For more than 90 years, VA Research has been improving Veterans’ lives.

VA Research is unique in that it is the only program in the United States focused entirely on conducting research to address the full spectrum of Veterans’ health needs. The program benefits from being part of a comprehensive health care system with state-of-the-art electronic medical records. Plus, most VA researchers are also clinicians who are directly involved in providing care to Veterans. Through this dynamic combination of factors, VA has become a model for conducting scientifically rigorous research—in the lab, the clinic, and the community—that is highly relevant to patients’ needs. Through a variety of initiatives, VA is now working more effectively than ever to translate the results of its research into everyday care to benefit Veterans and their families—and in many cases, all Americans and people around the world.

We invite you to read through this publication and to visit our website at www.research.va.gov/topics to view the Web version, which contains links to all the references cited.
Invented a wheelchair that allows users to crank up the push rims to a standing position, providing them with increased functionality and independence.

Published preliminary results from a study of auditory sensory stimulation as an aid to recovery from severe traumatic brain injury.

Successfully tested, in an animal model, a method whereby skin cells could potentially be converted into insulin-producing cells to treat diabetes.

Reported 10-year results from the Veterans Affairs Diabetes Trial, which showed that tight blood sugar control could help reduce cardiovascular risk, although no survival advantage was found in the study.

Developed, with NIH colleagues, a predictive model that can identify Veterans at high risk of suicide based on indicators in their electronic medical records.

Reported results from a rigorous clinical trial of mindfulness-based stress reduction for PTSD.

Found that for some smokers, lung cancer screening could be perceived as a substitute for quitting smoking.

Documented higher rates of PTSD in women Vietnam Veterans than had previously been found.

As part of the SPRINT group, published results from a major trial showing that lower blood pressure targets could have cardiovascular and survival benefits from some patients.

For the first time in the U.S., launched a feasibility trial of osseointegrated prosthetic implants, which allow an artificial leg system to be anchored directly to the residual bone.

Provided evidence to support VA’s decision to make the ReWalk robotic exoskeleton available to Veterans with spinal cord injury who could benefit from the device.

Developed an electrical stimulation system that enables people with paraplegia to pedal recumbent tricycles.

Confirmed that chronic traumatic encephalopathy (CTE)—a progressive degenerative disease of the brain resulting from repeated head trauma—is distinct from Alzheimer’s and other degenerative brain disorders and can be diagnosed definitively on the basis of unique patterns of protein accumulation in neurons and other brain cells, albeit only upon post-mortem examination.
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Cover photos by (clockwise from right):  
Robert A. Lisak; Tommy Leonardi; Frank Curran; Jeff Bowen

Any health information in this newsletter is strictly for informational purposes and is not intended as medical advice. It should not be used to diagnose or treat any condition.
ABOUT AFGHANISTAN AND IRAQ VETERANS

• The newest generation of Veterans is characterized by an increased number of Reservists and National Guard members who served in combat zones; a higher proportion of women; and different patterns of injuries, such as multiple injuries from explosions, than were seen among Veterans of previous wars.

• Many service members may need mental health care after returning from duty. Service members may experience symptoms of psychological distress, such as posttraumatic stress disorder (PTSD). Other issues may include stress, mood, anxiety, sleep, psychotic, and addictive disorders.

• Veterans wounded in Iraq and Afghanistan are surviving in greater numbers than in previous conflicts due to advances in body armor, battlefield medicine, and medical evacuation transport. As a result, more Veterans are living with disabling injuries, including the often-lifelong effects of traumatic brain injury (TBI).

• Afghanistan and Iraq combat Veterans can receive cost-free medical care for any condition related to their service in the theater of war for five years after the date of their discharge or release.

VA RESEARCH ON AFGHANISTAN AND IRAQ VETERANS: OVERVIEW

• VA researchers are seeking new ways to address the mental health issues of Iraq and Afghanistan Veterans, including PTSD. They are also researching TBI and its treatment, and are developing and testing prostheses that will allow Veterans with amputations or other issues to live as independently as possible.

• VA is working on new programs and services to help Veterans reintegrate after deployment. Researchers are looking at how transitioning out of the military affects Veterans’ physical and emotional health, work, finances, and social relationships.

• VA’s Polytrauma System of Care is the largest integrated system of care dedicated to the medical rehabilitation of Veterans and service members with multiple injuries. Research includes examining pain, TBI, and PTSD that co-occur, known as the polytrauma clinical triad.

• The National Health Study for a New Generation of U.S. Veterans is an ongoing study of Iraq and Afghanistan Veterans aimed at providing insight on the overall health of recent Veterans, improving VA’s understanding of the health services Veterans need, and maximizing the quality of care VA offers to these Veterans.

SELECTED MILESTONES AND MAJOR EVENTS

2010 - Began a longitudinal cohort study of the longer-lasting health effects of service during the Iraq war

2011 - Funded, along with the Department of Defense (DoD), two consortia to improve treatment for PTSD and mild TBI

2014 - Found that Veterans who sought and received care soon after the end of their service had lower rates of PTSD upon follow-up than those who waited to get treatment

2015 - Confirmed, by summarizing the results of 19 unique studies, that Iraq and Afghanistan Veterans had higher rates of respiratory problems during and after deployment

2015 - Began work with the Henry M. Jackson Foundation for the Advancement of Military Medicine and other partners to learn which programs and services are most helpful to Veterans as they reintegrate after deployment

(Continued on back)
Researchers are looking at how transitioning out of the military affects Veterans’ physical and emotional health, work life, finances, and social relationships.
ABOUT ALZHEIMER’S DISEASE

- Dementia is a general term for disorders involving a decline in memory, thinking, judgment, and learning ability. Although physicians can almost always determine whether a person has dementia, there is no single test that can show whether a person has Alzheimer’s or is at risk for the disease.

- Alzheimer’s disease is the sixth leading cause of death in the United States, with death usually coming as a result of secondary infections such as pneumonia and bladder infections common in incapacitated patients, or from the inability to follow medical instructions.

- Those with Alzheimer’s may, at first, notice mild confusion and difficulty remembering. Eventually, they may fail to even recognize important people in their lives and undergo dramatic personality changes.

- Medication and management strategies may temporarily improve the symptoms of the disease, allowing patients to maximize their ability to function and maintain their independence for a while longer. However, there is presently no cure for the disease.

VA RESEARCH ON ALZHEIMER’S DISEASE: OVERVIEW

- VA researchers are looking at ways to delay or possibly prevent the onset of Alzheimer’s disease. They are also developing new ways to detect the disease, to understand its connection to other illnesses and injuries, and to support those who have the difficult responsibility of caring for Veterans with Alzheimer’s.

- Some VA researchers are working on potential drug therapies for prevention and treatment of Alzheimer’s. Others are exploring the genetic and environmental causes of the disease, or studying the best ways to provide long-term care for patients with Alzheimer’s.

- The Alzheimer’s Disease Neuroimaging Initiative, led by VA researchers, is making it easier for clinicians to diagnose Alzheimer’s disease in its early stages.

- VA’s Center for Imaging of Neurodegenerative Disease is devoted exclusively to magnetic resonance imaging of the human brain, and is homing in on clues regarding Alzheimer’s disease and other diseases involving the progressive loss of brain function.

SELECTED MILESTONES AND MAJOR EVENTS

2004 - Took on leadership of a nationwide study to identify brain changes linked to Alzheimer’s disease

2006 - Established the Center for Imaging of Neurodegenerative Diseases at the San Francisco VA, in collaboration with the Department of Defense

2011 - Demonstrated the effectiveness of an insulin-based treatment, using a special nasal delivery system, to possibly help ward off Alzheimer’s

2014 - Found that vitamin E, an inexpensive treatment, can significantly delay functional decline among patients with mild to moderate Alzheimer’s

2015 - Developed a simple blood test that can be used to predict the buildup of amyloid in the brain, an Alzheimer’s biomarker, with modest accuracy

RECENT STUDIES: SELECTED HIGHLIGHTS

- Compounds that inhibit two cellular proteins can help remove the toxic plaques found in the brain of mice with Alzheimer’s disease.
Alzheimer’s disease, according to researchers with institutions including VA’s Geriatric Research Education Clinical Center in Madison, Wisconsin. The accumulation of this plaque is a key feature of neurodegenerative diseases such as Alzheimer’s. (Brain, March 2016)

• **Intranasal insulin detemir, a longer-lasting form of insulin**, improved cognitive functioning for patients with Alzheimer’s disease or mild cognitive impairment, found researchers with the VA Puget Sound’s Geriatric Research, Education, and Clinical Center and other institutions. (Journal of Alzheimer’s Disease, Jan. 1, 2015)

• **People living at higher altitudes may have a 50 percent lower risk** of dying of Alzheimer’s disease compared with people living at lower altitudes, according to researchers with the Puget Sound and Portland VA medical centers. They say oxygen levels might play a part in these findings, but more research is needed. (JAMA Psychiatry, December 2015)

• **A classification model based on cognitive and blood protein variables** can identify brain amyloidosis (the accumulation of protein in the vessels of the central nervous system), Amyloidosis is associated with dementia and Alzheimer’s disease. This research was part of the Alzheimer’s Disease Neuroimaging Initiative. (Neurology, Feb. 17, 2015)

• **Traumatic brain injury in older Veterans** was associated with a 60 percent increase in the risk of developing dementia, found researchers with the San Francisco VA Health Care System. This research suggests that Veterans who have had a traumatic brain injury may be more likely to develop dementia in the future. (Neurology, July 22, 2014)

• **Taking supplemental vitamin E may slow functional decline** in patients with mild to moderate Alzheimer’s disease, found a multicenter VA research team. The study showed that the vitamin added, on average, six months of better cognitive functions for patients with this progressive disease. (JAMA, Jan. 1, 2014)

• **Younger blood may possess rejuvenating properties** that could affect aging and degeneration in the brain, according to a literature review conducted by VA Palo Alto and Stanford University researchers of studies involving animal models. This finding suggests promising avenues for future research on blood-borne brain rejuvenation. (JAMA Neurology, October 2015)

• **Prisoners of war (POWs) and Veterans with PTSD may be at increased risk of dementia**, according to researchers with the San Francisco VA Health Care System. This retrospective study showed the risk of dementia was increased in those Veterans studied who were POWs or who had PTSD, with the greatest risk existing in those who both had PTSD and had been POWs. (Alzheimer’s & Dementia, June 2014)

For more information on VA studies on Alzheimer’s disease and other key topics relating to Veterans’ health, please visit www.research.va.gov/topics

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**VA researchers are looking at ways to delay or possibly prevent the onset of Alzheimer’s disease.**

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ABOUT ARTHRITIS

- Arthritis refers to joint inflammation from a number of causes. The term is used to describe more than 100 rheumatic diseases and conditions that affect joints, the tissues that surround the joint, and other connective tissue.

- Typically, pain and stiffness in and around one of the joints characterize rheumatic conditions. The symptoms can develop gradually or suddenly. Certain rheumatic conditions can also involve the immune system and various internal organs of the body.

- Osteoarthritis, or degenerative joint disease, is the most common form of arthritis, affecting up to 27 million Americans.

- Rheumatoid arthritis affects about 1.3 million Americans. In this disease, the body’s immune system attacks its own joint tissue, causing inflammation. It can result in the destruction of cartilage and bone.

VA RESEARCH ON ARTHRITIS: OVERVIEW

- VA researchers are developing new clinical treatments that reduce Veterans’ disabilities and improve the ability of VA clinicians to provide effective care for patients with arthritis.

- Some groups are identifying molecular mechanisms that affect skeletal health and can lead to new treatments for osteoarthritis. Others are using innovative techniques to design therapeutic interventions, from surgical techniques to physical therapy, for patients who have lost mobility or functioning. Still others hope to halt the progression of osteoarthritis, and to reverse the degeneration of cartilage associated with the disease.

- VA studies are exploring less expensive drug treatments for arthritis. Others are examining possible causes of arthritis, such as immune system changes and a possible link to PTSD.

- VA researchers are exploring complementary and integrative treatments, including nutritional supplements, massage, and activity pacing, to manage pain caused by arthritis.

SELECTED MILESTONES AND MAJOR EVENTS

2002 – Established the Rheumatoid Arthritis Registry, providing researchers with access to information about hundreds of male patients with rheumatoid arthritis

2006 – Found little overall benefit in two widely used nutritional supplements for arthritis (glucosamine and chondroitin sulfate)

2011 – Learned that the complement system, a group of proteins that move freely through the blood stream, plays an important role in the development and spread of osteoarthritis

2014 – Received the Lee C. Howley Sr. Prize for Arthritis Scientific Research (VA Boston Health Care System and others) for determining that less expensive anti-rheumatic drugs worked as well as newer, more expensive, biological treatments

2014 – Tested an anti-inflammatory drug on mice that may someday have the effect of reversing bone loss in patients with RA

RECENT STUDIES: SELECTED HIGHLIGHTS

- Group and individual physical therapy are equally effective for patients with knee osteoarthritis, found a study conducted at the Durham VA Medical Center in North Carolina. The researchers say both approaches are reasonable.
Arthritis refers to joint inflammation from a number of causes. The term is used to describe more than 100 rheumatic diseases and conditions that affect joints, the tissues that surround the joint, and other connective tissue.

- **Men with rheumatoid arthritis showed higher rates of mortality** than age-matched men without the disease, according to researchers from multiple VA health care systems. These men had a three-fold risk of respiratory-related deaths compared to men without rheumatoid arthritis. (*Arthritis Care & Research*, Dec. 21, 2015)

- **Swedish massage may be effective for reducing pain** in patients with knee osteoarthritis, according to investigators with the Durham VA Medical Center and their colleagues. Their pilot study showed that Swedish massage is a feasible and acceptable treatment for VA health care users, and they suggest a larger, randomized trial to further explore its possible benefits. (*Journal of Alternative and Complementary Medicine*, June 1, 2015)

- **Trauma exposure and PTSD may increase the risk of autoimmune disorders** such as rheumatoid arthritis, according to researchers at the San Francisco VA Medical Center. PTSD is associated with endocrine and immune abnormalities, and this study showed that Veterans with PTSD were at a significantly higher relative risk than Veterans without the condition. (*Biological Psychiatry*, Feb. 15, 2015)

- **An anti-inflammatory drug that blocks a specific receptor of T cells** may halt or even reverse bone loss related to rheumatoid arthritis. This Atlanta VA Medical Center study found that the tested drug promoted bone formation and density in mice. (*Arthritis & Rheumatology*, April 1, 2014)

- **Ann Arbor VA researchers are conducting a trial** that tests activity pacing in people with osteoarthritis, with funding from the National Institutes of Health. Activity pacing is a strategy that involves planning rest breaks during the day, which helps to avoid arthritis flare-ups. A pilot study has indicated that tailored activity pacing reduces fatigue and makes daily activity easier. (*National Institutes of Health*)

- **Less expensive combinations of disease-modifying anti-rheumatic drugs** produce the same clinical benefits for patients with rheumatoid arthritis as much more expensive biological treatment in a study conducted by the Omaha VA Medical Center and the University of Nebraska. The study included 353 patients at 16 VA medical centers, 12 rheumatoid arthritis investigational network sites, and eight Canadian medical centers. (*New England Journal of Medicine*, July 25, 2013)

For more information on VA studies on arthritis and other key topics relating to Veterans’ health, please visit [www.research.va.gov/topics](http://www.research.va.gov/topics)
ABOUT CANCER

• The 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 tissues.

• Around 40,000 cancer cases are reported to VA’s Central Cancer Registry annually, about 3 percent of all cancers in the United States.

• The five most frequently diagnosed cancers among VA cancer patients were prostate, lung and bronchial, colorectal, urinary and bladder cancers, and skin melanomas. This list is similar to that for American men as a whole.

• Colon cancer can be cured if diagnosed early, yet one-third of patients who develop colon cancer will die from the disease.

VA RESEARCH ON CANCER: OVERVIEW

• VA researchers conduct laboratory experiments aimed at discovering the molecular and genetic mechanisms involved in cancer; studies looking at the causes of disease; clinical trials to evaluate new or existing treatments; and studies focused on improving end-of-life care.

• VA researchers are finding ways to maintain good health and enhance the quality of life of the increasing number of cancer survivors.

• While most of the patients VA treats are male, the department is seeing increasing numbers of women Veterans. VA researchers are therefore looking closely at breast cancer, its causes, and treatments for the disease.

• VA studies are examining many topics related to cancer, including the possible risks of e-cigarettes, the link between Agent Orange exposure and prostate cancer, and gene therapy to halt the growth of tumor cells.

• VA and DoD are working on a program to tailor cancer care for patients based on the genes and proteins associated with their tumors. By using genomics, clinicians can provide individualized care based on patients’ specific biology.

SELECTED MILESTONES AND MAJOR EVENTS

1932 - Established a tumor research laboratory in Hines, Ill.—the first VA research laboratory to receive funding specifically for research

1950 - Concluded, in a paper by Dr. Robert Schrek of Hines, there is “strong circumstantial evidence” linking cigarette smoking with respiratory tract cancers

1956 - Linked cigarette smoking with precancerous lesions

1984 - Developed a transdermal nicotine patch to reduce the cravings for cigarettes

2000 - Showed the superiority of colonoscopy to sigmoidoscopy

2012 - Demonstrated that observation is as effective as surgery in treating early-stage prostate cancer

2015 - Joined with gastroenterologists from throughout the United States, Canada, and the United Kingdom to develop a new set of recommendations on the surveillance and management of areas of pre-cancerous cells in patients with inflammatory bowel disease

2016 - Formed the Applied Proteogenomics Organizational Learning and Outcomes (APOLLO) consortium, with the Department of Defense and National Cancer Institute, to tailor cancer care based on individual gene and protein information

RECENT STUDIES: SELECTED HIGHLIGHTS

• E-cigarettes may be toxic to airway cells, suppress host defenses, and promote inflammation over time, found a VA San
Diego Healthcare System study in mice. E-cigarette vapor exposure also led to more damage from bacteria in the throat. (Journal of Molecular Medicine, Jan. 25, 2016)

- Early lung cancer screenings can actually lower smokers’ motivation to quit smoking, according to researchers with the Center of Innovation for Veteran-Centered and Value-Driven Care. Many patients believed that undergoing the screening process meant they did not need to quit. The researchers recommend that clinicians address misconceptions about lung cancer screenings with patients. (JAMA Internal Medicine, September 2015)

- Longer-lasting colonoscopies are associated with lower cancer rates, according to researchers with the Minneapolis VA Health Care System and the University of Minnesota. Patients who had been examined by doctors with withdrawal times shorter than six minutes, on average, were more likely to have cancer. (Gastroenterology, October 2015)

- Patients who received radiation therapy for testicular cancer were six times more likely to develop stomach cancer, according to an international study including researchers from the Oklahoma City VA Medical Center. The study further found that those who had received very high doses of radiation were at nearly 20 times the risk. (British Journal of Cancer, Jan. 6, 2015)

- Honokiol, an extract from magnolia tree bark, blocks a protein called epidermal growth factor receptor (EGFR), found researchers with VA and the University of Alabama at Birmingham. EGFR is associated with squamous cell cancers of the head and neck. In the study, honokiol shut down cancer-cell growth in animal models. (Oncotarget, Aug. 28, 2015)

- Low-dose aspirin can impair the ability of breast cancer cells to renew themselves, found a Kansas City (Mo.) VA Medical Center study involving mice. A daily dose of aspirin almost halved tumor growth by altering the molecular signature in breast cancer cells. (Laboratory Investigation, July 2015)

- Gene therapy could halt the growth of prostate tumors, according to Kansas City (Mo.) VA Medical Center researchers. A combination of genes for prostate-specific antigen and prostate stem cell antigen seemed to stop prostate tumors from growing in mice by promoting the production of T cells that attacked tumor cells. (Immunotherapy, June 2011)

- Multitarget stool DNA testing is significantly more sensitive at detecting colorectal cancer and precancerous lesions than a fecal immunochemical test, according to a team led by researchers at the Center for Innovation at Roudebush Veterans Affairs Medical Center in Indianapolis. However, multitarget stool DNA testing gives more false positives than fecal immunochemical testing. (New England Journal of Medicine, April 3, 2014)

For more information on VA studies on cancer and other key topics relating to Veterans’ health, please visit www.research.va.gov/topics

Among other goals, VA researchers are finding ways to maintain good health and enhance the quality of life of the increasing number of cancer survivors.
ABOUT CARDIOVASCULAR DISEASE

- Cardiovascular disease is the number-one killer of Americans, and is the leading cause of hospitalization in the VA health care system. It is also a major cause of disability.
- Cardiovascular disease is particularly important to Veterans because it is associated with a number of other diseases that often affect them. These include diabetes, spinal cord injuries, and posttraumatic stress disorder.
- Although there are many different forms of cardiovascular disease, one of the most common forms is a narrowing or a blocking of the blood vessels that supply blood to the heart. This is called coronary artery disease (CAD), and is the main reason people have heart attacks.

VA RESEARCH ON CARDIOVASCULAR DISEASE: OVERVIEW

- A VA study conducted in the 1960s generated the first definitive evidence that treating moderate high blood pressure helps prevent and delay the complications hypertension can bring. These complications can include heart disease, kidney disease, stroke, and CAD.
- VA researchers are developing new treatments for cardiovascular disease and helping to improve existing treatments. They are looking at the genetic and lifestyle causes of the disease and are conducting studies ranging from lab experiments to large clinical trials involving thousands of patients.
- VA is also making Veterans and their families aware of the risk factors for cardiovascular disease. Besides high blood pressure, these include smoking, high cholesterol, obesity, lack of physical activity, and uncontrolled diabetes.
- The department offers a number of evidence-based programs to help Veterans manage these conditions. VA researchers review these programs, evaluate their effectiveness, and make suggestions for improvements.

SELECTED MILESTONES AND MAJOR EVENTS

1960 – Successfully implanted the first cardiac pacemaker, a device developed by a VA team

1970 – Published the results of a landmark VA cooperative study on hypertension, showing that treating moderate high blood pressure prevented or delayed catastrophic health complications

1996 – Developed clinical practice guidelines on cholesterol screening for the American College of Physicians

2007 – Learned that balloon angioplasty and stenting do little to improve outcomes for patients with stable coronary artery disease who also receive optimal drug therapy and undergo lifestyle changes

2015 – Participated in the Systolic Blood Pressure Intervention Trial (SPRINT), which found that significantly lowered systolic blood pressure reduces the rate of heart and kidney diseases, stroke, and age-related declines in people over 65

RECENT STUDIES: SELECTED HIGHLIGHTS

- Patients who were assigned to reach a systolic blood pressure goal below 120, far lower than current guidelines of 140 (or 150 for people over 60), had their risks of heart attacks, heart failure, and strokes reduced by a third, and their risk of death reduced by a quarter, according
Cardiovascular disease is the number-one killer of Americans, and is the leading cause of hospitalization in the VA health care system. It is also a major cause of disability.
ABOUT CAREGIVERS

• Increasingly, America is becoming a nation of caregivers. According to a 2015 report from AARP, an estimated 43.5 million adults in the United States provided unpaid care to an adult or a child in the prior 12 months.

• Whether supervising a spouse to help keep him or her from wandering, assisting with activities of daily living, helping to develop and implement treatment plans, or managing a loved one’s behavioral symptoms, caregivers face multiple demands on their time and emotional and physical energy, and as a result may be at risk for becoming anxious, depressed, or susceptible to chronic illness themselves.

• In 2010, legislation authorized VA to establish a wide range of new services to support certain caregivers of eligible Veterans who served after Sept. 11, 2001. These caregivers are now entitled to access to a toll-free caregiver support line (1-855-260-3274), expanded education and training on caring for Veterans at home, and other support services such as counseling and support groups.

• VA facilities also offer programs including in-home care; specialized education and training; respite care; equipment, home, and automobile modification; and financial assistance for eligible Veterans. Every VA medical center has a caregiver support coordinator to help link up caregivers and Veterans with available VA and non-VA support resources.

VA RESEARCH ON CAREGIVERS: OVERVIEW

• VA experts are developing and refining questionnaires and survey tools, as well as cross-cutting strategies that can be used to implement and test programs across a wide variety of caregiving situations.

• Several VA studies are looking at the impact of caregiver education and stress-reduction programs on the health and wellness of both the Veteran and the caregiver. Other studies are focusing on both the short- and long-term needs of caregivers, as many of these individuals will be providing care for years or even decades.

• VA investigators are continuing to improve their understanding of the care caregivers provide and the support they need. They also are learning how caregiving has affected the caregiver, the Veteran receiving care, and the Veteran’s entire family.

SELECTED MILESTONES AND MAJOR EVENTS

2007 – Introduced the Resources for Enhancing Alzheimer’s Caregiver Health (REACH VA) program to reduce stress on caregivers for Veterans with Alzheimer’s disease

2009 – Developed the VA Family Care map, to ensure family members are fully involved in the care of Veterans with polytrauma

2010 – Completed VA’s Family and Caregiver Experience (FACES) study, which provided significant information on who provides care to seriously injured Veterans, what kinds of services and support they provide, and what help they need

2013 – Determined that in families using a VA-developed home safety toolkit, there was less caregiver strain, better home safety, and fewer accidents and risky behaviors among those with Alzheimer’s

2015 – Found that the blame and anger associated with the grief of caring for a loved one with a traumatic brain injury (TBI) may be related to inflammation and certain chronic diseases including heart disease, cancer, and diabetes

(Continued on back)
RECENT STUDIES: SELECTED HIGHLIGHTS

- According to VA’s FACES study, 79 percent of caregivers for Veterans with multiple injuries (polytraumas) are women, usually the Veteran’s parent or spouse. Even as long as four years after their injury, 22 percent of Veterans with polytraumas supported by caregivers still need help with basic activities and daily living such as bathing, feeding, and toileting. An additional 48 percent need help with tasks such as shopping, driving, and money management, according to Minneapolis VA researchers. (Family and Caregiver Experience Study)

- Financial strain is common for caregivers. Among caregivers of Veterans with polytrauma, 62 percent reported to Minneapolis VA researchers that their assets had been depleted and 41 percent reported having to leave the labor force. These figures are much higher than those for other caregivers internationally. (Journal of Head Trauma Rehabilitation, January-February 2012)

- A safety toolkit that provides research-based recommendations for home safety has been created by researchers at the Bedford, Mass., VA hospital and Boston University. Families who used the 25-page, illustrated, simple-language guide to help them care for Veterans with Alzheimer’s disease had less caregiver strain, better home safety, and fewer accidents and risky behaviors than families whose loved one received usual care. (International Journal of Alzheimer’s Disease, 2013)

- Caregivers who have not been trained on how to navigate health care systems have higher levels of depression, feel more burdened by their responsibilities, and have lower self-esteem than those who had been trained in this skill. Researchers at the Richmond and Minneapolis VA Medical Centers also found caregivers who had not been trained in how to support the emotions of their care recipients now have higher levels of anxiety, depression, and care burden, and lower self-esteem than those who received such training. (Behavioral Neurology, 2015)

- Systematized feedback to caregivers could alleviate their burden and help them avoid burnout and mental health concerns. In a study by researchers from the Ann Arbor VA and the University of Michigan involving 369 Veterans with heart failure, those caregivers who received feedback about their loved one reported less caregiver strain and depression than in the control group. They also reported they had spent more time with their patients, including greater attendance at doctors’ appointments; increased involvement in patient medication adherence; and more time spent in supportive care. (Medical Care, August 2015)

- Blame and anger associated with the grief of caring for a loved one with a TBI may be related to inflammation and certain chronic diseases, including heart disease, cancer, and diabetes. A study by researchers at the Hines, Ill., VA hospital and Loyola University of Chicago found these caregivers collectively reported levels of grief comparable to that of individuals who have lost a loved one. Inflammatory-related health issues may be an important indicator of which caregivers may be at risk for developing chronic problems such as heart disease. (Biological Research for Nursing, January 2016)

For more information on VA studies on caregivers and other key topics relating to Veterans’ health, please visit www.research.va.gov/topics
ABOUT CIH

• More than 30 percent of American adults and about 12 percent of children use health care approaches developed outside of mainstream conventional medicine, according to the National Center for Complementary and Integrative Health.

• Complementary health is used along with standard medical care, while alternative medicine is used in place of standard care. Integrative health refers to care that blends both mainstream and alternative practices.

• Most complementary health approaches fall into one of two subgroups: natural products, which include herbs, vitamins and minerals, and probiotics; and mind and body practices such as yoga, meditation, massage therapy, acupuncture, and relaxation techniques.

• In VA, CIH techniques are most commonly used to help Veterans manage stress, or to promote wellness.

• CIH is often used to treat PTSD, depression, back pain, headache, arthritis, fibromyalgia (which involves chronic pain and fatigue throughout the body), and substance abuse.

VA RESEARCH ON CIH: OVERVIEW

• Many CIH practices have not been rigorously tested in formal research. VA researchers are conducting studies to determine which therapies are safe and effective, and for which conditions and populations they work best.

• VA has conducted several studies on integrative mental health treatments. They address topics such as meditation to treat PTSD and other mental health conditions; vitamin E to delay the decline of cognitive functioning in Alzheimer’s disease; and transcranial magnetic stimulation to treat depression, migraines, and tinnitus.

• VA researchers are exploring integrative cancer treatments such as extract from magnolia tree bark, antioxidants in fruits, and compounds in the spice turmeric. These natural compounds show potential to block cancer growth.

• Other complementary and integrative approaches being explored by VA include exercise for physical and mental health, maggot therapy to clean wounds, and fecal transplants to resolve C. difficile infections.

SELECTED MILESTONES AND MAJOR EVENTS

2006 – **Learned** that glucosamine and chondroitin sulfate, taken either alone or in combination, do not reduce pain effectively in patients with osteoarthritis of the knee

2011 – **Reported** that 90 percent of VA facilities offered complementary or integrative medicine therapies, or referred Veterans to licensed practitioners.

2014 – **Found** that vitamin E, an inexpensive treatment, can significantly delay functional decline among patients with mild to moderate Alzheimer’s disease.

2015 – **Learned** that mindfulness therapy may be more effective than standard group therapy in treating PTSD.

RECENT STUDIES: SELECTED HIGHLIGHTS

• Veterans who used “mantram” meditation had improved outcomes for anxiety, depression, and somatization (psychological distress expressed through physical symptoms), according to a study at six VA sites. Mantram meditation involves silently repeating a word or
VA researchers are conducting studies to determine which complementary and integrative therapies are safe and effective, and for which conditions and populations they work best.

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ABOUT DEPRESSION

- According to the National Institute of Mental Health (NIMH), major depression is one of the most common mental disorders in the United States, and it carries the heaviest burden of disability among mental and behavioral disorders. In 2014, NIMH estimated that some 15.7 million adults aged 18 or older in the United States had at least one major depressive episode in the past year—6.7 percent of all U.S. adults.

- Most experts believe a combination of genes and stressful life events can cause depression. Health problems such as anemia or an underactive thyroid gland can also lead to depression, as can certain medicines, such as steroids or narcotics.

- In 2008, VA estimated that about 1 in 3 Veterans visiting primary care clinics has some symptoms of depression; 1 in 5 has serious symptoms that suggest the need for further evaluation for major depression; and 1 in 8 to 10 has major depression, requiring treatment with psychotherapy or antidepressants.

VA RESEARCH ON DEPRESSION: OVERVIEW

- VA researchers are making important headway in treating, screening, and diagnosing depression and other mood disorders such as bipolar disorder, persistent despondency, and seasonal affective disorder.

- Researchers are developing models of family interventions and social support to help Veterans recover from mood disorders, learning which risk factors make a person more likely to suffer from depression or to respond positively to a specific medication, and identifying and testing potential new drugs for depression and other disorders.

SELECTED MILESTONES AND MAJOR EVENTS

2006 – Developed, through VA’s TIDES project, an evidence-based collaborative approach to depression management

2006 – Began the Heart and Soul Study, on how psychological factors influence the outcomes of patients with coronary heart disease

2008 – Demonstrated that the link between depression and heart disease may hinge largely on behavioral factors associated with depression, such as lack of exercise and increased smoking

2012 – Found that serotonin and norepinephrine reuptake inhibitors (SNRIs) may be more effective in treating depression symptoms than drugs that affect only serotonin (SSRIs)

2015 – Learned that talk therapy delivered by two-way video calls is at least as effective as in-person treatment delivery for older Veterans with depression

RECENT STUDIES: SELECTED HIGHLIGHTS

- Veterans with depression are more likely to complain of increased chest pain related to ischemic heart disease. Ischemic heart disease, also known as coronary artery disease, is the term given to heart problems caused by narrowed heart arteries. Researchers at the VA Puget Sound Health Care System found that changes in depression symptoms could affect the perception of a patient’s chest pain, or angina. The greater the perception of chest pain, regardless of the actual extent of the disease, the greater the likelihood of cardiac intervention. (Annals of Behavioral Medicine, February 2015)

- Veterans with depression, PTSD, and traumatic brain injury have the greatest level of difficulty in getting around, communicating and getting along with others, self-care, and other daily tasks, according to researchers at VA’s Translational Research Center for...
**DEPRESSION**

TBI and Stress Disorders. Patients with these conditions have higher levels of disability than those with any other three-diagnosis combination. ([Journal of Traumatic Stress](http://example.com), February 2015)

- **Women Veterans who undergo cardiac catheterization are more likely to be depressed** or have posttraumatic stress disorder (PTSD) than women who did not. They also tend to be younger and more obese than men and are also significantly less likely to have obstructive coronary disease, according to researchers with the VA Ann Arbor Healthcare System and the University of Michigan. Consequently, they were less likely to have been prescribed heart medications. However, their long-term health outcomes were about the same as those of their male counterparts. ([Circulation: Cardiovascular Quality and Outcomes](http://example.com), March 2015)

- **Talk therapy delivered by two-way video calls is at least as effective as in-person treatment delivery for older Veterans with depression.** A study led by researchers from VA's Health Equity and Rural Outreach Center randomly assigned 241 Veterans aged 58 or older with major depression to receive either telemedicine or same-room psychotherapy. Both groups received the same kind of treatment: behavioral activation, a talk therapy that emphasizes reinforcing positive behaviors. The team found that telemedicine-delivered psychotherapy produced similar outcomes to in-person treatment. ([Lancet Psychiatry](http://example.com), August 2015)

- **Cognitive behavioral therapy (CBT) can help Veterans and others with seasonal affective disorder (SAD).** CBT is a form of psychotherapy that focuses on the integral relationship between people's thoughts and their behaviors. SAD is a form of clinical depression that occurs in fall and winter and is more highly prevalent in those who live in northern climates. In a study by researchers from VA's Baltimore and Denver Mental Illness Research Education and Clinical Centers (MIRECCs), along with researchers from several universities, patients focused on behaviors that would help them cope with winter and were encouraged to engage in fun activities to counteract their avoidance mechanisms. ([American Journal of Psychiatry](http://example.com), Sept. 1, 2015)

- **Depression may be the cause of poor health behaviors, not its consequence,** according to a study led by VA and University of California, San Francisco researchers. The team found that depressive symptoms were linked to a range of lifestyle risk factors among 667 patients with coronary heart disease. These included smoking, low levels of physical activity, poor sleep quality, and poor mental activities. Each of these lifestyle factors got worse over a five-year period in depressed individuals, more so than in those who had cardiovascular disease but few, if any, symptoms of depression. ([Annals of Behavioral Medicine](http://example.com), August 2016)

For more information on VA studies on depression and other key topics relating to Veterans’ health, please visit [www.research.va.gov/topics](http://www.research.va.gov/topics)

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**Major depression is one of the most common mental disorders in the U.S., and it carries the heaviest burden of disability among mental and behavioral disorders.**

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ABOUT DIABETES

• Diabetes is a chronic disease in which the body cannot produce or properly use insulin, which the body needs to bring sugar out of the bloodstream and into cells. As a result of high blood sugar levels, damage eventually occurs to blood vessels and organs.

• Symptoms of diabetes include blurry vision, excessive thirst, fatigue, frequent urination, hunger, and weight loss. Persons with diabetes need to have their hemoglobin average blood glucose levels checked every three to six months.

• There are three major types of diabetes. In type 1 diabetes, the body makes little or no insulin, so daily injections of insulin are needed. It is usually diagnosed in childhood. Type 2 diabetes usually occurs in adults. In type 2 diabetes, the pancreas does not make enough insulin to keep blood glucose levels normal, often because the body does not respond well to insulin. The third type of diabetes is gestational diabetes, high blood glucose that develops during pregnancy in women who do not have diabetes.

• More than 90 percent of adults with diabetes have type 2 diabetes. More are at risk due to overweight or obesity.

• Diabetes affects nearly 25 percent of VA’s patient population. The disease is the leading cause of blindness, end-stage renal disease, and amputation for VA patients.

VA RESEARCH ON DIABETES: OVERVIEW

• 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.

• VA researchers are working to develop better ways to prevent and treat diabetes, especially in special populations such as the elderly, amputees, minorities, spinal cord-injured patients, and those with kidney or heart disease.

• VA investigators conducted the VA Diabetes Trial, a multiyear study examining the relationship between glucose control in diabetics and cardiovascular health. The seven-year study included nearly 1,800 patients with diabetes. VA continues to conduct follow-up studies based on the original trial.

• VA researchers are using data from other large studies, such as the VA-DoD Millennium Cohort Study, to examine predictors of diabetes in service members and Veterans. They have found links between diabetes and sleep apnea, poor sleep quality, statin use, and obesity.

• Dr. Andrew V. Schally, a Nobel Prize winner and VA researcher, is leading a team studying growth hormone-releasing hormone agonists’ ability to promote the growth and function of pancreatic islet cells. These new agonists—drugs that act like other substances and therefore stimulate an action in the body—may provide an improved approach to treating diabetes by stimulating the body to release insulin.

SELECTED MILESTONES AND MAJOR EVENTS

1977 – Received the Nobel Prize in physiology or medicine (Rosalyn Yalow, PhD), for developing a new way to measure insulin and other hormones in the blood

1998 – Discovered that an implantable insulin pump offers better blood sugar control, weight control, and quality of life for adult than multiple daily injections

2009 – Determined, through the VA Diabetes Trial, that intensively controlling blood sugar reduces the risks of heart disease only modestly

2013 – Documented the link between low blood sugar and dementia in older adults

(Continued on back)
**RECENT STUDIES: SELECTED HIGHLIGHTS**

- Clinicians should consider reducing the dosage of blood pressure- and blood glucose-lowering medicine in older patients with diabetes when blood pressure and glucose levels are low, found researchers with the VA Center for Clinical Management Research in Ann Arbor, Mich. Study data shows that medication is rarely de-intensified for these patients, which the researchers called a lost opportunity to reduce overtreatment. ([JAMA Internal Medicine](https://www.jama.com), December 2015)

- **Diabetes, diabetic complications, and overweight/obesity** were more commonly diagnosed among statin users than similar nonusers, according to researchers at the VA North Texas Health Care System and University of Texas. Statins are commonly prescribed to treat high cholesterol, but this study demonstrates that short-term clinical trials might not fully describe the risks and benefits of long-term statin use. (Journal of General Internal Medicine, November 2015)

- **A comprehensive telemedicine intervention improved outcomes** among Veterans with persistently poor diabetes control. The study, conducted by Durham VA Medical Center and Duke University researchers, found that Veterans in a telemedicine-based diabetes management program had improved outcomes over those who received only clinic care. ([Telemedicine Journal of e-Health](https://www.tjeh.org), April 29, 2016)

- **Agonists of growth hormone-releasing hormone (GHRH) improved** biological function and insulin production of the pancreas in animal models. This study provides an improved approach to the therapeutic use of GHRH agonists in the treatment of diabetes mellitus, according to researchers from the Endocrine, Polypeptide, and Cancer Institute of the Miami VA Healthcare System and their associates. ([Proceedings of the National Academy of Sciences](https://www.pnas.org), Nov. 3, 2015)

- **High blood pressure is associated with worse kidney outcomes** in patients with proteinuric diabetic kidney disease, according to a study based on the VA Nephropathy in Diabetes Trial. Control of blood pressure delays the progression of proteinuric diabetic kidney disease (in which protein leaks from the blood into the urine through the kidneys) to end-stage renal disease, and researchers in this study worked to pinpoint the optimal blood pressure to improve these outcomes. ([Clinical Journal of the American Society of Nephrology](https://jasn.asnjournals.org), Dec. 7, 2015)

- After nearly 10 years of follow-up as part of the VA Diabetes Trial, patients with type 2 diabetes who had been randomly assigned to intensive glucose control for over five years had 8.6 fewer major cardiovascular events per 1,000 person-years than those assigned to standard therapy, but no improvement was seen in the rate of overall survival. ([New England Journal of Medicine](https://www.nejm.org), June 4, 2015)

For more information on VA studies on diabetes and other key topics relating to Veterans’ health, please visit [www.research.va.gov/topics](http://www.research.va.gov/topics)

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**Diabetes affects nearly 25 percent of VA’s patient population. The disease is the leading cause of blindness, end-stage renal disease, and amputation for VA patients.**

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ABOUT GASTROINTESTINAL HEALTH

• Gastrointestinal problems are among the illnesses reported by many Gulf War Veterans. These problems include irritable bowel syndrome, which is marked by chronic cramping, bloating, and diarrhea.

• More than 1 million Americans have inflammatory bowel disease, which includes Crohn’s disease and ulcerative colitis. Crohn’s disease affects the entire gastrointestinal tract, while ulcerative colitis is limited to the colon.

• Frequent heartburn, or gastroesophageal reflux disease (GERD), is a common gastrointestinal issue. About one in 10 Americans experiences GERD symptoms at least once a week.

• Colorectal cancer is the third most common cancer in the United States.

VA RESEARCH ON GASTROINTESTINAL HEALTH: OVERVIEW

• VA researchers are exploring new techniques to treat Clostridium difficile (C. difficile) infections, such as doses of non-toxic C. difficile spores and fecal transplantation. C. difficile is often resistant to standard treatments such as antibiotics.

• Researchers from three VA sites developed new guidelines for screening and managing precancerous cells that could develop into colon cancer in patients with inflammatory bowel disease.

• VA has made it a priority to screen its patients aged 50 years or older for colon cancer. Evidence from the American Cancer Society suggests that screening efforts have helped lower the number of deaths from colon cancer in recent years.

• VA researchers are looking for potential drug therapies to help Veterans with gastrointestinal problems such as stomach ulcers, C. difficile infections, irritable bowel syndrome, inflammatory bowel disease, colon cancer, and GERD. They are also exploring less invasive treatments and seeking supportive strategies for Veterans during and after treatment.

2004 – Found that the open technique is superior to the laparoscopic technique for mesh repair of primary hernias

2013 – Learned that treatment with the drug infliximab and an immunomodulator significantly reduces the risk of hospitalization and surgery

2013 – Determined that weight is not a factor in whether proton-pump inhibitors can successfully treat gastroesophageal reflux disease

2015 – Found that giving spores of non-toxic C. difficile by mouth can stop repeated bouts of infection

RECENT STUDIES: SELECTED HIGHLIGHTS

• Giving spores of non-toxic C. difficile by mouth can stop repeated bouts of C. difficile infection, found an international team of researchers led by Dr. Dale Gerding of the Edward Hines, Jr. VA Hospital. C. difficile is an intestinal bacterial infection that is often difficult to treat and frequently reoccurs. (Journal of the American Medical Association, May 5, 2015)

• A procedure called fecal transplantation, which may date back thousands of years, can effectively battle C. difficile infections, according to a systematic review by VA and University of...
VA researchers are looking for potential drug therapies to help Veterans with gastrointestinal problems, exploring less invasive treatments, and seeking supportive strategies for Veterans during and after treatment.
ABOUT GULF WAR VETERANS

- Nearly 700,000 men and women served in the Persian Gulf during operations Desert Shield and Desert Storm in the early 1990s.
- A 2016 epidemiological study by VA Office of Public Health researchers, based on data that were collected in 2012, indicated that almost 20 years after the Gulf War, Veterans of that war continue to report poorer health than those who served at the same time but did not see service in the Gulf.
- VA offers eligible Veterans a free Gulf War Registry health exam to find possible long-term health problems related to Gulf War service. The comprehensive exam includes an exposure and medical history, laboratory tests, and a physical exam. The registry data helps VA understand and respond to the health problems of Gulf War Veterans more effectively.
- A prominent condition affecting Gulf War Veterans is a cluster of medically unexplained chronic symptoms that can include fatigue, headaches, joint pain, indigestion, insomnia, dizziness, respiratory disorders, and memory problems. VA refers to these illnesses as “chronic multisymptom illness” (CMI) and “undiagnosed illnesses.”
- Because the symptoms vary widely, VA prefers not to use the term “Gulf War Syndrome” when referring to medically unexplained symptoms reported by Gulf War Veterans. However, the condition is often referred to as “Gulf War illness” by VA clinicians and researchers and in the medical literature. As many as 300,000 Veterans—about 4 in 10 of those who deployed to the Persian Gulf during Desert Shield and Desert Storm—are now estimated to have Gulf War Illness, based on the latest data.

VA RESEARCH ON GULF WAR VETERANS: OVERVIEW

- VA researchers are learning about conditions affecting Gulf War Veterans and identifying the best ways to diagnose and treat them. Their efforts are guided by a strategic plan for Gulf War research developed with input from leading scientists and researchers, physicians, and Veterans themselves.
- Along with the specific research areas outlined in the strategic plan, VA investigators are conducting research in many other areas important to Gulf War Veterans. These include studies on pain, autoimmune disease, neurodegenerative disease, sleep disorders, gastrointestinal disorders, respiratory problems, and other chronic diseases.
- The Research Advisory Committee on Gulf War Veterans’ Illnesses makes recommendations to the Secretary of Veterans Affairs on government research relating to the health consequences of military service in the Southwest Asia theater of operations during the Persian Gulf War.
- One of the largest studies on the health of Gulf War Veterans is VA’s Longitudinal Health Study of Gulf War Era Veterans. This study compares changes in health status over time between deployed and non-deployed Veterans from the Gulf War era.

SELECTED MILESTONES AND MAJOR EVENTS

1995 – Conducted a baseline survey for a longitudinal health study of Gulf War-era Veterans

2003 – Determined that cognitive behavioral therapy and aerobic exercise can help Gulf War Veterans with symptoms of chronic multisymptom illness

2004 – Found that a year of treatment with doxycycline, an antibiotic used to treat bacterial infections, did not improve the health of Veterans with CMI

2011 – Found that nasal continuous airway pressure can alleviate the sleep problems many Gulf War Veterans face, and may also help with memory and thinking issues 

(Continued on back)
More than two decades after the Gulf War, Veterans of the war continued to report poorer health than Gulf-era Veterans who were not deployed.
ABOUT HEALTH CARE DELIVERY

- Health services researchers play a vital role in shaping the delivery of health care by studying access, cost, and quality. They seek to improve health care by coming up with ways to assess and improve how the system functions.

- Research on health care delivery examines new models of providing care to patients. This includes studying ways to share information with patients and health care providers, the interactions between patients and clinicians, and the economics of health care.

- Many VA researchers work with health care informatics, finding ways to use technology to benefit both science and communications, including looking at how the Internet can be used for patient communication and telehealth.

- Health services researchers also look at new ways to accomplish research itself, including reducing the time it takes to conduct research projects and have the results adopted into everyday care.

VA RESEARCH ON HEALTH CARE DELIVERY: OVERVIEW

- VA’s Health Services Research and Development (HSR&D) works to identify and evaluate innovative strategies that lead to accessible, high quality, cost-effective care for Veterans and the nation. This work includes special centers and programs to promote innovative and collaborative research.

- VA investigators are involved in a number of initiatives focused on improving access to care for Veterans, as well as improving the quality of the care Veterans receive. These initiatives include implementing programs outside of hospitals and clinics, getting Veterans and providers involved in improving access to care, and identifying the best strategies for effective treatments.

- VA’s National Center for Patient Safety works to reduce and prevent inadvertent harm to Veterans as a result of their care. This center develops and provides practical tools to improve patient safety in areas such as teamwork and simulated training, safe patient handling and movement, and patient fall prevention and management.

- Patient Aligned Care Teams have transformed how primary care is delivered in VA. These integrated teams aim to deliver care that is patient-driven, team-based, comprehensive, and coordinated. Researchers have looked at how this transformation has been implemented in VA, and how PACTs have influenced Veterans’ health.

- VA researchers have led the way in exploring how care can be enhanced by the use of telephone, Internet, videoconferencing, email, and text messaging.

- VA is quickening the pace at which research is conducted and the results translated into everyday care. One new approach is point-of-care research, in which patients take part in studies as part of their usual care routine, without the need for special study visits.

- VA invests significant resources in supporting health care informatics and “big data” research. Among other goals, VA researchers hope to use population informatics to improve the diagnosis and care of cancer through automated surveillance and enhanced data access for clinical providers.

SELECTED MILESTONES AND MAJOR EVENTS

1960 – Opened VA’s first HSR&D center in Fort Howard, Md.


2008 – Created VINCI, a high-performance computing environment offering researchers access to comprehensive VHA data
Health services researchers play a vital role in shaping the delivery of health care by studying access, cost, and quality.

2013 – Funded first Collaborative Research to Enhance and Advance Transformation and Excellence (CREATE) to encourage collaboration among researchers to improve Veterans’ health care

2015 – Published, in the Federal Register, a plan to improve access to articles and data prepared by VA researchers while protecting Veterans’ data and privacy

**RECENT STUDIES: SELECTED HIGHLIGHTS**

- **Contamination of the skin and clothing of health care personnel occurs frequently during removal of contaminated gloves or gowns, according to researchers at the Cleveland VA Medical Center. This contamination can lead to infection risk, and educational interventions are needed for the safety of both patients and health care workers, say the researchers.** ([JAMA Internal Medicine](http://jama.ama-assn.org), December 2015)

- **Telemedicine-based diabetes management improved outcomes for Veterans with persistently poor diabetes control. A study of 50 Veterans with diabetes, conducted by Durham VA Medical Center and Duke University researchers, found that telemedicine led to better diabetes management than clinic-based care only.** ([Telemedicine Journal and e-Health](http://journals.sagepub.com/doi/abs/10.1177/1534758315595465), April 5, 2015)

- **Veterans who used both the VA health care system and a Medicare Advantage plan had neither better nor worse health outcomes than Veterans who used only VA care, found researchers from several VA medical centers and their colleagues. Many Veterans use non-VA health to supplement their VA care, a practice that this study suggests does not result in fragmented care with poorer outcomes.** ([Health Services Research](http://journals.sagepub.com/doi/abs/10.1111/1541-0420.12523), December 2015)

- **VA has developed the “No Preventable Harms” campaign to reduce occurrences of preventable safety problems such as infections, medication-related errors, and blood clots. An initiative by experts within a seven-hospital Midwestern VA network led to a significant reduction in catheter-associated urinary tract infections in non-intensive care units. Regional collaborations such as this could be a valuable strategy to address important patient safety problems, say the researchers.** ([American Journal of Infection Control](http://www.ajicjournal.org/content/43/3/307), March 1, 2015)

- **Mobile phones and the Internet could help address the health care needs of homeless Veterans, according to researchers with the VA Center for Healthcare Organization and Implementation Research in Bedford, Mass. The researchers found that a large percentage of homeless Veterans surveyed had mobile phones and access to the Internet, and nearly all were interested in receiving mobile reminders and outreach about their health care.** ([Telemedicine Journal and e-Health](http://journals.sagepub.com/doi/abs/10.1177/1534758313514762), Sep. 3, 2014)

- **Diagnostic errors affect at least 1 in 20 U.S. adults, found researchers with the Houston VA Center for Innovations in Quality, Effectiveness and Safety. The researchers say that this evidence should encourage policymakers, health care organizations, and researchers to make efforts to measure and reduce diagnostic errors.** ([BMJ Quality and Safety](http://qualitysafety.bmj.com/content/23/4/245), April 17, 2014)

For more information on VA studies on health care delivery and other key topics relating to Veterans’ health, please visit [www.research.va.gov/topics](http://www.research.va.gov/topics)
ABOUT HEALTH EQUITY

• Members of minority communities have higher rates of chronic illnesses such as diabetes and hypertension. According to the Centers for Disease Control and Prevention (CDC), 42 percent of adult blacks are hypertensive, compared to 28.8 percent of whites—and levels of control of hypertension are lowest for Mexican Americans. CDC also reported that 7.0 percent of adult white Americans are diabetic, compared to 11 percent of blacks, 10.2 percent of Hispanics, and 8.2 percent of Asian Americans.

• Minorities also have higher rates of many cancers and tend to get diagnosed at later stages, when those illnesses are harder to treat. In 2015, the National Cancer Institute estimated the death rate from all cancers is 25 percent higher for blacks than for whites.

• There are no simple reasons for disparities, and no simple solutions. Health care access is important, but it is not the only factor. Income, education, social context and support, life experience, perceived discrimination, and patient-level preferences may also contribute. Provider and health care system factors may also play a role.

• As the nation’s largest health care system, VA offers a unique opportunity to understand the complex reasons that health care disparities may occur. VA also offers an ideal setting in which to develop and evaluate patient-centered and culturally sensitive approaches to care.

VA RESEARCH ON HEALTH EQUITY: OVERVIEW

• VA researchers improve the lives of Veterans by identifying disparities in health care between populations of Veterans, understanding the factors that may underlie these differences, and developing and testing ways to reduce and eliminate them.

• One of the nation’s premier research sites for such work is the Center for Health Equity Research and Promotion (CHERP), supported mainly by VA’s Health Services Research and Development (HSR&D) service. CHERP has investigators at both the Pittsburgh and Philadelphia VA medical centers.

• In 2007, VA’s Evidence-Based Synthesis Program systematically reviewed existing evidence on disparities within VA to determine the clinical areas in which disparities were present and to describe what was known about the sources of these disparities. VA investigators have used the knowledge gained from that report to determine the most promising avenues for future research aimed at improving equity in VA health care.

SELECTED MILESTONES AND MAJOR EVENTS

2001 – Founded the Center for Health Equity Research and Promotion (CHERP) in Philadelphia and Pittsburgh, PA. In 2013, CHERP became a VA Center of Innovation (COIN)

2004 – The Health Equity and Rural Outreach Innovation Center (HEROIC) in Charleston, South Carolina, began as a targeted research initiative, focused on health equity for rural and minority Veterans and reducing disparities in health outcomes, and improving both access and the quality of care. In 2013, HEROIC became a VA Center of Innovation (COIN)

2006 – VA researchers at CHERP published a conceptual framework to guide future health disparities research: detection, understanding, and reduction and elimination of disparities

2007 – Completed a systematic review of the existing evidence on health care disparities within VA and identified promising areas for future research

2011 – Published a systematic review of Interventions to improve minority health care and racial and ethnic disparities

2013 – Established the VA Office of Health Equity

2014 – American Journal of Public Health

(Continued on back)
As the nation’s largest health care system, VA offers a unique opportunity to understand the complex reasons why health care disparities may occur.
ABOUT HEARING LOSS

• Some hearing loss can be reversed through surgery or medication. In other cases, hearing loss is permanent, but can be reduced through the use of hearing aids. Though almost all people with hearing loss could be helped by hearing aids, only about 1 in 5 who would benefit from them use them, according to the National Institute on Deafness and Other Communication Disorders.

• Conductive hearing loss, which is due to damage to the eardrum and middle ear structures, can often be reversed through surgery or medication. Sensorineural hearing loss, caused by damage to the inner ear and auditory nerve, is permanent, but can often be helped through the use of hearing aids.

• At the close of fiscal year 2015, more than 1 million Veterans were receiving disability compensation for hearing loss, and 1.45 million received compensation for tinnitus. In addition, many Veterans score normally on hearing tests but have difficulty understanding speech. This condition, called auditory processing disorder, is often associated with blast exposure.

VA RESEARCH ON HEARING LOSS: OVERVIEW

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

• In 1997, VA established the National Center for Rehabilitative Auditory Research (NCRAR) to study hearing problems in Veterans, and to develop effective treatments. Researchers here work to alleviate communication, social, and economic problems resulting from hearing loss and tinnitus. Among the topics studied at the center are methods of early detection of hearing loss; the effects of certain diseases or conditions, such as diabetes and multiple sclerosis, on auditory functioning; and the impact of auditory problems on speech perception.

• NCRAR researchers and their colleagues throughout VA system are looking at ways to improve speech recognition in noisy areas for people with hearing impairments, and studying the combined effects of aging and noise exposure on hearing.

RECENT STUDIES: SELECTED HIGHLIGHTS

• Tinnitus is common in Veterans, but there are no objective tests to diagnose the problem. NCRAR researchers and researchers from Oregon Health and Science University conducted three phases of testing to try to distinguish Veterans with tinnitus from those who do not have it. They found some differences between the groups, but also that no single test or series of tests could reliably diagnose the condition. (Journal of Rehabilitation Research & Development, Vol. 50, No. 4, 2013)
Though almost all people with hearing loss could be helped by hearing aids, only about 20 percent of those would benefit from them use them.
ABOUT HEPATITIS C

The symptoms of hepatitis C infection are often very mild. Most people can carry the virus for years and will not notice any symptoms. The most common symptoms are vague abdominal discomfort, fatigue, and joint pains.

Over time, HCV can cause other health problems, such as cirrhosis and liver cancer. Because the virus stays in the body, an infected person can give hepatitis C to someone else.

People at risk for hepatitis C should consider getting tested. Blood tests are required to determine if HCV is present in the body.

As of March 2016, VA had treated more than 76,000 Veterans infected with hepatitis C and approximately 60,000 had been cured. Since the beginning of 2014 and as of March 2016, more than 42,000 patients had been treated with new, highly effective antiviral medications.

In fiscal year 2015, VA allocated $696 million for new hepatitis C drugs, which is 17 percent of VA’s total pharmacy budget.

VA RESEARCH ON HEPATITIS C: OVERVIEW

VA research on hepatitis C includes clinical trials of treatments, epidemiologic studies, investigations of the biological mechanisms of infection, and studies on identifying and removing barriers to treatment.

Some VA researchers are working on projects to improve screening and testing methods for HCV. Others are working to improve the assessment and treatment of patients traditionally excluded from hepatitis C treatment, including those with mental illness, substance abuse, or who also are infected with the human immunodeficiency virus (HIV), the virus that causes AIDS.

In addition, VA researchers are developing and disseminating models of interdisciplinary care to optimize treatment and clinical standards for treating patients at all stages of HCV infection.

RECENT STUDIES: SELECTED HIGHLIGHTS

A new model uses routine laboratory tests and machine-learning methods to help identify which patients clinically identified with HCV have the greatest need for new antiviral drugs. According to researchers from the VA Ann Arbor Healthcare System and the University of Michigan, hepatitis will remain stable...

Viral Hepatitis Program within VA’s Office of Public Health

2013 – Determined that patients with both anemia and the HCV virus can benefit from intensive treatment for the virus

2015 – Learned that cure rates from new HCV treatments were much better than previous treatments, but not as good as rates reported in clinical trials

2015 – Developed a new model to help identify which patients chronically identified with HCV have the greatest need for new antiviral drugs

2016 – Found that patients with HCV infections are at increased risk of developing osteoporosis and fractures
As of March 2016, VA had treated more than 76,000 Veterans infected with hepatitis C, and approximately 60,000 had been cured.
ABOUT HOMELESSNESS AMONG VETERANS

• VA and its federal, state, local, and nongovernmental partners recognize that ending Veteran homelessness is not a single event in time, but rather a deliberate ongoing effort toward achieving and maintaining the goal of ending homelessness among Veterans.

• The U.S. Department of Housing and Urban Development’s annual point-in-time estimate of America’s homeless population found that fewer than 40,000 Veterans were experiencing homelessness (including those living on the street or in a shelter, temporary safe haven, or any place unfit for habitation) on a given night in January 2016. The January 2016 estimate found just over 13,000 unsheltered homeless Veterans actually living on the streets, a 56 percent decrease since 2010.

• VA’s National Center on Homelessness Among Veterans (NCHAV), established in 2009, works to promote recovery-oriented care for Veterans who are homeless or at risk for homelessness by developing and disseminating evidence-based policies, programs and best practices.

• The Domiciliary Care for Homeless Veterans program has been providing medical services to disadvantaged Veterans since the close of the Civil War.

• The National Call Center for Homeless Veterans (1-877-4AID-VET) is staffed by trained responders providing support and resources to Veterans and their families who lack secure housing. Live chat with trained responders is available at the Veterans Crisis Line website.

VA RESEARCH ON HOMELESSNESS: OVERVIEW

• VA research looks at the causes and risks of homelessness among Veterans, and ways to prevent Veterans from becoming homeless.

• Researchers help develop interventions to improve homeless Veterans’ health and provide resources and training to professionals working on their behalf.

• VA researchers have helped VA implement the Housing First approach, which aims to get homeless people into safe, stable housing even if they are still coping with substance use or mental health issues.

SELECTED MILESTONES AND MAJOR EVENTS

1987 – Initiated the Northeast Program Evaluation Center (NEPEC) to serve homeless Veterans

1991 – Established that, in Vietnam Veterans, there does not appear to be a causal relation between homelessness and military service, including exposure to combat

2013 – Determined there is an association between homelessness among Veterans and childhood problems such as abuse and family instability

2015 – Learned that 30 percent of female and 9 percent of male homeless Veterans have children in their custody

2015 – Found that Veterans who had been discharged from the military for misconduct had dramatically higher rates of homelessness than those who left under normal circumstances

RECENT STUDIES: SELECTED HIGHLIGHTS

• VA’s Housing First mode of care enables people who have not yet achieved sobriety or are still exhibiting symptoms of mental health problems to receive permanent housing through government-funded rental vouchers. A survey of nearly 100 VA employees, taken by researchers at the Birmingham VA Medical Center, found that front-line staff faced challenges in housing homeless Veterans quickly because of difficult rental markets, the need to coordinate with local public housing authorities, and a lack of available funds for move in costs. They also found,
VA research looks at the causes and risks of homelessness among Veterans, and ways to prevent Veterans from becoming homeless.

However, that 80 to 90 percent of Veterans housed in this program were able to remain in that housing. (*Psychiatric Services*, May 1, 2014)

- Many people living on the streets prioritize having a mobile phone, to give them an identity and a way of communicating with the world. Researchers from VA’s Center for Healthcare Organization and Implementation Research in Bedford, Massachusetts, interviewed 109 Veterans in a variety of that state’s homeless programs. They found that 89 percent of those surveyed owned a mobile phone, and 76 percent used the Internet. Of those with phones, 93 percent were interested in receiving either text messages or phone calls about upcoming medical appointments, and 88 percent wanted to be asked by phone if they would like to schedule an appointment if they had not been seen by a health care provider in over a year. (*Telemedicine Journal and E-Health*, September 2014)

- VA medical centers that have successfully implemented Housing First share several significant characteristics, according to Birmingham VA researchers. The leaders of successful medical centers join front-line staff in the work of finding acceptable housing; elevate people knowledgeable about homelessness into senior leadership positions; and work to resolve logistical challenges. They also help ensure that work groups dealing with homelessness are properly aligned and integrated into their organizations. (*Journal of General Internal Medicine*, December 2014)

- Both male and female Veterans are at greater risk for homelessness than their non-Veteran counterparts, although the disparity has declined over time. According to researchers with the VA Connecticut Health Care System and Yale University, this disparity is most prominent among Veterans of the all-volunteer force—those who signed up for the armed services after July 1, 1973, when the draft was eliminated. The researchers stated that Veterans appear to have many of the same major risk factors for homelessness as other adults, with the strongest and most consistent ones being substance abuse, severe mental illness, and low income. (*Epidemiologic Reviews*, 2015)

- Homeless Veterans are infected with HIV, the virus that causes AIDS, at least three times more often than the rest of the U.S. population. A study led by researchers at the VA Greater Los Angeles Healthcare System repeatedly visited three Los Angeles shelters to provide AIDS testing, results, and follow-up if necessary to Veterans and other residents. The team believes that given the high costs and health risks of untreated HIV infection, the program’s cost of $48.95 per client tested is cost-effective and could significantly reduce HIV rates among homeless Veterans. (*American Journal of Public Health*, January 2015)

- Veterans who had been discharged from the military between 2001 and 2012 for misconduct had dramatically higher rates of homelessness than those who left under normal circumstances, a study by researchers with VA’s Salt Lake City Health Care System and NCHAV has found. Overall, 1 percent of VA patients were homeless at some point within a year of their discharge, but 5.4 percent of those discharged for misconduct fell in that category. Misconduct is defined as a discharge related to drug use, alcoholism, offenses against the military code of conduct, infractions of the law, or other misbehaviors. (*Journal of the American Medical Association*, Aug. 25, 2015)

For more information on VA studies on homelessness and other key topics relating to Veterans’ health, please visit [www.research.va.gov/topics](http://www.research.va.gov/topics).
ABOUT INFECTIOUS DISEASES

• While many organisms live in and on humans, and are normally harmless or even helpful, some can cause disease under certain conditions. They do so either by disrupting the body’s normal processes or by stimulating the immune system to produce a defensive response, resulting in high fever, inflammation, and other symptoms.

• Some infectious diseases can be passed from person to person through contact with bodily fluids, coughing, sneezing, and other methods. Others are transmitted from insect or animal bites, or by ingesting contaminated food or water or other environmental exposures.

• Many infectious diseases can become difficult to control, if the infectious agents develop a resistance to commonly used drugs. Bacteria, for example, can accumulate mutations in their DNA, or acquire new genes that allow them to survive contact with antibiotics that would normally kill them.

• VA has determined that nine infectious diseases are related to military service in the first Gulf War, Iraq, and Afghanistan. They include malaria, brucellosis, campylobacter jejuni, coxiella burnetii (Q fever), mycobacterium tuberculosis, nontyphoid salmonella, shigella, visceral leishmaniasis, and west Nile virus.

VA RESEARCH ON INFECTIOUS DISEASES: OVERVIEW

• VA researchers are advancing the understanding, prevention, and treatment of numerous infectious diseases, ranging from the common cold to major public health threats such as tuberculosis, AIDS, hepatitis C, and influenza.

• A number of effective new preventive strategies, vaccines, and drugs for infectious diseases have been developed by VA investigators.

• Some researchers are focusing on infectious diseases that may endanger American troops serving abroad, such as malaria and leishmaniasis. Others are searching for new approaches to treat infectious diseases, focusing on how pathogens change and drug resistance evolves.

SELECTED MILESTONES AND MAJOR EVENTS

1946 – Developed and tested effective therapies for tuberculosis through multicenter clinical trials that led to the development of the VA Cooperative Studies Program

2005 – Demonstrated the effectiveness of a new vaccine for shingles, a painful skin and nerve infection affecting older adults

2011 – Published findings showing a 60 percent or greater decrease in MRSA infections from a VA-wide infection control initiative

2014 – Learned that treatment for pneumonia that included the antibiotic azithromycin (Zithromax) was associated with a significantly lower risk of death and a slightly increased risk of heart attack

2015 – Found that patients who received antiretroviral therapy within a year of their infection were half as likely to develop AIDS, compared with those who waited longer

2016 – Determined that a hospital infection-control program aimed mainly at methicillin-resistant Staphylococcus aureus (MRSA) can also significantly reduce transmission of bacteria that cause infections such as pneumonia, blood infections, surgical infections, and meningitis

RECENT STUDIES: SELECTED HIGHLIGHTS

• Treatment for pneumonia that included the antibiotic azithromycin (Zithromax) compared with other antibiotics was associated with a significantly lower risk of death and a slightly increased risk of heart attack. Researchers from several VA facilities concluded there is a net benefit associated with azithromycin use in patients hospitalized for pneumonia. (Journal of the American Medical Association, June 4, 2014)
VA researchers are advancing the understanding, prevention, and treatment of numerous infectious diseases, ranging from the common cold to major public health threats such as tuberculosis, AIDS, hepatitis C, and influenza.

- Patients who received antiretroviral therapy within a year of their infection were half as likely to develop AIDS, compared with those who waited longer. They were also more likely to achieve and maintain a normal level of infection-fighting T-cells. A study by researchers from the South Texas VA Healthcare System and the University of Texas contradicted traditional HIV treatment methodology, which encourages physicians to wait until patients reached certain infection thresholds before recommending antiretroviral therapy. (JAMA Internal Medicine, January 2015)

- An algorithm to help hospitals and public health officials determine the earliest stages of flu season has been developed by researchers with VA and other health care institutions throughout the nation. The algorithm, which researchers call the Above Local Elevated Respiratory Illness Threshold (ALERT) uses routine information, such as the number of influenza cases confirmed per week in a region, to determine where and when the flu needs to be combatted. Having this information could help public health officials preserve resources while combatting the virus. (Clinical Infectious Diseases, Feb. 15, 2015)

- In 12 minutes, a pulsed xenon ultraviolet (UV) light system could disinfect a hospital room as well as a human can. Before and after UV disinfection, researchers from the Central Texas Veterans Health Care System took samples of five “high-touch” surfaces in 38 patient rooms, including the patient call button, bedrail, and tray table, as well as the handrail and toilet in the restroom. They found that the UV method cut the number of bacterial colonies per room by about 70 percent, roughly the same level of effectiveness as manual disinfection. (American Journal of Infection Control, April 1, 2015)

- Giving spores of nontoxic C. difficile by mouth can stop repeated bouts of C. difficile infection. An international team of researchers led by investigators with the Edward Hines, Jr. VA Hospital in Illinois randomly assigned 168 adult patients with C. difficile infections who had been treated for their infection to receive doses of either 10,000 or 10 million spores per day of nontoxic C. difficile in liquid form for 7 or 14 days, or to receive an identical-looking placebo. Statistically significant reductions of relapses in infection were shown in those who received any dose of nontoxic C. difficile; the best results were shown in those who received 10 million spores a day for seven days. C. difficile is an intestinal bacterial infection that is difficult to treat using standard antibiotic treatment, because it has a very high recurrence rate. (Journal of the American Medical Association, May 5, 2015)

- A procedure that dates back thousands of years can be an effective method for battling C. difficile infections. The procedure, called fecal transplantation, involves removing stool containing healthy bacteria from a donor and inserting it into a sick patient. VA researchers and researchers with the University of Minnesota found that fecal transplantation proved successful in treating 85 percent of patients with recurring infections, and that such transplantation is a safe and effective way to treat recurrent infections. (Annals of Internal Medicine, May 5, 2015)

For more information on VA studies on infectious diseases and other key topics relating to Veterans’ health, please visit www.research.va.gov/topics
ABOUT KIDNEY DISEASE

• The kidneys are a pair of fist-sized organs located on either side of the spinal column that perform life-sustaining functions to keep the rest of the body in balance.

• Early kidney disease has few symptoms. As it worsens, many complications—such as high blood pressure, arteriosclerosis (thickening and hardening of the artery walls), anemia, weak bones, and nerve damage—can develop.

• Some forms of kidney failure are temporary and may get better. This is called acute kidney failure. Chronic or end-stage kidney failure is the result of a scarring process that leads to the shutdown of the kidneys.

• Chronic kidney failure does not get better. Veterans with chronic kidney failure need dialysis treatments (artificial replacement of kidney function) for the rest of their lives, or may receive a kidney transplant.

VA RESEARCH ON KIDNEY DISEASE: OVERVIEW

• In 2012, VA and the University of Michigan began creating a national kidney disease registry to monitor kidney disease among Veterans. This registry will provide information on kidney disease to Veterans, help identify those at risk for kidney disease, and improve access to care.

• Dr. Thomas E. Starzl conducted the first long-term successful kidney transplant in 1962 while on the staff of the Denver VA Medical Center.

• Research has found that rates of chronic kidney disease are higher among Veterans than in the general population. VA researchers are working on ways to diagnose chronic kidney disease earlier and more effectively treat it.

• VA researchers are studying the relationship between kidney disease and other diseases to find better therapies and drug treatments for the condition.

SELECTED MILESTONES AND MAJOR EVENTS

1962 – Conducted the first long-term successful kidney transplant, by Dr. Thomas E. Starzl, a VA surgeon and researcher

1998 – Learned that if erythropoietin is injected under the skin instead of into a vein, smaller doses of the medication can be used

2008 – Determined that high-intensity renal-replacement therapy in critically ill patients with acute kidney injury is no better than less intensive therapy

2012 – Established, along with the University of Michigan, a National Kidney Disease Registry to monitor kidney disease among Veterans

2015 – Found that patients with chronic kidney disease were more likely to have vascular diseases, diabetes, hypertension, and cancer than those without the condition

RECENT STUDIES: SELECTED HIGHLIGHTS

• Patients with chronic kidney disease are more likely to have other chronic diseases such as vascular disease, diabetes, and cancer. A study involving VA researchers in Richmond, Va., and Buffalo, N.Y., showed that Veterans have a higher rate of CKD than the general U.S. population, and those with CKD had much higher rates of other diseases, compared with other populations of kidney patients.

(Continued on back)
VA researchers are working on ways to diagnose chronic kidney disease earlier and treat it more effectively.
ABOUT MENTAL HEALTH

• VA offers a wide range of mental health services to Veterans. The goal of VA mental health care is to support recovery and enable Veterans who experience mental health problems to live meaningful lives in their communities and achieve their full potential.

• VA aims to provide coordinated care for the whole person, not just for the person’s mental illness. The department promotes the idea that having a healthy body, satisfying work, and supportive family and friends are integral to mental health.

• All Veterans who receive specialty mental health care have mental health treatment coordinators to help them define and work toward their overall mental health goals.

• Mental health services are available in VA’s mental health specialty clinics, primary care clinics, nursing homes, and residential care facilities. Those with serious mental health problems may take part in specialized programs such as mental health intensive case management, day centers, work programs, and psychosocial rehabilitation.

• Emergency mental health care is available 24 hours a day, seven days a week at VA medical centers. Facilities that do not have 24-hour emergency rooms must provide emergency services through a local non-VA hospital.

• Veterans thinking about hurting or killing themselves or others, experiencing an emotional crisis, feeling hopeless or engaging in self-destructive behavior such as drug abuse, should call the Veterans Crisis Line at 1-800-273-TALK (8255). Press 1 for Veterans.

• The area of mental health is covered in several other VA fact sheets as well as this one, including Depression, Posttraumatic Stress Disorder (PTSD), Substance Use Disorders, and Suicide Prevention.

VA RESEARCH ON MENTAL HEALTH: OVERVIEW

• VA researchers are looking at potential new approaches for treating and preventing mental health disorders. They are also working on related projects such as developing and evaluating collaborative primary care models, and improving access to services from rural and other remote areas by using the Internet and other technologies.

• Among the areas VA researchers are focusing on are mood disorders, such as depression and bipolar disorder; psychotic disorders, such as schizophrenia; PTSD and other anxiety conditions; and substance use disorders.

• VA investigators are also looking at the co-occurrence of mental health issues and physical disorders—for instance, depression in those with spinal cord injury, or substance abuse in patients with chronic pain.

• The National Research Action Plan is a wide-reaching plan developed in 2013 by VA and the departments of Defense; Health and Human Services; and Education. The plan is designed to improve access to mental health services for Veterans, service members, and military families. Implementation of the plan will improve scientific understanding of PTSD, traumatic brain injury (TBI), various co-occurring conditions, and suicide. Other goals of the plan include providing effective treatments for these diseases, and reducing their occurrence.

• VA’s 15 Mental Illness Research, Education, and Clinical Centers (MIRECCs) were established by Congress with the goal of researching the causes and treatments of mental disorders, and using education to put new knowledge into routine clinical practice in VA. Specialized mental health centers of excellence are an essential part of VA’s ability to meet Veterans’ mental health needs.

(Continued on back)
VA investigators are looking at the co-occurrence of mental health issues and physical disorders—for instance, depression in those with spinal cord injury, or substance abuse in patients with chronic pain.
ABOUT OBESITY

• Obesity results from a combination of causes and contributing factors, including individual factors such as behavior and genetics.

• Behaviors contributing to obesity can include dietary patterns, physical activity or inactivity, medication use, and exposures to various environmental factors. Additional contributing factors in American society include the food and physical activity environment, education and skills, and food marketing and promotion.

• Obesity is a risk factor for heart disease, type 2 diabetes (once known as adult-onset or noninsulin-dependent diabetes), stroke, and some types of cancer. In particular, diabetes and obesity have become a very prevalent combination.

• In 2013, VA estimated that more than 165,000 Veterans who receive their health care from the department have a body mass index (BMI) of more than 40, which indicates a serious condition called morbid obesity. Morbid obesity can interfere with basic physical functions and significantly increase the risk of obesity-related conditions.

VA RESEARCH ON OBESITY: OVERVIEW

• VA research on obesity looks at the biological processes of weight gain and weight loss. Researchers compare the safety and effectiveness of obesity treatments, and work to find ways to help Veterans keep from gaining weight—for example, through exercise and healthy eating.

• VA researchers work hand in hand with the department’s MOVE! program, a national weight-management and exercise initiative designed and coordinated by VA’s National Center for Health Promotion and Disease Prevention.

SELECTED MILESTONES AND MAJOR EVENTS

2002 – Reported key findings on ghrelin, a “hunger hormone” that was first discovered in 1999

2006 – Implemented VA MOVE! program nationally, providing overweight Veterans with the largest and most comprehensive weight management program associated with a U.S. medical care program

2013 – Found that Iraq and Afghanistan Veterans with PTSD and depression are at the greatest risk of obesity and not being able to lose weight, relative to all those who served in the two countries between 2001 and 2010

2015 – Learned that bariatric surgery helps overweight patients live longer

2016 – Found that as fat cells develop, they change the types of nutrients they metabolize to produce fat and energy—an important step towards finding new ways to treat both diabetes and obesity

RECENT STUDIES: SELECTED HIGHLIGHTS

• Many health care providers have strong negative attitudes and stereotypes about people with obesity—and these attitudes influence their perceptions, judgment, interpersonal behavior, and decision-making. A team of researchers with VA’s Center for Chronic Disease Outcomes Research also found that these biases were more negative than those exhibited toward racial minorities, gays, lesbians, and poor people. The researchers believe that doctors should discuss weight issues with obese patients, but should do so in a less judgmental, more affirming way—making the discussion about feeling good, not about a number on a scale. (Obesity, April 2014; Obesity Reviews, April 2015)
Obesity is a risk factor for heart disease, type 2 diabetes, stroke, and some types of cancer.

VA MOVE! programs throughout the nation are helpful even when participants are at locations other than where the classes are taught. Researchers at the Sioux Falls VA Health Care System studied weight loss outcomes among 120 Veterans, half of whom took 12 MOVE! classes to help them develop weight-management skills through videoconferencing. The others took no classes. The MOVE! participants lost weight, while the control group gained weight. The average weight difference between the groups was about 12 pounds after one year. (Journal of Rural Health, Winter 2014)

Fat cells, or adipocytes, are connective tissue cells that have become differentiated from other cells and become specialized in the manufacture and storage of fat. Researchers at the VA San Diego Healthcare System and the University of California learned that as fat cells develop, they change the types of nutrients they metabolize (process). They create branched-chain amino acids, along with glucose, to produce fat and energy. Therefore, fat cells play an important role in regulating the body’s levels of these amino acids, which are typically found in higher levels in people with diabetes and obesity. A better understanding of how these amino acids are created could lead to new treatments for these conditions. (Nature Chemical Biology, January 2016)

Bariatric surgeries help severely overweight people live longer, not only to shed pounds they cannot otherwise lose. A study by researchers at several VA medical centers found that 2,500 severely overweight Veterans who had the surgery had a 53 percent lower risk of dying from any cause 5 to 10 years after the procedure, compared with 7,500 other severely overweight Veterans who had not. (Journal of the American Medical Association, Jan. 6, 2015)

Eating sweet foods causes the brain to form a memory of a meal. A study by researchers at the Charlie Norwood VA Medical Center in Atlanta and two Georgia universities showed that neurons in the dorsal hippocampus, the part of the brain that is critical for episodic memory, are activated by consuming sweets. Meals consisting of a sweetened solution, either sucrose or saccharin, significantly increased the expression of activity-related cytoskeleton-associated protein (Arc) in dorsal hippocampal neurons in rats—a process that is necessary for making memories. (Hippocampus, March 2016)

The drug rapamycin reduces body fat and appetite in older rats, according to a study by researchers at the Malcolm Randall VA Medical Center in Gainesville and the University of Florida. Rapamycin is a pharmaceutical used to coat coronary stents and prevent transplant rejection. The research team found that when treated with rapamycin, the body weight of 24-month-old rats dropped by approximately 13 percent. Rats of that age are about equivalent in their life cycle to 65-year-old humans. (The Journals of Gerontology, Series A, July 2016)

For more information on VA studies on obesity and other key topics relating to Veterans’ health, please visit www.research.va.gov/topics
About Pain Management

- Nearly 40 million American adults experience severe pain, and an estimated 25.3 million had pain every day over a three-month period, an NIH study found.

- Chronic pain can cause disability, loss of work productivity, and increased health care costs.

- Unrelieved and persistent chronic pain contributes to depression, anxiety, poor sleep patterns, decreased quality of life, and substance use disorders.

- Medication is the most common treatment for both acute and chronic pain. For patients interested in treatments other than or in addition to medication, complementary and integrative medicine—such as acupuncture and yoga—is a popular option.

VA Research on Pain Management: Overview

- VA researchers are working to develop new approaches to alleviate Veterans’ pain, which may result from spinal cord injury, burns, amputations, traumatic brain injury, cancer, or musculoskeletal conditions. Some types of chronic pain, such as the nerve pain experienced by many people with spinal cord injury, are very difficult to treat. VA research on pain covers a wide range of topics, such as drug discovery and the impact of pain on daily function and quality of life.

- The Center for Neuroscience and Regeneration Research, a collaboration between VA and its partners, conducts biomedical research that contributes to the scientific understanding of pain, especially nerve pain. The center is dedicated to molecular and cell-based discoveries on nervous system function.

- VA’s Pain, Research, Informatics, Medical Comorbidities, and Education (PRIME) Center, part of the VA Connecticut Healthcare System, conducts research to improve pain care and sponsors education activities for Veterans and clinical staff.

- The Chronic Pain Rehabilitation Program at the James A. Haley Veterans Hospital in Tampa, Fla., is a nationally known center for chronic pain research, treatment, and education. The CPRP offers inpatient and outpatient rehabilitation programs to help Veterans manage their chronic pain conditions.

- The Pain Management and Patient Aligned Care CREATE has three goals: to enhance Veterans’ access to pain care, to use health information technology to promote better pain care for Veterans, and to build sustainable improvements in pain care.

- VA’s Stepped Care Model for Pain Management gives clinicians the ability to assess and treat pain within a primary care setting, while enabling them to use other treatment options including specialized care and multidisciplinary approaches. The model is designed to ensure VA clinicians are fully trained in pain management techniques, that pain assessment is performed consistently throughout VA, and that Veterans receive prompt and appropriate treatment.

- VA researchers are working to better understand chronic low back pain in older adults through a series of papers and an NIH task force. As many as 40 percent of Veterans over 65 years old have chronic back pain.

Selected Milestones and Major Events

1988 – Established a chronic pain rehabilitation program in Tampa, Fla., to help Veterans with chronic pain cope with their conditions

1988 – Distributed the first national pain management strategy, which established pain management as a national VA priority

2003 – Mandated, in a VA directive, that all patients be systematically screened for the presence and intensity of pain
Nearly 40 million American adults experience severe pain, and an estimated 25.3 million had pain every day over a three-month period, an NIH study found.
ABOUT PARKINSON’S DISEASE

- PD causes a variety of “motor” symptoms (symptoms related to movement of the muscles), including rigidity, delayed movement, poor balance, and tremors. Non-motor symptoms of PD include sleep disturbances, urinary dysfunction, constipation, swallowing problems, mood disorders, and cognitive deficits.
- The exact cause of PD is unknown. Most researchers agree that the disease is caused by both genetic and environmental factors, and by interactions among these factors.
- NIH estimates that the disease affects at least 500,000 Americans, mostly people over age 50. The average age of onset is about 60. There is no cure for PD; however, many effective medications and treatment options are available.
- In 2010, VA recognized PD as associated with exposure to Agent Orange or other herbicides during military service. Veterans with PD who were exposed to herbicides during their service may be eligible for disability compensation and health care.

VA RESEARCH ON PARKINSON’S DISEASE: OVERVIEW

- In 2001, VA created six specialized centers to provide Veterans with PD with state-of-the-art clinical care, education, research, and national outreach and advocacy. Known as the Parkinson’s Disease Research, Education, and Clinical Centers (PADRECCs), they are located in Philadelphia; Richmond, Va.; Houston; Los Angeles; San Francisco; and the Seattle/Portland area.
- The centers also provide comprehensive diagnosis and treatment services for other movement disorders, including essential tremor, restless leg syndrome, dystonia, Lewy body disease, progressive supranuclear palsy, multiple system atrophy, and corticobasal degeneration.
- Researchers at these sites are studying the biochemical pathways involving dopamine, and testing a variety of treatment approaches, including medication, surgery and electrical stimulation. Biomedical and clinical studies on PD are ongoing at many other VA sites as well.

SELECTED MILESTONES AND MAJOR EVENTS

2001 – Created Parkinson’s Disease Research, Education, and Clinical Centers (PADRECCs), at six sites throughout the nation
2003 – Initiated a landmark clinical trial to assess the effectiveness of deep brain stimulators (DBS) for PD

RECENT STUDIES: SELECTED HIGHLIGHTS

- Deep brain stimulation (DBS) is a surgical procedure used to treat a variety of disabling neurological symptoms, especially those related to PD. Researchers from two VA Chicago-area hospitals and three schools of medicine in the area found that 6 to 12 months after DBS surgery, patients whose neurostimulator (a surgically implanted, battery operated device that delivers electrical stimulation to targeted areas in the brain that control movement) was implanted in their brains’ subthalamic nucleus had a significantly greater increase in their use of medication for mental health issues than those whose neurostimulator was implanted in their brains’ globus pallidus internus. The study found no significant differences in the two groups’ use of outpatient or inpatient health care. (Journal of Parkinson’s Disease, 2015)

2009 – Determined that DBS may hold significant benefits for those with PD who no longer respond well to medication alone
2014 – Found that walking is a safe and easily accessible way to improve PD symptoms
2015 – Developed a procedure to convert skin cells into dopamine neurons
Patients who walk briskly for 45 minutes, three times a week, show improvements in their Parkinson’s symptoms, according to a study by researchers with the Iowa City VA Health Care System and the University of Iowa. They were also less depressed and less tired. According to researchers, even moderate walking can make a significant difference in improving PD symptoms. (*Neurology*, July 29, 2014)

Low-intensity workouts, stretching, and resistance exercise all improved the mobility of patients with Parkinson’s disease in a VA and University of Maryland study. Those who walked on a treadmill at a comfortable pace for nearly an hour showed the most consistent improvement in gait and mobility. (*JAMA Neurology*, February 2013)

Up to 60 percent of PD patients experience psychosis (a mental disorder characterized by symptoms that indicate impaired contact with reality) at some point during their illness. Physicians commonly prescribe antipsychotic drugs to treat the condition. A study led by researchers at the Philadelphia VA, the VA Ann Arbor Healthcare System, and the University of Pennsylvania found that those who began using antipsychotic drugs while being treated for PD were more than twice as likely to die during the following six months, compared with a matched set of PD patients who did not use such drugs. (*JAMA Neurology*, May 1, 2016)

VA researchers followed a cohort of patients with PD and baseline normal cognition skills (the activities of thinking, understanding, learning, and remembering) for a minimum of two years and a maximum of six. The investigators, from the Corporal Michael J. Crescenz VA Medical Center in Philadelphia and the University of Pennsylvania, found that after one year, 8.5 percent of the patients had developed mild cognitive impairment, and by the end of six years the figure increased to 47.4 percent. All of the patients who had had mild cognitive impairment at the end of the first year developed dementia by the end of the study. The research team concluded that the transition from normal cognition in PD patients to cognitive impairment, including dementia, occurs frequently and quickly. (*Neurology*, Oct. 13, 2015)

The E4 variant of the apolipoprotein-E (APOE) gene is more common in people with dementia who have either PD, Alzheimer’s disease, or Lewy body disease (a neurodegenerative disorder that causes dementia), according to a nationwide team of VA researchers and their colleagues. In genetic studies of donated brain tissue, APOE was found in 7 percent of people without dementia. It was found far more often in Alzheimer’s patients with and without Lewy body disease, people with only Lewy body disease, and patients with PD. (*JAMA Neurology*, February 2013)

For more information on VA studies on Parkinson’s disease and other key topics relating to Veterans’ health, please visit [www.research.va.gov/topics](http://www.research.va.gov/topics).

Most researchers agree that Parkinson’s disease is caused by a combination of genetic and environmental factors.
ABOUT PTSD

• PTSD can occur after a traumatic event like combat, assault, or disaster. While stress is common after a trauma, for those with PTSD reactions such as reliving an event in their mind and feeling distant or angry do not go away over time, and can even get worse.

• While PTSD can affect people who have experienced a wide range of life-threatening events, in Veterans the condition is commonly associated with combat trauma. It has taken a significant toll on many war Veterans who currently use VA health care, including Iraq and Afghanistan Veterans. Military sexual assault or harassment can also lead to PTSD.

• PTSD also occurs after other types of trauma including terrorist attacks; serious accidents such as car wrecks; and natural disasters, such as fires, tornadoes, hurricanes, floods, or earthquakes.

• The disorder can lead to distressing and persistent symptoms, including re-experiencing the trauma through flashbacks or nightmares; emotional numbness; insomnia; relationship problems; sudden anger; and drug and alcohol abuse.

VA RESEARCH ON PTSD: OVERVIEW

• VA has a continuing commitment to fund efforts to understand, prevent, and treat PTSD. The wide-ranging nature of current PTSD research includes studies of Veterans at large, subgroups of Veterans, families, and couples. Veterans of all eras are included in these studies.

• Ongoing studies range from investigations of the genetic or biochemical foundations of the disorder to evaluations of new or existing treatments.

• VA’s National Center for PTSD (NCPTSD) is a world leader in research and education programs focusing on PTSD and other psychological and mental consequences of traumatic stress. It currently consists of seven VA academic centers of excellence across the United States, with headquarters in White River Junction, Vermont.

• In 2013, VA and the Department of Defense (DoD) announced that the two departments together were committing more than $100 million to fund two new consortia aimed at improving diagnosis and treatment of PTSD and mild TBI.

• In 2014, VA and the Department of Defense (DoD) announced that the two departments together were committing more than $100 million to fund two new consortia aimed at improving diagnosis and treatment of PTSD and mild traumatic brain injury. These organizations are bringing together leading scientists and researchers throughout the nation, and are part of VA and DoD’s response to an executive order to improve access to PTSD services for Veterans, service members, and military families.

SELECTED MILESTONES AND MAJOR EVENTS

1989 – Created the National Center for PTSD to address the needs of Veterans and other trauma survivors with PTSD.

2007 – Confirmed the value of prolonged exposure therapy as a treatment for women Veterans with PTSD.

2013 – Funded, along with the Department of Defense (DoD), two consortia to improve treatment for PTSD and mild TBI.

2014 – Found that cognitive processing therapy (CPT) delivered via videoteleconferencing is as effective for PTSD as in-person therapy.

2014 – Found that Veterans who sought and received care soon after the end of their service had lower rates of PTSD than those who waited to get treatment.

RECENT STUDIES: SELECTED HIGHLIGHTS

• Four specific RNA molecules were found at lower-than-normal levels in Veterans who had TBIs along with PTSD by researchers at the James J. Peters VA Medical Center in the Bronx and VA’s War-Related Illness and Injury Study Center in East Orange, N.J. RNA, or ribonucleic acid, is a nucleic acid present in all living cells. Its...
main role is to act as a messenger carrying instructions from DNA for controlling the synthesis of proteins. The molecules are known by the designations ACA48, U35, U55, and U83A. Veterans with only PTSD had significantly lower levels of only the U55 RNA molecule, and Veterans who only had a TBI and not PTSD had normal levels of all four molecules. The team hopes that their findings will eventually result in a simple blood test to help diagnose the two issues in Veterans. (American Journal of Neurodegenerative Disease, December 2014)

• PTSD symptoms can be significantly improved in Veterans who receive prompt mental health care. Researchers at the San Francisco VA Medical Center found that Iraq and Afghanistan Veterans who sought and received care soon after the end of their service had lower levels of PTSD a year after they initiated care. For each year that a Veteran waited to initiate treatment, there was about a 5 percent increase in the odds of PTSD symptoms either not improving, or worsening. (Psychiatric Services, Dec. 1, 2014)

• Receiving psychotherapy and related services remotely can have positive effects on rural Veterans with PTSD. A study at three VA medical centers looked at 266 Veterans, half of whom received care at either their local community-based outpatient clinic or their nearest VA medical center. The other half received cognitive processing therapy through an interactive video hookup with psychologists based at the medical center. They also received calls from nurse managers and pharmacists and had psychiatric consultations via video chat. Participants in the telemedicine group were much more likely to engage in care for their PTSD and showed larger decreases in their symptoms. (JAMA Psychiatry, January 2015)

• Veterans with a combination of PTSD, depression, and military-related TBI had the greatest difficulties of all Iraq and Afghanistan Veterans in getting around, communicating and getting along with others, self-care, and accomplishing other daily tasks. According to researchers with VA’s Transactional Research Center for TBI and Stress Disorders (TRACTS), many Iraq and Afghanistan Veterans require highly integrative treatment approaches, and their health problems need to be dealt with in a comprehensive and coordinated manner. (Journal of Traumatic Stress, February 2015)

• Women who serve in combat are at the same risk of developing PTSD as men, according to VA researchers and researchers with the University of California, San Francisco. The study looked at more than 2,300 pairs of men and women deployed to Iraq and Afghanistan who were matched based on variables such as combat exposure, age, race, military occupation, marital status, and pay grade. After following the pairs for an average of seven years, the research team found that 6.7 percent of the women and 6.1 percent of the men in the study developed PTSD. The difference was not statistically significant. (Journal of Psychiatric Research, September 2015)

• According to VA’s HealthVIEWS study of women Veterans, 20.1 percent of women who served in Vietnam have developed PTSD either during or after their service. By contrast, 11.5 percent of those who served near Vietnam, and 14.1 percent of those who served in the United States have developed PTSD at some time during their lives. The results suggest that the mental health effects of Vietnam-era service among women Veterans are long lasting. (JAMA Psychiatry, November 2015)

For more information on VA studies on PTSD and other key topics relating to Veterans’ health, please visit www.research.va.gov/topics

The wide-ranging nature of current PTSD research includes studies of Veterans at large, subgroups of Veterans, families, and couples. Veterans of all eras are included in these studies.
ABOUT PROSTHETICS

• VA's involvement in providing prostheses to Veterans began in 1921, when the Veterans Bureau, a predecessor agency to the Department of Veterans Affairs, was given the responsibility to provide artificial limbs and appliances to World War I Veterans.

• VA provides a full range of equipment and services to Veterans. These range from items worn by the Veteran such as artificial limbs and hearing aids; to those that improve accessibility, such as ramps and vehicle modifications; to devices surgically placed in the Veteran, such as hips and pacemakers.

• The department has more than 70 locations at which orthotics and prosthetics are custom-fabricated and fitted, using state-of-the-art componentry. The American Board accredits each for Certification in Orthotics, Prosthetics and Pedorthics, the Board of Orthotic/Prosthetic Certification, or both.

VA RESEARCH ON PROSTHETICS: OVERVIEW

• To help meet the lifestyle and medical needs of Veterans who have lost limbs, VA researchers develop and test a wide variety of prosthetic devices. VA's goal is to offer Veterans prosthetics that will restore them to their highest possible level of functioning within their families, communities, and workplaces.

• Some VA researchers are working on developing high-functioning artificial limbs that are very similar to their natural counterparts. Others are working on advanced wheelchair designs that promote mobility and independence for wheelchair users, and make it easier to use a wheelchair.

• Still other VA researchers are using functional electrical stimulation and other technologies to help those with weak or paralyzed muscles, and developing and testing state-of-the-art adaptive devices to help those with vision or hearing loss.

• Many of the latest innovations and discoveries in prosthetics research in the United States take place at VA centers. These centers generally work in close partnership with affiliated universities, and sometimes with other universities, as well as with commercial partners and other federal agencies.

• VA laboratories specializing in prosthetics development include the Advanced Platform Technology Center, in Cleveland; the Center for Functional Electrical Stimulation, also in Cleveland; the Human Engineering Research Laboratories in Pittsburgh; the Center of Excellence for Limb Loss Prevention and Prosthetic Engineering in Seattle; and the VA Center of Excellence for Neurorestoration and Neurotechnology in Providence, Rhode Island.

SELECTED MILESTONES AND MAJOR EVENTS

1947 – Introduced the first mobility and orientation rehabilitation-training program for blinded Veterans

2007 – Unveiled the first powered ankle-foot prosthesis, as part of a team with researchers at MIT and Brown University

2013 – Reported on new technology to help restore the sense of touch for those who have lost an upper limb and use an artificial hand

2014 – Published results of a study on how users and clinicians feel about the DEKA arm, the first prosthetic arm capable of performing multiple simultaneous powered movements

2015 – Invented a wheelchair allowing users to crank up the push rims to a standing position, providing them with increased functionality and independence

2015 – Began the first human study in the United States to investigate osseointegrated prosthetics, in which implants are firmly anchored in place by integrating implanted material in living bone

(Continued on back)
2016 – **Determined** that knee replacement surgery could benefit some patients aged 85 and older

### RECENT STUDIES: SELECTED HIGHLIGHTS

- **A 10-year trial of a surgically implanted electrical stimulation system for people with spinal cord injuries (SCIs)** was completed by researchers at VA’s Cleveland Functional Electrical Stimulation (FES) Center and Case Western University in 2015. By stimulating muscles, the system activates muscles to allow for standing, better balance, and exercise. A study of 15 people with SCIs who had received the system found that the patients had incorporated the neuroprostheses into their lives; that the system worked as well for patients after a year as it had when they first received it; and that the neuroprosthesis was safe and reliable to use. (*Archives of Physical Medicine and Rehabilitation*, May 2012)

- **The DEKA advanced prosthetic arm is the first prosthetic arm capable of providing multiple simultaneous powered movements.** VA researchers and colleagues collected data on the DEKA arm over four years at four VA sites, and it is now approved by the U.S. Food and Drug Administration. In a 2014 study led by researchers from the Providence VA Medical Center and Brown University, 24 upper-limb amputees were fitted with a second-generation arm, and 13 were fitted with a third-generation arm, and were surveyed about their experiences. In all, 95 percent of Gen 2 users and 91 percent of Gen 3 users indicated that they were able to perform new activities they had been unable to perform with their existing prosthetic device. (*Prosthetics and Orthotics International*, December 2014)

- **BrainGate is a neural prosthesis that allows people whose arms and legs are paralyzed to control robotic arms or computer cursors with their thoughts.** It was developed by a research team of VA, Brown University, Harvard University, and Massachusetts General Hospital investigators in the 2000s. Recently, the research team found that advances in the system enabled those using it to acquire “targets” on a computer screen, such as letters on a keyboard, more than twice as quickly as before. Another study found that the system can allow point-and-click communication by people with locked-in syndrome, who are fully conscious but unable to move any muscles except for those that control eye movement. (*Science Translational Medicine*, Nov. 11, 2015: *Neurorehabilitation and Neural Repair*, June 2015)

For more information on VA studies on prosthetics and other key topics relating to Veterans’ health, please visit [www.research.va.gov/topics](http://www.research.va.gov/topics)

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Some VA researchers are working on developing high-functioning artificial limbs that are very similar to their natural counterparts.
ABOUT RESPIRATORY HEALTH

• Two specific types of respiratory diseases that can restrict breathing are asthma and chronic obstructive pulmonary disease (COPD).

• Asthma is a chronic inflammatory disorder of the airways characterized by episodes of breathing problems. While it cannot be cured, its symptoms can be controlled.

• COPD is characterized by airflow limitation. The limitation is usually progressive and is associated with an abnormal inflammatory response of the lungs to noxious particles or gases, such as those in cigarette smoke.

• The term COPD includes two main conditions: emphysema (in which the air sacs of the lung are damaged and enlarged), and chronic bronchitis (a long-lasting cough caused by chronic inflammation of the bronchi). Most people with COPD have both conditions.

• Veterans who develop respiratory cancer (cancer of the lung, bronchus, larynx, or trachea) and were exposed to Agent Orange or other herbicides during military service do not have to prove a connection between their disease and their service to be eligible to receive VA health care and disability compensation.

• Veterans may suffer from other respiratory problems due to exposure to respiratory hazards such as infectious agents and other environmental exposures. Examples of respiratory diseases that may be caused by infectious agents are tuberculosis, lung cancer, and pneumonia. Environmental hazards found in war theaters, such as Agent Orange, may put Veterans at additional risk of respiratory problems.

• VA researchers are advancing the understanding, prevention, and treatment of numerous respiratory illnesses, ranging from the common cold and pneumonia to major public health threats such as tuberculosis and lung cancer.

• VA's Office of Public Health (OPH) works with all levels of government to prepare for possible pandemic influenza (flu) outbreaks.

• Respiratory problems are the leading cause of death in Veterans and others who have spinal cord injury (SCI). VA's Center of Excellence on the Medical Consequences of Spinal Cord Injury (SCI), located in the Bronx, N.Y., is studying ways to treat complications of SCI, including breathing difficulties.

SELECTED MILESTONES AND MAJOR EVENTS

1946 – Developed and tested effective therapies for tuberculosis through multicenter clinical trials that led to the development of the VA Cooperative Studies Program

1950 – Concluded there is “strong circumstantial evidence” linking cigarette smoking with respiratory tract cancers

2013 – Found that sleep apnea and poor sleep quality predicted diabetes, independent of other diabetes risk factors or mental health status

2014 – Learned that treatment for pneumonia that included the antibiotic azithromycin (Zithromax) was associated with a significantly lower risk of death and a slightly increased risk of heart attack

2016 – Developed a blood test to determine the causes of upper respiratory illness, to help ensure antibiotics are used appropriately

RECENT STUDIES: SELECTED HIGHLIGHTS

• COPD is a progressive disease that makes it hard to breathe. Patients with COPD have a variety of bacterial pathogens in their lungs. Researchers at the VA Western New York Healthcare System and the University of Buffalo demonstrated that COPD patients experience significant respiratory symptoms when their lungs are colonized by bacteria, even when they are not having acute respiratory problems.

According to the U.S. Environmental Protection Agency, most people take between 17,000 to 23,000 breaths a day. For the healthy, this is simple. But for millions of people with respiratory problems, breathing is not easy.
Treating bacterial infections should therefore help improve their quality of life. ([Annals of the American Thoracic Society](https://www.journals.org/journals/aats), March 2014)

- **Smoking marijuana is not as bad as smoking cigarettes when it comes to lung disease**, researchers with the Central Arkansas Veterans Healthcare System in Little Rock and the University of Arkansas have found. The team found a clear linkage between marijuana use and chronic bronchitis and large airway inflammation, conditions that make breathing difficult. However, they found no links to emphysema, a chronic disease in which the air sacs in the lungs are gradually damaged, and only weak, if any, links to lung cancer. The researchers concluded, however, that there is unequivocal evidence that habitual or regular marijuana use is not harmless, and that doctors should caution patients about possible lung damage from regular heavy marijuana use. ([Current Opinion in Pulmonary Medicine](https://www.journals.org/journals/copm), March 2014)

- **Medical imaging techniques often used to diagnose lung cancer are not as good at detecting that cancer in regions where there is endemic infectious lung disease**, compared with regions where such disease is not widespread. Positron emission tomography (PET) is a medical imaging technique that produces 3-D images showing differences between healthy and diseased tissue. PET commonly uses a radioactive tracer called FDG (fluorodeoxyglucose), so the test is sometimes called an FDG-PET scan. They are often used in combination with computed tomography (CT) scans. In regions where lung diseases like histoplasmosis and blastomycosis are common, these diseases may sometimes be mistaken for cancer on these imaging tests. ([Journal of the American Medical Association](https://www.journals.org/journals/jama), Sept. 24, 2014)

- **An algorithm to help hospitals and public health officials determine the earliest stages of flu season** has been developed by researchers with VA and other health care institutions throughout the nation. The algorithm, called the Above Local Elevated Respiratory Illness Threshold (ALERT), uses routine information, such as the number of influenza cases confirmed per week in a region, to determine where and when the flu needs to be combatted. Having this information could help public health officials preserve resources while combatting the virus. ([Clinical Infectious Diseases](https://www.journals.org/journals/cid), Feb. 15, 2015)

- The standard dose of flu vaccine works just as well as a higher dose version for patients between the ages of 65 to 84, according to researchers at the Philadelphia VA Medical Center and the University of Pennsylvania. However, for Veterans 85 and older, the higher dose was better in terms of avoiding hospitalization for the flu or pneumonia. ([Clinical Infectious Diseases](https://www.journals.org/journals/cid), July 15, 2015)

- **Lung cancer screening can actually lower smokers’ motivation to quit smoking**, according to investigators with the VA Puget Sound Health Care System and the University of Seattle. The team interviewed smokers who had just undergone lung cancer screening. Nearly half found some reason to believe that just being screened meant that they did not need to stop smoking. This assumption is false, as is the assumption many study participants had that lung cancer was the only potential lethal effect of smoking. ([JAMA Internal Medicine](https://www.journals.org/journals/jamainternalmedicine), September 2015)

For more information on VA studies on respiratory health and other key topics relating to Veterans’ health, please visit [www.research.va.gov/topics](https://www.research.va.gov/topics)

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**VA researchers are advancing the understanding, prevention, and treatment of numerous respiratory illnesses, ranging from the common cold and pneumonia to major public health threats such as tuberculosis and lung cancer.**
ABOUT RURAL HEALTH

• Veterans are more likely to live in rural areas than Americans who did not serve in the military. While 18 percent of Americans live in rural areas, a quarter of Veterans do.

• More than half (57 percent) of rural Veterans enrolled in VA health care are 65 years old or older. In addition, 6 percent are women; 9 percent report being members of racial and ethnic minorities; and nearly 435,000 are Veterans of our recent conflicts in Iraq and Afghanistan. About 44 percent of rural Veterans have one or more service-related disabilities.

• Rural Veterans have lower average household incomes than other Veterans; they often face long driving distances to access quality health care; and there are fewer health care providers and nurses per capita in rural areas.

• VA’s Office of Rural Health (ORH) strives to eliminate the barriers between rural Veterans and the services they have earned and deserve, thus improving Veterans’ health and well-being by increasing access to care.

VA RESEARCH ON RURAL HEALTH: OVERVIEW

• In the past 10 to 15 years, VA has launched a number of initiatives to expand and ensure access to high-quality health care for Veterans enrolled in the VA health care system who live in rural areas. VA researchers have been instrumental in these efforts by developing and evaluating new technologies, interventions, and models of care.

• Veterans who live in remote areas of the country have faced challenges in accessing VA care. VA researchers have focused on understanding these Veterans’ health care needs, and on developing and evaluating new initiatives to fill the gaps. Some VA studies focus specifically on Veterans in rural areas, while others have a broader focus but explore issues or possible solutions that are relevant to rural health care.

• With support from the Office of Research and Development, a Collaborative Research to Enhance and Advance Transformation and Excellence (CREATE) group, Improving Rural Veterans’ Access/Engagement in Evidence-Based Healthcare, is working with VA’s Office of Rural Health to ensure rural Veterans receive adequate levels of mental health care.

SELECTED MILESTONES AND MAJOR EVENTS

2011 - Published a systematic review of rural vs. urban ambulatory (outpatient) health care, a reconceptualized model of access, and numerous articles on VA access to rural health in a special issue of the Journal of General Internal Medicine

2013 - Established the Improving Rural Veterans’ Access/Engagement in Evidence-Based Healthcare CREATE and several centers to research rural health

2013 - Established the Charleston Health Equity and Rural Outreach Innovation Center (HEROIC) to improve health outcomes among rural Veterans by examining the increasing role of technology in ensuring access

2014 - Published a study of the population demographics and health care needs of female rural Veterans enrolled in VA care

2015 - Established the Virtual Specialty Care QUERI Program and QUERI for Team-Based Behavioral Health to improve rural access to health care through technology

2016 - Established the QUERI-Office of Rural Health Partnered Evaluation on Healthcare Resource Needs and Program Implementation for Rural Veterans

RECENT STUDIES: SELECTED HIGHLIGHTS

• Women Veterans living in rural and highly rural areas were older and more likely to be married than their urban counterparts, according to a study of the population demographics and health care

(Continued on back)
VA researchers have been instrumental in developing and evaluating new technologies, interventions, and models of care to help Veterans living in rural areas.
ABOUT SPINAL CORD INJURY

• The spinal cord is the main pathway for passing information between the brain and nerves that lead to muscles, skin, internal organs, and glands. Injury to the spinal cord disturbs movement, sensation, and function.

• SCIs are estimated to affect as many as 337,000 Americans, with about 12,500 new injuries occurring each year. About 80 percent of people with new injuries are males.

• Nearly half of all SCIs occur in people between the ages of 16 and 30, meaning many patients must live with the effects of these injuries for decades.

• VA treats more than 27,000 Veterans with SCI and related disorders each year, making the department the largest health care system in the world providing spinal cord care.

VA RESEARCH ON SPINAL CORD INJURY: OVERVIEW

• VA research focuses on returning motor and sensory function to Veterans with SCI. Researchers are working in the many fields, including neural engineering, wheelchairs and adaptive technology, treatment of SCI complications, new rehabilitation methods, and regenerative medicine.

• VA has played a major role in the development of BrainGate, a system that uses microelectrodes implanted in the brain to pick up neural signals. This system shows promise in allowing patients with SCI to control robotic devices and computer software systems using their brains.

• VA’s Center on the Medical Consequences of Spinal Cord Injury is studying ReWalk, a wearable robotic exoskeleton that provides powered hip and knee motion to enable people with SCI to stand upright, walk, and turn.

• Researchers at VA’s Cleveland FES Center completed a 10-year clinical trial to test a surgically implanted electrical stimulation system in people with SCI. In this program, electrodes are implanted in muscles, which allow electrically stimulated standing, better balance, and exercise. Studies show the system is safe and reliable for use.

• VA is part of the Gordon Mansfield Spinal Cord Injury Translational Collaborative Consortium, a project to advance the field of regenerative rehabilitation. Regenerative rehabilitation aims to restore tissue and organ function lost as a result of aging, injury, or disease through techniques such as cell transplantation.

• The VA Rehabilitation Research and Development Center for the Restoration of Nervous System Function is researching molecular and cell-based methods to alleviate pain and restore nervous system function in Veterans whose nerves have been damaged by SCI, multiple sclerosis, and diabetes.

• The VA Center in Wheelchairs and Associated Rehabilitation Engineering continually improves the mobility and function of Veterans with disabilities through advancing engineering and clinical research in wheelchair design and other mobility technologies.

• Researchers modified the VA MOVEd program to better suit the needs of Veterans with SCIs. They created pamphlets that include wheelchair fitness activities, safety tips for wheelchair users, and ideas to help SCI patients perform physical activity safely.

SELECTED MILESTONES AND MAJOR EVENTS

1988 – Established the Center for Neuroscience and Regeneration Research at the VA Connecticut Healthcare System

1989 – Established the Cleveland FES Center to focus on the application of electrical currents to generate or suppress activity in the nervous system
VA treats more than 27,000 Veterans with SCI and related disorders each year, making the department the largest health care system in the world providing spinal cord care.
ABOUT SUBSTANCE USE DISORDERS

- According to the Centers for Disease Control and Prevention (CDC), SUDs are a leading cause of death in the United States. Excessive alcohol use alone leads to about 88,000 premature deaths each year, and more than 480,000 deaths each year are caused by cigarette smoking.

- SUDs can develop in individuals who use alcohol or other addicting drugs in harmful quantities. According to the VA/DoD Clinical Practice Guideline for the Management of Substance Use Disorders, about 9 percent of Americans over age 18 have a non-tobacco SUD, and about 1 in 4 Americans will develop a non-tobacco SUD over the course of a lifetime.

- In service members and Veterans, SUD commonly co-occurs with and complicates other conditions or issues. These conditions or issues may be health-related, such as other mental health conditions. They may also be societal, such as homelessness, criminal justice involvement, or unemployment.

- SUDs have substantial negative consequences on Veterans’ mental and physical health, work performance, housing status, and social function. The department offers treatments for substance use problems throughout its health care system.

VA RESEARCH ON SUBSTANCE USE DISORDERS: OVERVIEW

- VA supports a broad portfolio of research looking at substance abuse prevention, screening, and treatment. Some researchers are looking at treatment-seeking patterns: why and when Veterans ask for help—and why many don’t. Treatment strategies, including cognitive behavioral strategies and Web-based approaches, are also being studied.

- Other researchers are working to identify the most effective therapies for co-morbid disorders, such as depression and PTSD, and attempting to determine if early intervention improves outcomes. Still others are focusing on how readjustment issues relate to substance abuse.

- A Collaborative Research to Enhance and Advance Transformation and Excellence (CREATE) group is working to promote value and access in VA’s SUD services. The group is doing so by validating and refining quality metrics; evaluating and disseminating low-cost, high impact innovations; and promoting patient and provider knowledge about evidence-based treatment for SUDs.

SELECTED MILESTONES AND MAJOR EVENTS

1956 – Linked cigarette smoking with precancerous lesions

1976 – Completed a comparison trial of two different types of methadone

1984 – Developed the nicotine transdermal patch and other therapies to help smokers quit

1992 – Published a study in which the drug Naltrexone was shown to be effective in keeping alcoholics from relapsing into heavy drinking and reduced cravings for alcohol

2013 – Successfully tested a vaccine to treat methamphetamine addiction on mice

2016 – Developed, and tested on rats, a painkiller as strong as morphine that is unlikely to be addictive and has fewer side effects

RECENT STUDIES: SELECTED HIGHLIGHTS

- For treating alcohol dependence, a 26-week primary care intervention is just as effective as specialty outpatient treatment, according to VA researchers in Philadelphia. The study enrolled 163 Veterans and randomly assigned them to primary care treatment or specialty treatment groups. Those receiving primary care treatment were offered medicine and psychosocial support, delivered in person and by phone. The researchers found that Veterans in the primary care treatment group were more than five
SUDs have major negative impacts on Veterans’ mental and physical health, work performance, housing status, and social function.

Updated September 2016 • For a digital version of this fact sheet with active links to sources, visit www.research.va.gov/topics
ABOUT SUICIDE PREVENTION

Veterans can be at risk for suicide for a variety of reasons. Some are coping with aging, stress, or lingering effects stemming from their military service that have never been addressed. Many have underlying mental health conditions, in some cases aggravated by their military service, that increase their risk. Many recently discharged Veterans have difficulty with their relationships or their transition back to civilian life.

As part of its efforts to address this problem, VA has established a toll-free, confidential Veterans Crisis Line at 1-800-273-8255 (1-800-273-TALK). The hotline, staffed by mental health professionals 24 hours a day, seven days a week, has received more than 2.3 million calls (as of July 2016) since it was established in 2007. VA also offers a texting service at #838255.

Veterans and their families can chat online with trained counselors at www.VeteransCrisisLine.net. Registration with VA or enrollment in VA health care is not necessary. VA also has full-time suicide prevention coordinators at each of its 144 hospitals.

VA RESEARCH ON SUICIDE PREVENTION: OVERVIEW

Times of crisis can be related to chronic pain, anxiety, depression, sleeplessness, or anger, or disturbing memories of combat service. VA researchers are taking steps to protect at-risk Veterans from contemplating, attempting, and completing the act of suicide.

Investigators are exploring risk factors for suicide in Veterans and helping to improve risk assessments. They are also working to develop effective interventions and to identify crucial time periods at which to intervene.

Other researchers are developing national systems to capture and manage data relating to suicide, attempted suicide, and suicide reattempts among Veterans. These systems will help investigators determine risk and protective factors for suicidal behavior among Veterans.

VA’s Center of Excellence for Suicide Prevention, located at the Canandaigua, N.Y., VA Medical Center, has a mission to reduce occurrences of suicide, primarily by studying and applying public health approaches to suicide prevention.

VA is part of the Military Suicide Research Consortium, a partnership that manages studies to increase knowledge on topics such as risk assessment, treatment, and prevention, as they pertain to suicidal behavior in the military and among Veterans.

SELECTED MILESTONES AND MAJOR EVENTS

2007 – Established a Center of Excellence for Suicide Prevention in Canandaigua, N.Y.

2012 – Completed a report providing data on suicides and attempted suicides among Veterans

2012 – Found that the experience of killing in war was strongly associated with thoughts of suicide

2016 – Determined that Veterans receiving high doses of opioid painkillers were more than twice as likely to die by suicide than those receiving low doses

2016 – Announced a series of actions to reduce Veteran suicide, including using data on suicide attempts and overdoses to guide prevention strategies

(Continued on back)
RECENT STUDIES: SELECTED HIGHLIGHTS

• Changes in the levels of certain amino acids in the body may contribute to suicide risk, according to Durham VA Medical Center researchers. The amino acids in question are important in regulating people's mood and behavior, although understanding their exact relationships to suicide requires further study. (Military Medicine, May 2014)

• Veterans with pain, traumatic brain injury (TBI), and posttraumatic stress disorder (PTSD) have no greater risk of suicide than those who have PTSD alone. Researchers from the South Texas Veterans Health Care System found that the riskiest combination of conditions for suicide was PTSD, depression, and substance abuse. PTSD has by far the largest effect, and adding depression or substance abuse to PTSD significantly raises the risk of suicide over PTSD alone. (American Journal of Public Health, February 2015)

• A possible link between air pollution and suicide has been uncovered by researchers at the VA Salt Lake City Health Care System and the University of Utah. They found that the odds of completing suicide were 20 percent higher for people who had been exposed to increased levels of nitrogen dioxide in the two to three days before their deaths. In particular, men and those between 36 to 64 years of age experienced the highest risk of suicide following short-term air pollution exposure. (American Journal of Epidemiology, March 1, 2015)

• Non-suicidal self-injury, or purposely hurting oneself without conscious suicidal intent, is relatively common among Iraq and Afghanistan Veterans. A study led by researchers at the Durham VA Medical Center indicated that of 151 Veterans of the two wars studied by the research team, 14 percent reported a history of such injuries—and those who deliberately hurt themselves were more likely to engage in suicidal behavior. (Psychiatry Research, June 30, 2015)

• Veterans receiving the highest doses of opioid painkillers are more than twice as likely to die by suicide, compared with those receiving the lowest doses. Investigators with the VA Ann Arbor Healthcare System and the University of Michigan looked at Veterans with non-cancer chronic pain who had received prescriptions for opioids. Using the National Death Index, the researchers identified 2,601 of these patients who died by suicide. They found that the suicide risk rose as dosages increased. The researchers could not tell, however, whether there was a direct causal link between the pain medications and suicide risk. (Pain, May 2016)

• Nearly 14 percent of Veterans reported they had experienced suicidal thoughts in the two weeks before being asked whether they'd had such thoughts, according to a study led by VA's National Center for PTSD. The results of the study also indicate that higher levels of psychiatric distress, physical health problems, and a history of substance abuse predict chronic suicidal thinking, and that thoughts of suicide can come and go over time. (Journal of Affective Disorders, June 2016)

For more information on VA studies on suicide prevention and other key topics relating to Veterans’ health, please visit www.research.va.gov/topics

VA researchers are taking steps to protect at-risk Veterans from contemplating, attempting, and completing the act of suicide.
VA research on

TRAUMATIC BRAIN INJURY

The Department of Defense estimates that 22 percent of all combat casualties from Iraq and Afghanistan are brain injuries. Traumatic brain injury is also a significant cause of disability outside of military settings.

ABOUT TRAUMATIC BRAIN INJURY

• Traumatic brain injury (TBI) can happen from a blow or jolt to the head, or from an object penetrating the brain. When the brain is injured, the person who has been injured may experience a change in consciousness that can range from becoming disoriented and confused to slipping into a coma. The person may also have a loss of memory for the time immediately before or after the event that caused the injury. Not all injuries to the head result in a TBI, however.

• TBI can involve symptoms ranging from headaches, irritability, and sleep disorders to memory problems, slower thinking, and depression. These symptoms often lead to long-term mental and physical health problems that hurt Veterans’ employment and family relationships, and their reintegration into their communities.

• The severity of a TBI is determined at the time of the injury and is based on the length of the loss of consciousness, the length of either memory loss or disorientation, and how responsive the individual was after the injury.

• Most TBI injuries are considered mild, but even mild cases can involve serious long-term effects on areas such as thinking ability, memory, mood, and focus. Other symptoms may include headaches, vision, and hearing problems.

• While most people with mild TBI have symptoms that resolve within hours, days, or weeks, a minority may experience persistent symptoms that last for several months or longer. Treatment typically includes a mix of cognitive, physical, speech, and occupational therapy, along with medication to control specific symptoms such as headaches or anxiety.

VA RESEARCH ON TRAUMATIC BRAIN INJURY: OVERVIEW

• Among the goals of VA researchers working in this field are to shed light on brain changes in TBI, improve screening methods and refine tools for diagnosing the condition, and develop ways to treat brain injury or limit its severity when it first occurs.

• Researchers are also designing improved methods to assess the effectiveness of treatments, and learning the best ways to help family members cope with the effects of TBI and support their loved ones.

• VA’s Translational Research Center for TBI and Stress Disorders (TRACTS) conducts studies to understand the complex changes in the brain, thinking, and psychological well-being that result from TBI and posttraumatic stress disorder (PTSD). These studies will lead to more understanding and better treatment options for returning Veterans with TBI and PTSD.

• The department’s Brain Rehabilitation Resource Center, at the Malcolm Randall VA Medical Center in Gainesville, Florida, develops and tests treatments to improve or restore motor, cognition, and emotional impairments that have been caused by brain disease or injury.

• At the Michael E. DeBakey VA Medical Center in Houston, the department has established a Traumatic Brain Injury Center of Excellence focusing on mild TBI.

SELECTED MILESTONES AND MAJOR EVENTS

2013 – Funded, along with the Department of Defense (DoD), two consortia to improve treatment for PTSD and mild TBI as part of the National Research Action Plan

2013 – Learned that, in mice, an artificial communication link inserted in the brain can restore functions lost as a result of TBI

2015 – Found that the blame and anger associated with the grief of caring for a
TRAUMATIC BRAIN INJURY

TBI can involve symptoms ranging from headaches, irritability, and sleep disorders to memory problems, slower thinking, and depression. These symptoms often lead to long-term mental and physical health problems.

I loved one with a TBI may be related to inflammation

2015 – Learned that Veterans who were near to bomb blasts in Iraq and Afghanistan appear to experience faster brain aging

2016 – Identified the cerebellum as particularly vulnerable to repeated blast exposures

RECENT STUDIES: SELECTED HIGHLIGHTS

• The cerebellum is particularly vulnerable to repeated blast exposures, according to researchers with the VA Puget Sound Health Care System and the University of Washington. The investigators looked at brain scans from Veterans who had experienced an average of 21 mild TBIs each as a result of explosions. The more blasts they were exposed to, the more they showed lower levels of glucose metabolism, a marker of brain activity, in the cerebellum. The cerebellum is the area of the brain that coordinates and regulates muscle activity. (Science Translational Medicine, Jan. 13, 2016)

• The blame and anger associated with the grief of caring for a loved one with a TBI may be related to inflammation. A study by researchers at the Edward Hines, Jr. VA Hospital in Hines, Ill., and Loyola University of Chicago examined grief and its association with inflammation in 40 wives or partners of Veterans with TBIs. The caregivers studied collectively reported levels of grief comparable to that of individuals who have lost a loved one. That grief was not associated with TNF-alpha or inflammation in general. However, higher levels of TNF-alpha were found in those caregivers who reported high levels of blame and anger associated with their grief. High levels of TNF-alpha are related to a variety of inflammatory-related health issues, including heart disease, cancer, and diabetes. (Biological Research for Nursing, January 2016)

• Veterans who were near bomb blasts in Iraq and Afghanistan appear to experience faster brain aging. Researchers from TRACTS conducted specially designed brain imaging on Veterans who had been within 100 feet of bomb blasts. They found that even in blasts that did not necessarily lead to concussion, those exposed showed brain aging in images designed to detect the “leakiness” and fraying of the white matter in the brain. Consequences of this brain aging in Veterans near bomb blasts could be increased rehabilitation time and an earlier need for health care for aging issues such as dementia. (Brain, August 2015)

• Veterans with a combination of depression, PTSD, and military-related TBI had the greatest difficulties of all Iraq and Afghanistan Veterans in getting around, communicating and getting along with others, self-care, and accomplishing other daily tasks. According to TRACTS researchers, many Iraq and Afghanistan Veterans require highly integrative treatment approaches, and their health problems need to be dealt with in a comprehensive and coordinated manner. (Journal of Traumatic Stress, February 2015)

For more information on VA studies on traumatic brain injury and other key topics relating to Veterans’ health, please visit www.research.va.gov/topics
ABOUT VIETNAM VETERANS

• According to Congress, the United States’ military involvement in the Vietnam War began in February 1961 and lasted until May 1975. Some 2.7 million American men and women served in Vietnam. During the war, more than 58,000 servicemen and women lost their lives.

• During the Vietnam War, the U.S. military used more than 19 million gallons of various herbicides for defoliation and crop destruction in the Republic of Vietnam. Veterans who served in Vietnam anytime during the period beginning Jan. 9, 1962, and ending May 7, 1975, are presumed to have been exposed to herbicides.

• VA established an Agent Orange Registry to study the health effects associated with exposure to herbicides such as Agent Orange. Veterans who served in Vietnam, or in other areas throughout the world where herbicide was sprayed, who are interested in participating in an Agent Orange Registry health exam should speak to the environmental health coordinator or patient care advocate at their local VA medical center.

• Congress established VA’s Vet Center program in 1979, after recognizing that a significant number of Vietnam Veterans were still experiencing readjustment problems. Today, the Vet Center program provides a broad range of counseling, outreach, and referral services to Vietnam Veterans, and to Veterans of other periods of armed hostilities after the Vietnam era.

VA RESEARCH ON VIETNAM VETERANS: OVERVIEW

• VA researchers have long recognized the importance of gathering reliable and generalizable information on Vietnam Veterans and those who served during the Vietnam era, in order to inform health care policies and practices. Investigators have carried out many studies of this kind, focusing on Vietnam Veterans’ health and well-being. These studies include mental and physical health outcomes among both women and men.

• In 1983, VA collaborated with an external entity, the Research Triangle Institute, to conduct the National Vietnam Veterans Readjustment Study (NVVRS). Study researchers concluded that, across more than 100 indexes, the majority of Vietnam Veterans appeared to have successfully readjusted to postwar life, and the majority at the time of the study were experiencing few symptoms of psychological disorders.

• The NVVRS also revealed that a substantial minority of Vietnam-era Veterans were suffering from a variety of psychological problems such as PTSD, and were experiencing a wide range of life-adjustment problems, such as marital trouble and work difficulties.

SELECTED MILESTONES AND MAJOR EVENTS

1986 – Launched the Vietnam Era Twin Registry

1988 – Completed the National Vietnam Veterans Readjustment Study

1991 – Established that, in Vietnam Veterans, there does not appear to be a causal relation between homelessness and military service, including exposure to combat

2009 – Initiated the largest health study ever of Vietnam-era women Veterans (CSP #579)

2014 – Found that Vietnam Veterans with PTSD have diminished health functioning and increased disability today, compared with those who did not develop PTSD

2016 – Launched the Vietnam Era Health Retrospective Observational Study (VE-HEROeS), a large-scale nationwide study to assess the health and well-being of Vietnam-era Veterans, and compare their health to that of their counterparts who did not serve in the military

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**RECENT STUDIES: SELECTED HIGHLIGHTS**

- **Veterans exposed to Agent Orange are not only at higher risk for prostate cancer than other Veterans, but are more likely to have aggressive forms of the disease.** A study by Portland VA Health Care System researchers was based on the records of 2,720 VA patients who had undergone an initial prostate biopsy. Prostate cancer was diagnosed in a third of the Veterans. The chance of finding cancer was 52 percent higher in those whose records indicated Agent Orange exposure. Exposure to Agent Orange raised the risk of high-grade versions of the disease by 75 percent. (*Cancer*, July 1, 2013)

- **The rate of non-melanoma invasive skin cancer among a sample of men who joined the Agent Orange registry was about twice as high as among men of the same age in the general population, according to investigators at the Washington, D.C., VA Medical Center and the University of Texas M.D. Anderson Cancer Center.** The rate among the registry sample was 52 percent, with the risk reaching 73 percent among Veterans involved in spraying Agent Orange. The researchers found no increase of malignant melanoma, the most dangerous type of skin cancer. (*Plastic and Reconstructive Surgery*, February 2014)

- **Women Vietnam-era Veterans had a lower risk of death from all causes combined and from diabetes, heart disease, chronic obstructive pulmonary disease, and diseases of the nervous system, compared with other American women of their age.** Data for this study came from The HealthVIEWS: Health of Vietnam Era Women’s Study, conducted by VA’s Cooperative Study Program (CSP #579), which is a study of approximately 10,000 women who served in the U.S. military during the Vietnam War. (*American Journal of Epidemiology*, March 15, 2014)

- **Vietnam Veterans with PTSD have diminished health functioning and increased disability today compared with those who did not develop PTSD, according to researchers from VA’s Seattle Epidemiologic Research and Information Center.** The same was true for Veterans who saw combat, compared with those who did not. Data for the study came from VA’s Vietnam Era Twin Registry, consisting of approximately 7,000 identical and fraternal male twin pairs, both of whom served in the military during Vietnam. (*Quality of Life Research*, June 2014)

- **More than 20 percent of women Veterans who served in Vietnam developed PTSD either during or after their service.** By contrast, 11.5 percent of those who served near Vietnam, and 14.1 percent of those who served in the United States, have developed PTSD at some time during their lives. According to data from VA’s HealthVIEWS study, the prevalence of PTSD for women who served in Vietnam was higher than previously documented, and Vietnam service significantly increased the chances of developing PTSD relative to service in the United States. (*JAMA Psychiatry*, November 2015)

- **As they age, many combat Veterans confront and rework their wartime memories in an effort to find meaning and build coherence,** investigators with VA’s National Center for PTSD have found. Through reminiscence, life review, and wrestling with issues such as integrity versus despair, they intentionally re-engage with experiences they avoided or managed successfully earlier in their lives. While some Veterans can navigate this process alone or with their friends, others may benefit from support groups even if a half-century has passed since their combat experience. (*Gerontologist*, February 2016)

For more information on VA studies on Vietnam Veterans and other key topics relating to Veterans’ health, please visit [www.research.va.gov/topics](http://www.research.va.gov/topics)

VA researchers have long recognized the importance of gathering reliable and generalizable information on Vietnam Veterans and those who served during the Vietnam era, in order to inform health care policies and practices.
ABOUT VISION LOSS

- VA’s Office of Blind Rehabilitation Services estimates there are approximately 157,000 Veterans in the United States who are legally blind, and more than a million Veterans who have low vision that causes a loss of ability to perform necessary daily activities.

- Among Veterans who have served in Iraq and Afghanistan, blast-related brain injuries can be followed by vision problems such as blurred vision, double vision, sensitivity to light, and difficulty reading. VA estimates that as many as 64 percent of service members with traumatic brain injuries (TBIs) also have a vision problem.

- Throughout the nation, VA operates 13 Blind Rehabilitation Centers (BRCs). These are residential inpatient training programs that help Veterans adjust to their blindness. BRCs offer a variety of courses designed to help blinded Veterans achieve a realistic level of independence.

- The Visual Impairment Center to Optimize Remaining Sight (VICTORS) program complements existing BRCs to support Veterans who are not blind but have significant visual impairment. VICTORS provides rehabilitation through offering definitive medical diagnosis and functional visual evaluation, prescribing low-vision aids and training Veterans in their use, and providing counseling and follow-up.

- VA’s Atlanta-based Center for Visual and Neurocognitive Rehabilitation is focused on enhancing Veterans’ health by conducting research on the rehabilitation of visual and related neurological impairments.

- Researchers at the VA Center for the Prevention and Treatment of Visual Loss, located at the Iowa City VA Health Care System, focus on the early detection of potential blinding disorders of the Veteran and general population. These include retinal disease, glaucoma, and TBI. Researchers at the center test new ways of determining early signs of disease progression and response to treatment. They also develop new treatments.

VA RESEARCH ON VISION LOSS: OVERVIEW

- VA research projects in the area of vision loss and vision restoration cover the entire spectrum of Veterans’ needs.

- In addition to developing vision-restoring treatment, VA investigators are designing and improving assistive devices for those with visual impairments, as well as doing work on a number of innovative wayfinding systems to help Veterans with vision loss navigate in various environments and perform everyday tasks.

- Investigators are also developing more accurate and efficient methods of vision testing, and are studying the connections between injury and vision loss in eyes that have suffered no overt damage.

SELECTED MILESTONES AND MAJOR EVENTS

1947 – Developed the first mobility and orientation rehabilitation training program for blind persons

1948 – Established the first Blind Rehabilitation Center for Veterans in Hines, Ill.

1975 – Developed the C-5 laser cane to help blinded Veterans navigate

2003 – Conducted the first tests of electrical stimulation of the human retina using an implanted microelectrode array to help restore vision to patients with blindness

2013 – Found that more than 65 percent of Veterans with blast-induced TBIs had vision problems, and 77 percent had sensitivity to light
VA investigators are designing and improving assistive devices for those with visual impairments, as well as developing innovative wayfinding systems to help Veterans with vision loss navigate in various environments and perform everyday tasks.
ABOUT WOMEN’S HEALTH

• At each VA medical center nationwide, a Women Veterans program manager is designated to advise and advocate for women Veterans. These program managers help coordinate services for eligible women for both primary and specialized care.

• Gender-specific primary care programs include cervical cancer and breast cancer screening, birth control, prescription counseling, human papillomavirus vaccine, and menopausal support such as hormone replacement therapy.

• Mental health programs geared specifically for women include evaluation and assistance for issues including depression, mood, and anxiety disorders; intimate partner and domestic violence; sexual trauma; parenting and anger management; and marital, caregiver, or family related stress.

• Special services are available to women who have experienced military sexual trauma (MST). VA provides free, confidential counseling and treatment for mental and physical health conditions related to MST.

• Reproductive health care includes maternity care, infertility evaluation and limited treatment, sexual problems, tubal ligation, and urinary incontinence.

• VA also offers special programs providing services for homeless women Veterans and those who have undergone domestic violence. The department also offers help to women Veterans who are interested in education and training, employment assistance, and vocational rehabilitation.

VA RESEARCH ON WOMEN’S HEALTH: OVERVIEW

• VA researchers are looking at a broad range of health issues related to women Veterans, including gender differences in health status and medical care; risk and resilience factors; mental and behavioral health; the impacts of military service and combat; sexual trauma; gynecological and reproductive care; access to care; improving the quality and delivery of care; and women Veterans’ experiences of and preferences for care.

• Deployment and post-deployment health research is now a major portion of the VA women’s health research portfolio, extending VA’s knowledge of the health care needs of women returning from Iraq and Afghanistan, as well as women still on active duty.

• The goal of VA’s Women’s Healthcare CREATE is to use research to accelerate the implementation of comprehensive care for women Veterans, and to focus on fundamental issues in how VA delivers care to women Veterans in the context of national VHA policy.

SELECTED MILESTONES AND MAJOR EVENTS

1992 – Formally targeted women Veterans’ health issues as a research priority and conducted a series of studies on their health care needs

1993 – Established the Women’s Health Sciences Division within the National Center for Posttraumatic Stress Disorder

1998 – Released the “Women Vietnam Veterans Reproductive Outcomes Health Study,” which found that women Vietnam Veterans had a statistically significant increase in the prevalence of children with birth defects in comparison with women Veterans who had not served in Vietnam

2005 – Held the first women’s health research agenda-setting conference

2009 – Initiated the largest health study ever of Vietnam-era women Veterans

2010 – Created the Women’s Health Practice Based Research Network to include more women in VA studies and to sharpen the focus on their health needs

Currently, there are just over 2 million living women Veterans, who make up nearly 9.4 percent of the total Veteran population. By 2018, women are expected to account for 10 percent of all Veterans.
Deployment and post-deployment health research is now a major portion of the VA women’s health research portfolio, extending VA’s knowledge of the health care needs of women returning from Iraq and Afghanistan, as well as women still on active duty.