and the degree to which pain interferes with their enjoyment of life and general activity. The researchers say the new tool elicits better information than single-item pain screenings—such as those that simply ask patients to rate their pain on a scale—but is still practical for primary care.

Safer prescribing of opioids – Researchers at the VA Northern California Health Care System are evaluating the Prescription Opioid Documentation and Surveillance System, an informatics tool aimed at improving patient care, refining pain control, and reducing the risk of opioid abuse.

Facts About Pain

Pain is one of the most common reasons people consult a physician and is cited as the most common symptom in service members returning from combat. Research suggests that a quarter of returning Operation Enduring Freedom/ Operation Iraqi Freedom Veterans report chronic pain that interferes with their daily activities—among the most common types, back pain from the weight of body armor and equipment and pain from traumatic nerve injury. In the belief that no patient should suffer preventable pain, VA requires its doctors and nurses to treat pain as "a fifth vital sign," to be assessed and recorded along with blood pressure, pulse, temperature, and breathing rate.

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Parkinson's Disease

VA Research has six Centers of Excellence focused on Parkinson's disease, based in Houston, Philadelphia, Portland, Richmond, San Francisco, and Los Angeles. Researchers at these sites are studying the biochemical pathways involving dopamine—a brain chemical implicated in Parkinson's disease—and testing a variety of treatment approaches, including medication, surgery, and electrical stimulation.

Examples of VA Research Advances

VA-NIH trial backs brain implants for some patients – Deep brain stimulation—a treatment in which a pacemaker-like device sends pulses to electrodes implanted in the brain—is riskier than drug therapy but may hold significant benefits for those with Parkinson's disease who no longer respond well to medication alone, reported researchers with VA and the National Institutes of Health who conducted a six-year study comparing deep brain stimulation with "best medical therapy." The trial, the largest of its kind to date, included 255 patients at seven VA and six university sites. Significantly, the trial included patients ranging in age from 37 to 83 and found that older patients—a group typically excluded from brain stimulation research and treatment—benefited as much as younger patients from the treatment.

Generating dopamine neurons – Researchers within VA and elsewhere are exploring ways to replenish brain cells that make dopamine. A loss of these cells is one of the hallmarks of Parkinson's. A VA team in San Francisco has discovery that a protein called beta-catenin plays a key role in transforming precursor cells in the brain into dopamine neurons. The finding may lead to new strategies to boost the effectiveness of therapies that introduce stem cells or other precursor cells into the brain.

Videophones useful in Parkinson's care – A study at the Houston VA found a high rate of satisfaction among patients with Parkinson's and their providers—including expert neuroscience nurses—who communicated by videophone for follow-up care.

Facts About Parkinson's Disease

Parkinson's disease is a disorder of the central nervous system resulting in rigidity of the muscles, delayed movement, poor balance, and tremors. It affects as many as 1.5 million Americans, mostly people over age 50. Some 50,000 new cases are diagnosed annually. VA treats at least 40,000 Veterans with this debilitating disorder each year. Parkinson's patients have a progressive loss of the brain chemical dopamine, caused by the death of dopamine-producing nerve cells. Experts suspect that a combination of genetic and environmental factors is responsible for this loss.

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Personalized Medicine

VA's Office of Research and Development is at the forefront of developing safer, more effective treatments based on new knowledge about the role of genes in health and disease. The goal is to provide medical care that is personalized to the genetic makeup of individual Veterans. This approach is referred to as personalized medicine. Genomic analysis has already provided tremendous insights into the origins of diseases that affect large numbers of Veterans, such as diabetes and cancer. Genomic analysis may also help predict Veterans' response to certain drug treatments.

Examples of VA Research Advances

Survey finds most Veterans in favor of genomic research – A majority of Veterans who have received health care through VA would support and participate in genomics research, according to a study by the Genetics and Public Policy Center at Johns Hopkins University. VA initiated the study to ascertain Veterans' attitudes and preferences before moving ahead with plans to create a database of genetic information based on participants' DNA samples, combined with information from VA's electronic health record. Experts believe such a database, with appropriate privacy safeguards, would be a powerful tool for researchers seeking links between genes, environmental factors, and health outcomes.

ALS study under way – Researchers at VA's Pharmacogenomics Analysis Lab in Little Rock are analyzing DNA samples from Veterans with ALS (amyotrophic lateral sclerosis, or Lou Gehrig's disease) and working with epidemiologists at the Durham VA to identify genetic and other factors that may contribute to the disease.

Gene variant linked to worse kidney cancer outcomes – Researchers led by Dr. Raj Dahiya at the San Francisco VA found that while one variant of a gene known as bcl2 is generally associated with longer survival in patients with renal cancer, another variant of the gene may actually predict worse outcomes.

Facts About Personalized Medicine

With the recent completion of the Human Genome Project and other gene-mapping efforts, researchers have a detailed map of humans' genetic structure. Research is now focused on how to apply this knowledge to medical care, with the goal of customizing patients' care based on their individual genetic make-up. This might involve, for example, predicting patients' risk for a certain condition or their response to a particular drug. Researchers have been laying the groundwork for this field by scanning huge batches of DNA—often obtained through research studies—and analyzing which genetic variations are statistically associated with particular diseases or other health characteristics.

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Posttraumatic Stress Disorder

VA's Office of Research and Development supports numerous studies aimed at understanding, treating, and preventing posttraumatic stress disorder (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. A VA study published in 2007 found that of 103,788 Veterans of Operations Enduring Freedom and Iraqi Freedom who were seen at VA facilities between 2001 and 2005, some 13 percent had received a diagnosis of PTSD.

Examples of VA Research Advances

PTSD studied as part of informatics project – As part of a larger VA project that is using a technology called "natural language processing" to enable researchers, clinicians, and managers to make better use of free text in electronic medical records, one study is focusing on PTSD. The goal is to examine whether free text—such as notes entered by doctors, nurses or other clinicians—can shed light on how the disorder progresses and how symptoms may vary from one patient to the next.

PTSD and dementia risk – A VA review study found mixed results in past research looking at ties between PTSD and specific physical illnesses. Data conflicted in studies on PTSD in connection with diabetes, coronary heart disease and stroke. The findings were slightly more consistent with regard to arthritis and digestive disorders. The authors expressed surprise at the sparsity of medical literature on this topic and emphasized the need for large epidemiological trials that track patients over several years.

Risperidone being tested – VA investigators are conducting a clinical trial of the drug risperidone. The trial involves 400 Veterans with chronic PTSD who have not responded to antidepressants, which are considered the first-line drugs for PTSD treatment. Aside from antidepressants, risperidone is seen as the drug with the strongest scientific evidence backing its use in PTSD.

Facts About PTSD

PTSD is a psychiatric disorder that can affect people who have experienced life-threatening events, such as combat, a terrorist attack, or a personal assault. Symptoms include flashbacks, nightmares, depression, and social withdrawal, as well as physical health changes. Treatment often includes anti-anxiety drugs or other medication along with psychotherapy. Current evidence-based psychological treatments for PTSD include prolonged-exposure therapy, in which patients recall their traumas in a safe setting and gradually learn to adjust their emotional response; and cognitive-processing therapy, a systematic 12-session program that helps patients release the negative emotions linked to the trauma.

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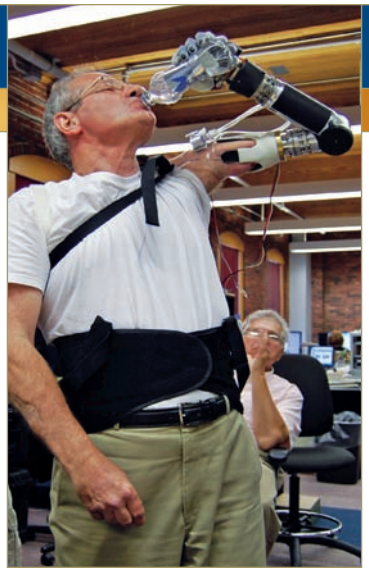
Prosthetics/Amputations



VA researchers are exploring the use of leading-edge technology such as robotics, tissue engineering, and nanotechnology to design and build lighter, more functional prostheses that look, feel, and respond more like real arms and legs. They are also exploring new methods to improve and maximize the reconstruction of injured extremities. Additionally, researchers are studying how best to match available prosthetic components to the needs of amputees, especially those who seek to maintain an active lifestyle and require versatile, high-performance prostheses.

Examples of VA Research Advances

Advanced prosthetic arm – VA has launched a three-year "optimization study" of an advanced prosthetic arm developed by DEKA Integrated Solutions through funding from the Defense Advanced Research Projects Agency (DARPA). The arm represents a huge leap forward for prosthetic arms: It has six pre-programmed hand grasps, and more can be programmed in. This allows users to perform a wide range of tasks, from picking up a key to using power tools. Current artificial hands basically only open and close. The eight-pound DEKA arm also has a "tactor"—a small device that sits on the user's skin and vibrates to signal the strength of the grasp. Users can raise, twist and bend the arm, and even raise it overhead, almost as they would a natural arm. In the VA study, participants with upper-limb amputation will be custom-fitted with the arm, use it for two weeks, and provide feedback to guide the further development and optimization of the arm.

Biohybrid limbs – Researchers at the Center for Restorative and Regenerative Medicine—a collaboration among VA, Brown University, and MIT—are working to improve function for people who have lost limbs. Their overarching goal is to develop high-tech "biohybrid" limbs that merge biological and non-biological materials and work in a natural, lifelike manner. The effort involves investigators with expertise in orthopedics, tissue engineering, neurotechnology, prosthetic design, and rehabilitation. One project involves a brain-computer interface that may allow people to control prosthetic devices and other devices using only their thoughts.

Facts About Prosthetics

As of Aug. 1, 2008, the Department of Defense had reported 1,214 service members who suffered limb loss in Operations Enduring Freedom and Iraqi Freedom (OEF/OIF). Many are now in care in the VA system. Foot ulcers caused by diabetes, which affects more than a quarter of VA patients, are another major cause of amputations. In the U.S., people with diabetes account for about two-thirds of all lower-limb amputations. VA has long been a world leader in prosthetics research and care, and is now in the forefront of developing and testing innovative prosthetic devices for OEF/OIF Veterans who have experienced the loss of a limb.

Spinal Cord Injury

VA researchers are studying the biological processes involved in spinal cord injury (SCI), in hopes of finding a cure. They are also working to develop better treatments and adaptive technologies for Veterans with SCI. Another focus of research is preventing the medical complications that often develop as a result of this disability. For example, VA investigators are developing microstimulators that help to prevent respiratory problems by recreating natural breath and cough patterns. Respiratory problems are the leading cause of death in patients with SCI.

Examples of VA Research Advances

Exploring the value of steroids for acute treatment – A team at VA's Bronx-based Center of Excellence for the Medical Consequences of SCI is exploring whether the steroid drug oxandrolone may be useful as an acute treatment for spinal cord injury. To date, nearly all the research in this area has involved another steroid, methylprednisone. Studies suggest that this drug, given within eight hours of an injury and continued for up to two days, may preserve some movement and limit permanent damage. However, it can cause immunosupression and other side effects. Oxandrolone does not suppress the immune system and has been used for decades to promote muscle regrowth in conditions causing weight loss. In the latest VA study, oxandrolone increased axonal sprouting and functional recovery when given to rats soon after an injury. Further study is planned on the drug's potential risks and benefits.

OEF/OIF Veterans with SCI – VA's Center for Complex Care and SCI Quality Enhancement Research Initiative surveyed providers at 17 VA SCI centers to learn more about the particular needs of Veterans returning from Iraq and Afghanistan with SCI. Among the findings: The Veterans often had additional conditions that required intensive care and in many cases delayed SCI rehabilitation—for example, fractures, pressure ulcers, traumatic brain injuries, PTSD, and drug-resistant infections. Priority vocational needs included computer use, education, and participation in sports.

Sharing SCI pain data – Dr. Eva Widerstrom-Noga of VA and the Miami Project to Cure Paralysis chaired an international group on pain assessment in SCI. The group developed a standardized measure of pain for research and clinical practice that is expected to ease collaboration between medical centers worldwide.

Facts About SCI

Spinal cord injury impairs the brain's ability to send messages to the rest of the body, and can result in paralysis, loss of feeling, chronic pain, and many other serious medical problems. Spinal cord injuries are estimated to affect some 250,000 Americans, with 10,000 new injuries occurring each year, mostly among young males. VA cares for more than 25,000 Veterans with spinal cord injuries or disorders, making it the largest integrated health care system in the world providing spinal cord care.

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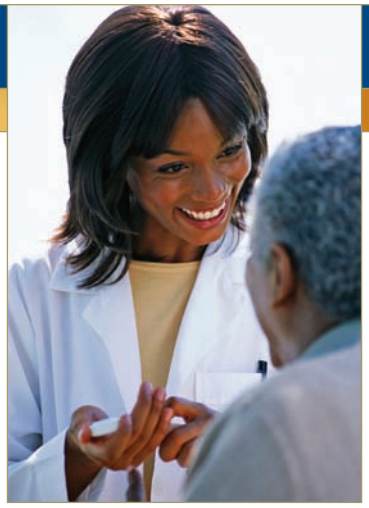

Substance Abuse

A leader in the field of addiction research for decades, VA Research continues to support a broad portfolio examining substance-abuse prevention, screening, and treatment, including studies aimed at understanding the genetic factors that may predispose people to alcohol or drug abuse and addiction. One area of particular focus is improving substance-abuse treatment for homeless Veterans.

Examples of VA Research Advances

Alcohol use linked to fractures – A team at VA's Center for Health Care Evaluation, in Palo Alto, studied the records of 32,622 VA outpatients and found that those who scored higher on an alcohol-use screening tool known as the AUDIT-C—indicating problem drinking—were more likely to subsequently break a bone. The researchers suggest that providers use the evidence as part of the counseling they give to patients who screen positive for alcohol problems, informing them that they may be putting themselves at greater risk for fractures, among other health issues.

'Dual diagnosis' and treatment outcomes – Researchers with the Center for Health Care Evaluation looked at the benefits of residential substance-abuse treatment for patients with a dual diagnosis—that is, substance abuse plus psychiatric problems. They found that dual-diagnosis patients perceived treatment more negatively than did those with only substance abuse issues and had worse outcomes at discharge. Substance-abuse outcomes evened out for the two groups over five years, although the mental-health problems of the dual-diagnosis patients persisted.

Access to care for homeless Veterans – VA's Northeast Program Evaluation Center tested a clinic that combined homeless, primary-care and mental-health services for homeless Veterans with mental illness or substance abuse disorders. Compared with similar patients in "usual care," those using the clinic had more primary-care and preventive services and fewer emergency room visits. Physical health status and hospital use, however, were similar between the two groups.

Facts About Substance Abuse

Substance use disorders—a term that includes alcohol and drug abuse and addiction—have been called the nation's number one health problem, taking a huge toll on individuals and families and costing the U.S. about $414 billion each year. During fiscal year 2007, more than 375,000 Veterans received care in VA for substance use disorders. More than half of these patients also had a psychiatric disorder. In addition to those treated for substance use disorders, nearly 500,000 Veterans received care for nicotine dependence. Moreover, an estimated 1.4 million Veterans smoke tobacco.

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Traumatic Brain Injury

VA researchers are conducting cutting-edge research aimed at improving care for Veterans with traumatic brain injury (TBI). VA research in this area focuses on gaining a better understanding of the brain changes that occur in TBI; refining screening and diagnostic tools; developing drugs to treat TBI, either long-term or immediately after an injury; helping Veterans with TBI reintegrate into the community; and identifying the best coping strategies for families.

Examples of VA Research Advances

Detecting mild TBI – VA scientists in San Diego are exploring whether newer brain-scanning technology can detect injuries missed with ordinary MRI or CT scans. They are using two methods together: magnetoencephalography, which captures the electromagnetic activity of brain cells as they give off signals to each other, and diffusion tensor imaging, which tracks water molecules as they move through the brain's white matter. The team plans to eventually add MR spectroscopy, which records chemical flow in the brain. The researchers' study will involve up to 150 Veterans and active-duty troops.

Blasts' effects on thinking skills – Researchers with the Tampa VA and Defense and Veterans Brain Injury Center conducted neuropsychological tests with patients who had suffered brain injuries—some from blasts and some from other causes. The results on cognitive tests did not differ sharply between the two groups, although those who had experienced blasts were more likely to report symptoms of PTSD. Researchers are increasingly exploring the effects on the brain of blasts versus other TBI causes.

New TBI centers – VA has funded two new centers focused on TBI. The Translational Research Center for TBI and Stress Disorders, led by Dr. Henry Lew in Boston, will use advanced brain-scan methods and wide-reaching exams to study how TBI and PTSD symptoms interact. The Neurons to Networks Center for Rehabilitation Research, led by Dr. Harvey Levin in Houston, will focus on improving diagnosis of Veterans with mild to moderate TBI. The center will also develop and evaluate treatments involving virtual reality and neurobiofeedback.

Facts About Traumatic Brain Injury

Traumatic brain injury (TBI) is estimated to affect some 20 percent of U.S. troops injured in Afghanistan or Iraq. The cause is usually an explosive. Most of the injuries are considered mild, but even these cases can involve serious long-term effects on areas such as thinking ability, memory, mood, and focus. Symptoms may also include headaches and other forms of chronic pain. Treatment typically includes a mix of cognitive, physical, speech, and occupational therapy, along with medication to control specific symptoms, such as headaches or anxiety. As of September 2008, there were more than 22,000 Veterans being compensated for TBI, of whom more than 5,800 were Veterans of the current wars.

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Vision Loss

One of the most exciting areas of VA research in this field is the development of an artificial retina to restore vision to those affected by macular degeneration or retinitis pigmentosa. VA researchers are also working to improve or design new assistive devices for the visually impaired, and to develop more accurate and efficient methods of vision assessment.

Examples of VA Research Advances

Vision and traumatic brain injury – In a Palo Alto VA study involving 68 Veterans with moderate to severe traumatic brain injury and 124 with mild TBI, most of the those in both groups—78 and 98 percent, respectively—had normal or near-normal visual acuity—that is, they could read the letters or numbers on eye charts or cards. However, about three-quarters of the Veterans across both groups reported vision complaints, and many of them tested positive for vision problems. For instance, more than 4 in 10 Veterans had convergence insufficiency, which affects how the eyes work at close distances. Often missed on basic eye exams, the condition causes eye strain, blurred or double vision, and headaches. Most of the brain injuries in both groups were the result of blasts.

New research center – The Center for the Prevention and Treatment of Visual Loss, led by Dr. Randy Kardon, at the Iowa City VA Medical Center, will focus on early detection and treatment of potentially blinding conditions and injuries. Dr. Kardon's team will test new ways to detect early signs of disease progression and response to treatment. They will also develop therapies that involve natural proteins called growth factors. Work at the center will also explore the use of telemedicine for diagnosis and monitoring.

Cognitive impairment may impact rehab – Researchers with VA and Duke University found a high prevalence of problems with verbal fluency and memory among 101 older adults with macular degeneration who were referred for low-vision rehabilitation. Special strategies may be required to maximize the success of rehab in this population, say the investigators.

Facts About Vision Loss

VA estimates that by 2010 there will be nearly a million Veterans coping with severe visual impairment. In older Veterans, major causes of vision loss include age-related macular degeneration, glaucoma, cataracts, stroke, and diabetic retinopathy. Many of these Veterans are helped through VA's extensive network of Low Vision Rehabilitation programs. Among the newest generation of war Veterans, many of those who have suffered brain injuries as the result of blasts also experience vision problems, such as blurred vision, double vision, sensitivity to light, and difficulty reading. One study at a VA polytrauma center found that 38 percent of patients had a visual impairment; in those injured by blasts, the figure jumped to 52 percent.

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Women's Health

In response to the increasing number of women Veterans, VA Research has focused additional attention on the unique health needs of this population. Current studies are examining the general health issues and health care usage of women Veterans; exploring the experiences of women Veterans regarding sexual and military-related traumas; and assessing the delivery of VA care for female Veterans and identifying opportunities for improvement.

Examples of VA Research Advances

Long-term health outcomes of Vietnam service – VA researchers are studying the long-term health outcomes of up to 10,000 women Veterans of the Vietnam era. Data will be collected through mail surveys, telephone interviews, and medical-chart reviews. Among other conditions, the researchers will examine lifetime and current incidence of PTSD, depression, diabetes, heart disease, and disability. The study is the most comprehensive look yet at the long-term health outcomes of this Veteran population.

Immunization rates lower among older women Veterans – A team with VA's Los Angeles-based Center for the Study of Health Care Provider Behavior found that older men were more likely than older women to receive immunizations against influenza and pneumonia. For influenza, 73 percent of men versus 69 percent of women were vaccinated. For pneumonia, the rates were 87 versus 83 percent. The researchers said that although overall immunization rates are higher in VA than in other settings, older female Veterans may benefit from educational outreach on this topic.

Metabolic syndrome and cognitive risk – Among older women, having metabolic syndrome increases the risk of cognitive impairment by 66 percent, according to a study by VA researchers and colleagues of nearly 5,000 post-menopausal women in 25 countries. Metabolic syndrome is the presence of three of more of the following: abdominal obesity, type 2 diabetes, high blood pressure, high triglycerides, or reduced HDL (the "good" cholesterol). The analysis was part of a clinical trial looking at the effects of the osteoporosis drug raloxifene on the risk of vertebral fractures in women.

Facts About Women's Health

As of Sept. 2008, there were more than 1.8 million women Veterans in the United States and Puerto Rico, accounting for nearly 8 percent of the U.S. Veteran population. More than 250,000 of these women rely on VA health care. In response to the growing number of women Veterans in recent years, VA has taken steps to significantly increase the participation of women Veterans in VA studies and to develop an expansive research agenda focused on their specific needs. Today, VA is recognized as a national leader in the investigation of women's health.

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