

VA

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Research News from the U.S. Department of Veterans Affairs



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Photo by Bill George

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PTSD increases women Veterans' risk of heart disease

PTSD significantly increased the risk of ischemic heart disease in woman Veterans, found a VA Greater Los Angeles Health Care System study. In ischemic heart disease, the heart does not get enough blood because of plaque in the arteries. It is the most common type of heart disease. Researchers looked at data on women Veterans visiting VA medical centers between 2000 and 2017. Out of more than 800,000 women, about 18% had PTSD. These women had significantly higher risk for ischemic heart disease, compared with women without PTSD. This risk was independent of age, obesity, alcohol use, and other factors related to heart disease. Previous research has linked PTSD with ischemic heart disease in men, but studies in women have been limited. The researchers recommend early and routine screening for ischemic heart disease in women Veterans with PTSD. (*Journal of the American College of Cardiology*, March 2020)




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Cover photo: Army Veteran Robert Lewis uses a kiosk in the lobby of the VA Pittsburgh Healthcare System. Read more on page 6.

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VA



U.S. Department
of Veterans Affairs

Opioid agonist therapy infrequent in VA

Opioid agonist therapy is delivered infrequently in VA hospitals, found a study by VA Portland researchers and colleagues. Opioid agonists are medications, such as methadone and buprenorphine, that help prevent withdrawal from and cravings for opioids. Researchers looked at data on more than 12,000 patients with opioid use disorder who were hospitalized at a VA facility. Only 15% received opioid agonists, mostly to help with withdrawal symptoms. Just 2% began agonist treatment after discharge. Treatment delivery frequency varied across the health system. The results show that policy and educational steps should be taken to promote hospital-based opioid agonist therapy, say the researchers. (*Journal of General Internal Medicine*, April 14, 2020)



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Brain activity relation to emotions could predict PTSD treatment response

How well patients respond to PTSD treatment may be linked to how regions of the brain activate and connect with other regions, according to a VA study. Researchers used MRI to study brain signals in Veterans with PTSD. Patients were treated with either prolonged exposure therapy, medication, or both and were compared to a control group. Results showed that patients with greater activation in brain regions related to emotional processing and modulation before treatment responded better to all types of treatment. Greater connectivity between brain regions involved in attention and emotional processing also positively

affected PTSD improvement. The findings suggest that measuring how these brain regions function could help predict PTSD treatment response, according to the researchers. (*Depression and Anxiety*, April 19, 2020)



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Spiritual difficulties may increase suicidal thoughts

Spiritual difficulties were linked with increased suicidal thoughts, in a Durham VA study. Researchers collected data on religion and spirituality for a thousand Iraq and Afghanistan Veterans. They found that perceived lack of control and problems with self-forgiveness increased the risk of suicidal thoughts. Perceived punishment by God and a lack of meaning or purpose significantly increased the risk of suicide attempts. The results suggest that screening for spiritual difficulties, possibly in collaboration with

chaplains, could help detect Veteran suicide risk, according to the researchers. (*Depression and Anxiety*, April 5, 2020)

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Trust of electronic health records sharing differs by race

Patient views on sharing electronic health records differed by race, in a study of nearly 20,000 Veterans. Currently, VA patients must opt in to allow their electronic health records to be shared with outside health care providers. But as VA transitions to a new electronic health record system, it is switching to an opt-out model to make data-sharing easier. In the opt-out model, patient data can be shared with other health care providers unless the patient withdraws consent. Researchers surveyed patients about their preferences for providing data-sharing consent. A

majority of white patients, 57%, preferred an opt-out policy. But patients of other races were less likely to prefer the opt-out model: 48% of Asian/Pacific Islander patients, 45% of Hispanic patients, 40% of black patients, and 38% of Native American patients preferred this policy to opt-in. The results show that cultural sensitivity and trust must be considered during the electronic health records implementation, say the researchers. (*Journal of the American Informatics Association*, March 9, 2020)



Infectious disease specialist consultation improves long-term staph infection outcomes

Infectious disease consultation improves long-term outcomes for patients with *Staphylococcus aureus* bacteremia, found an Iowa City VA study. Bacteremia is when the bacterial infection makes it into the bloodstream. Studies have shown that 15% to 30% of patients with *S. aureus* bacteremia die within 30 days. They also have high rates of infection recurrence. Researchers studied data on more than 30,000 VA patients who had the infection. About

half of the patients had a consultation with an infectious disease specialist during their initial hospital stay. These patients were 23% less likely than patients who had not had a consultation to die from any cause in the five years after hospitalization. They were also 32% less likely to have a bacteremia recurrence five years later. The results suggest that consulting infectious disease specialists improves patients' long-term health, say the researchers. (*JAMA Network Open*, Feb. 5, 2020)



Prolonged exposure therapy could improve sexual desire problems

Prolonged exposure therapy for PTSD could improve sexual desire problems, found a study that included an Atlanta VA researcher. People with PTSD often report difficulties with sexual functioning, including sexual desire. The researchers assessed nearly 200 Veterans who were undergoing prolonged exposure therapy for PTSD. They found that patients who saw PTSD symptom improvement also experienced improved sexual desire. Those who did not respond to the treatment did not see sexual desire improvements. Patients with severe

depression at the start of treatment showed less sexual desire improvement than patients without depression, regardless of PTSD improvement. The results suggest that prolonged exposure could help with PTSD-related sexual desire problems. (*Psychiatry*, April 1, 2020)



Army Veteran Robert Lewis, wearing a myoelectric arm, peruses a magazine at the VA Pittsburgh Healthcare System.

Study probes user satisfaction with upper-limb prostheses

A survey of more than 400 Veteran users of upper-limb prostheses found little difference in satisfaction among users of myoelectric, body-powered, and cosmetic devices. Overall rankings fell just shy of "satisfied."

A new study finds similar levels of satisfaction among Veteran users of upper-limb prostheses regardless of which type of device they use.

The results appeared online in the journal *Prosthetics and Orthotics International* in January 2020.

In a survey of more than 400 Veterans, the researchers found little difference in satisfaction, at the group level, among users of myoelectric, body-powered, and cosmetic prostheses. Overall across the three groups, the average rankings fell just shy of "satisfied."

A myoelectric prosthesis is an externally powered artificial limb that is controlled with electrical signals generated by one's muscles. The device can replace missing hands, elbows, and shoulders, depending on the level of amputation. The most advanced experimental systems can transmit sensation back to the user in the case of fingers and touch, a feature that is not available in commercial devices.

A body-powered device is operated by a cable. Movement of another part of the body, such as the shoulder blades,

pulls the cable open and controls the limb.

Cosmetic prostheses are used by upper- and lower-limb amputees for appearance purposes. Older designs are often a kind of vinyl, while more recent ones are made from urethanes and silicones that closely reflect the appearance of the natural limb.

The researchers also observed no satisfaction difference based on the type of terminal device, which is the prosthetic hook or hand. The most commonly used prostheses have hooks or hands that open and close in one position. Advanced prosthetic hands with multiple degrees of freedom allow the user to move the hand into different grasping positions.

Dr. Linda Resnik of the Providence VA Medical Center led the study. She and her colleagues expected to see greater satisfaction with people using myoelectric devices that provide multiple degrees of freedom. She was thus surprised to find no difference in prosthesis satisfaction.

'The latest and greatest devices'

"I thought that people who got the newest and the latest and greatest devices that offer multiple degrees of freedom would be happier with them," says Resnik, who is also affiliated with Brown

University in Rhode Island. "There could be many reasons we didn't find that. These devices are known to be more fragile. The more mechanically complicated devices are, the more places they can break. So they may end up being in the shop more. Many people have expectations about what these devices should do that just aren't being met."

Resnik and her team also aimed to identify factors linked to prosthesis satisfaction. They found that initial prosthetic training was associated with greater happiness, pointing to the "critical role of occupational or physical therapy in the early stages of prosthetic care."

"That training usually includes hours and hours of practice using it, learning strategies to use it, and

"Many people have expectations about what these devices should do that just aren't being met."



Photo by Bill George

Lewis uses a kiosk in the lobby of the VA Pittsburgh Healthcare System.

learning how to incorporate the prosthesis into your everyday activities," Resnik explains. "That's what physical therapists and occupational therapists do. It's hard to believe, but data show that some people don't

receive training to use their devices.

When that happens, patients don't incorporate their device into their daily lives, as well. They become frustrated and are set up for a bad experience. Early training is very important for later satisfaction.

"Some medical centers don't have the expertise to provide the right training," she adds. "That's a problem with a lot of specialized rehabilitation and training protocols. Clinicians don't see enough patients to develop the right expertise. VA has some advantages. We have a national amputation system of care with regional amputation centers. Also, VA can offer tele-rehab and consultation."

In additional findings, the researchers observed that the proximal level, which is the closeness of the amputated limb to the frame of the body, was linked to lower satisfaction levels. The shoulder is closer than the elbow or wrist, for example. This finding was consistent with past literature that showed people with

amputation at the shoulder level had the highest rate of device rejection (60%), followed by those who had the procedure above the elbow (57%), and those with an amputation below the elbow (6%).

“The more joints you lose, basically the harder it is to replace the function of the arm,” Resnik says. “If you lose your shoulder, for example, it’s really difficult to replace that kind of movement. Your shoulder is critical to getting the hand placed in different positions. The weight of the prosthesis gets progressively heavier, too, depending on how long it is and how many components it includes. So it’s pretty well known that people with more proximal amputations tend to abandon devices because they don’t feel like they restore enough function and because they think they’re not worth the effort.”

No one size fits all with upper-limb prostheses

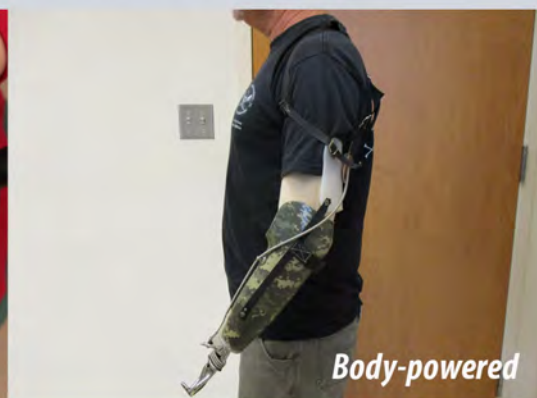
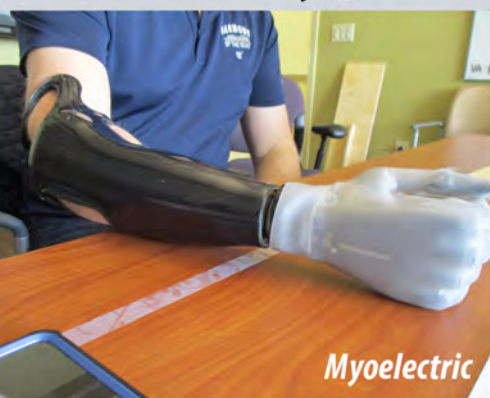
Resnik has been working in upper-limb prosthetic development for more than a decade. The field can be very complex, with no one-size-fits-all solution that

satisfies everyone. She has studied some of the most sophisticated technologies, including the LUKE/DEKA arm, which was the first prosthetic arm with the ability to perform simultaneous powered movements. VA researchers were key to testing and optimizing the LUKE/DEKA arm, which the U.S. Food and Drug Administration approved in 2014. In comparing that device to existing prostheses, she became interested in the capabilities of other technologies. She has been trying to understand which devices people are happiest with and which ones are most functional.

Her latest study is part of a larger national survey published last year. The survey covers many aspects of Veteran prosthesis use and care received. “That’s what motivated me to do this study,” she says. “It was working on the development of new technologies and realizing that we don’t know what today’s upper-limb prostheses can do or how people feel about what’s available.”

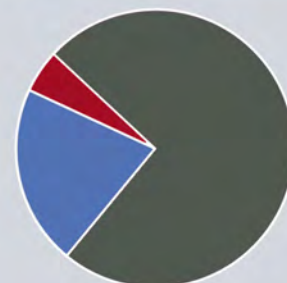
Read more at www.research.va.gov/currents ★

Types of upper-limb prostheses



What type of device did study participants use?

■ Body-powered	74%
■ Myoelectric/hybrid	21%
■ Cosmetic	5%



Study of nearly 2 million Veterans confirms links between weight and pain

Patients with higher body weight were more likely to experience pain, in a study of nearly 2 million Veterans with musculoskeletal disorders. The relationship between body weight and pain was especially pronounced in patients with osteoarthritis.

The study was one of the largest to date looking at the connection between body weight and pain specifically in a population with musculoskeletal disorders. It is the largest such study focusing on Veterans.

The results appeared March 18 in the journal *Pain Medicine*.

'A complicated relationship'

"Pain, osteoarthritis, and weight share a complicated relationship," explains study author Dr. Diana Higgins, a researcher with the VA Boston Healthcare System and Boston University School of Medicine. "Overall, the more weight a patient with a musculoskeletal disorder carries, the more likely they are to report experiencing pain, which may affect functioning and quality of life."

Previous research has shown a link between higher body mass index (BMI) and an increased risk of chronic pain. Studies have also shown a relationship between weight and musculoskeletal disorders, particularly osteoarthritis. However, the connection between these disorders, weight, and pain together is less well-known. Most studies examining the relationship between BMI and pain intensity do so among patients with existing chronic pain conditions rather than in disorders that may or may not have accompanying pain, explain the researchers.

To that end, researchers from several different VA health care systems examined data on nearly 2 million

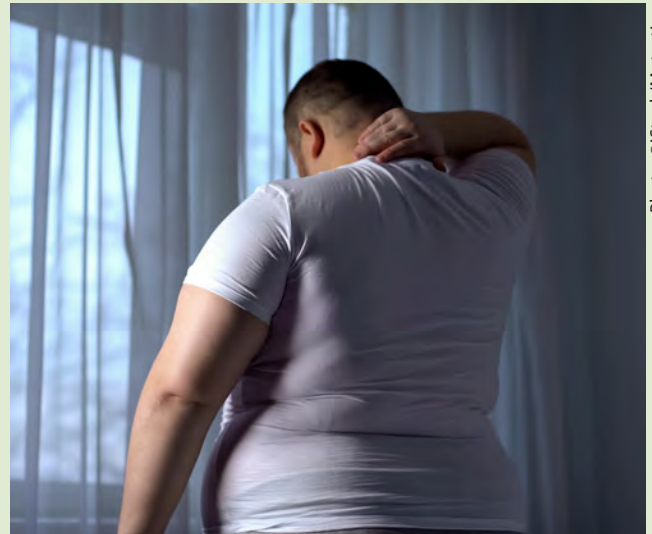


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Past research found that of some 46,000 overweight Veterans surveyed, 72% reported painful conditions.

Veterans with musculoskeletal disorders. Conditions included non-traumatic joint disorder; osteoarthritis; and low back, back, and neck pain.

According to Higgins, the nature of the VA health care system provides researchers with a wealth of data to conduct large studies such as this one. "Because it is an integrated health system serving a large number of patients," she says, "VA offers a unique opportunity to conduct these large health services research studies."

Higher BMI, more likely to report pain

About 79% of the study sample were overweight or obese, and 42% of the whole group said they did not have any pain.

The higher a patient's BMI, the more likely he or she was to report pain. Compared to patients with normal weight, patients classified as having moderate obesity (BMI of 35 to 39.9) were 9% more likely to report pain. Patients with severe obesity (BMI of 40 or higher) had 23% higher odds of pain.

Read more at www.research.va.gov/currents ★



VA researchers probed the reasons why nurses and other health care workers sometimes deviate from established protocols regarding the use of respiratory protective equipment.

Study offers insight on use of respiratory gear in hospitals

A recent VA study offers insight on the use of respiratory protective gear by health care workers. Why do nurses and other staff sometimes fail to use the equipment when it's required, or vice versa?

It's critical for nurses and other hospital and clinic staff to use best practices to help keep infections from spreading. A recent VA study provides insight on why health care workers sometimes fail to use respiratory protective equipment (RPE)—namely, respirator masks—to protect them from getting and spreading airborne infections, and why they sometimes use the equipment when it's not required.

One way the new coronavirus and other dangerous respiratory infections spread is by people coughing or sneezing. VA researchers found that policies and social norms within hospitals tend to reinforce correct RPE use. They also found that this culture of safety can be undermined when health care workers are unsure of risk levels or if they mistrust hospital protocols and rely on their own judgment.

“One of our biggest takeaways is that teams should have explicit conversations—such as in team huddles—that address their concerns,” says Dr. Gemmae Fix, lead author on the research, which appeared in October 2019 in the *American Journal of Infection Control*.

Study based on focus groups

Fix is a medical anthropologist and health services researcher with Boston University and VA's Center for Healthcare Organization and Implementation Research (CHOIR), based at the VA medical centers in Boston and nearby Bedford.

Her group conducted 12 focus groups with nurses and nursing assistants at four VA and academic medical centers in the Northeast and Midwest.

The study focused on N-95 respirators, special masks that are individually fitted to cover the nose and mouth and filter out 95% of airborne germs—even tiny droplets. Simpler face masks, also called surgical or medical masks, seen widely in the public since the coronavirus outbreak, block only larger droplets and are not nearly as effective.

Fix's team found that health care workers generally knew when hospital policy called for using RPE, and that following hospital RPE protocol was seen as "part of the job." Social norms in the hospitals reinforced this culture of safety. This can be seen in instances like health care workers urging other staff members to don a mask, or organizing respiratory safety training for other hospital workers, such as food service staff, when they observed that RPE protocol was not followed.

Discomfort not the main factor in misuse

Fix notes that N-95 respirators can be uncomfortable, especially when worn for hours at a time, and that previous studies have focused on this as the main driver of poor adherence to protocol. But she says her team found that "while RPE was reported to be uncomfortable, people wanted to follow RPE protocol. RPE misuse was instead driven by 'personal' protocols, such as when people did not trust the protocol and instead relied on their experience."

For example, a patient who is coughing heavily

might lead some nurses to put on a respirator mask. But that symptom in itself is not necessarily an indicator for RPE.

The researchers emphasize that when staff follow their own personal safety protocols, this can undermine the broader safety culture. Overuse of RPE, they say, can potentially desensitize hospital staff to the value of correct RPE use and needlessly alarm others. Overuse may also result in RPE being unavailable when it is actually needed.

"Some health care workers worry the protocols inadequately protect them," says Fix, "so they want to

follow their own 'personal' protocol and proactively wear RPE even when it is not specified. Mistrusting the safety protocols in place may lead to overuse of RPE, which undermines both the general safety culture and also risks depleting supplies."

Fix notes the overuse is generally well-intended. "The nurses want to protect themselves and their other patients."

"One of our biggest take aways is that teams should have explicit conversations—such as in team huddles—that address their concerns."

Urban versus rural facilities and emergency departments

Fix's team found that workers in urban hospitals tended to see themselves at higher risk for infection than their rural colleagues because their facilities had many high-risk patients. This led some urban health care workers to perceive that their hospitals did not have enough RPE or that it was not readily accessible when needed. In contrast, rural hospital staff reported RPE as plentiful and accessible.

Emergency departments (EDs) had their own issues. The focus groups suggested a "distinctly different clinical context" at play in these hospital units, says Fix.

"Unlike the other units, patients come into the ED without a working diagnosis," she explains. "Thus, there is the persistent potential that patients may have an airborne infection. Health care workers in the ED likely get acclimated to not having a diagnosis [for

Continued on next page

the patient] and subsequently not wearing RPE. Not wearing RPE then persists as these health care workers from the ED move through the facility, even after the patient has been given a diagnosis that now requires RPE.”

Fortunately, risk factors are modifiable

The authors conclude that because “a large-scale pandemic is always possible,” adherence to RPE protocol may become critical with little advance notice. They recommend that each hospital assess its own unique context and safety culture with regard to RPE use, especially in urban areas or EDs where risk perceptions may differ.

Fortunately, they note, their data provide insight into reasons why health care workers do not follow RPE protocol—and those reasons are usually modifiable.

“RPE use is informed by not only national and local policies, but the local culture,” notes Fix. “Human behavior is complex, but modifiable. Explicit work to address poor adherence, such as team huddles, can help health care workers talk about their concerns, address potential mistrust of the protocols, and ensure everyone is working as part of a culture of safety.”

Read more at www.research.va.gov/currents ★

For an overview of the latest VA research on high-priority topics affecting Veterans' health, visit www.research.va.gov/topics.



VA research on POSTTRAUMATIC STRESS DISORDER (PTSD)

In earlier wars, it was called "soldier's heart," "shell shock," or "combat fatigue." Today, clinicians recognize the issues described by each of these terms as a distinct medical condition called posttraumatic stress disorder, or PTSD.

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 or 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.
- 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. Recently, reckless and self-destructive behavior has been added as a PTSD symptom.

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 genetic or biochemical foundations of the disorder to evaluations of new or existing treatments.
- VA's [National Center for PTSD](#) (NCFPTSD) 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.
- VA's [National PTSD Brain Bank](#) is a brain tissue repository that supports research on the causes, progression, and treatment of PTSD. The bank is responsible for tissue acquisition and preparation, diagnostic assessment, and storage. Most of the brains stored in the bank are from people once diagnosed with PTSD. Others are from donors who had major depressive disorders. Other brains are from healthy controls. The goal is to help to pinpoint how PTSD affects brain structure and function.
- In 2015, VA and the Department of Defense (DOD) announced that they were committing more than \$50 million to fund new PTSD research.

(Continued on back)



VA research on TRAUMATIC BRAIN INJURY

VA research related to TBI is wide-ranging. 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.

ABOUT TRAUMATIC BRAIN INJURY

The CDC defines a TBI as “a disruption in the normal function of the brain that can be caused by a bump, blow, or jolt to the head or penetrating head injury.”

After a TBI, the person may experience a change in consciousness that can range from becoming dazed and confused to loss of consciousness. The person may also have a loss of memory for the time immediately before or after the injury.

The DOD estimates that 22 percent of all combat casualties from Iraq and Afghanistan are brain injuries. TBI is a significant cause of disability outside of military settings, most often as the result of assaults, falls, automobile accidents, or sports injuries.

TBI can include a range of conditions, 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 impact Veterans' employment and family relationships, and their reintegration into their communities.

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

- Beyond studying how to better treat TBI, 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 [TBI Model System \(TBMMS\)](#) is a longitudinal, multicenter research program that examines the recovery course and outcomes of Veterans and active duty service members with TBI. The goal of the system is to conduct research that contributes to evidence-based rehabilitation interventions and practice guidelines that improve the lives of people with TBI.
- VA's [Translational Research Center for TBI and Stress Disorders](#) (TRACS) 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 CHRONIC EFFECTS OF NEUROTRAUMA: CONCEPTS (CEMC) serves as a comprehensive research network for DOD and VA that focuses on the long-term effects of combat and military-related TBI. The CEMC is designed to conduct research that provides clinically relevant answers and interventions for service members and Veterans, and to develop long-term solutions to the chronic effects of TBI.

2008 - Established a Brain Bank to collect and study post-mortem human brain and spinal cord tissue to better understand the effects of trauma on the human nervous system.

2012 - Discovered chronic traumatic encephalopathy, a degenerative disease linked to repeated head trauma such as concussion, in the brains of four Veterans after their deaths.

2013 - Funded, along with the DOD, two [contracts](#) to improve treatment for PTSD and mild TBI as part of the [National Research Action Plan](#).

2015 - Learned that Veterans who were near to bombs blast in Iraq and Afghanistan appear to experience faster brain aging.

(Continued on back)



VA research on MULTIPLE SCLEROSIS

Multiple sclerosis is a complex neurological disease that affects the central nervous system, including the brain, spinal cord, and vision pathways.

ABOUT MULTIPLE SCLEROSIS

- In MS, the immune system attacks the myelin sheath, the fatty tissue that surrounds and protects nerve fibers, as well as the nerve fibers themselves. Damage from these attacks is called demyelination. When any part of the myelin sheath or nerve fiber is damaged or destroyed, nerve impulses traveling to and from the brain and spinal cord are distorted and interrupted, causing a wide variety of symptoms.
- Sometimes the myelin can repair itself and the MS symptoms go away after the immune attack. Over time, however, the myelin and underlying nerve fibers cannot recover and suffer permanent damage. The cause of MS is currently unknown.
- Symptoms vary depending on the location of the lesions in the brain and spinal cord. They may include tingling, numbness, painful sensations, slurred speech, and blurred or double vision. Some people experience muscle weakness, poor balance, poor coordination, muscle tightness or spasticity, tremor, or temporary or permanent paralysis. Problems with bladder, bowel, sexual function, or mood are also very common.

Fatigue is a major concern for most people with MS, as are challenges with memory, attention, and concentration. Symptoms may come and go, appear in any combination, and be mild, moderate, or severe.

- Many symptoms—such as fatigue, insomnia, mood, cognition, mobility, spasticity, and bowel function—are very responsive to self-care lifestyle changes such as increased activity. In addition, medication therapies and other interventions are available to help manage MS symptoms.

VA RESEARCH ON MULTIPLE SCLEROSIS: OVERVIEW

- Medical care for Veterans with MS, whether or not that illness was service-connected, can include disease-modifying therapies, other medications, physical and occupational therapy, and other health care services and medical equipment.
- Current VA research includes investigations into the biology of MS; targets for intervention; impacts of spasticity; fatigue and fall management programs; health services and the care delivery to evaluate and improve mood and fatigue; and telehealth interventions to improve access to care and symptom management, among others.

VA's Multiple Sclerosis Center of Excellence (MSCE) are dedicated to furthering the understanding of MS and its impact on Veterans and developing effective treatments to help manage the disease and its symptoms. MSCE East is located in Baltimore, and MSCE West is jointly located in Seattle and Portland, Oregon.

VA has also established a national integrated network of dedicated MS health care professionals for care and referrals within the VA health care system.

SELECTED MILESTONES AND MAJOR EVENTS

- 2009 - Founded the Multiple Sclerosis Center of Excellence.**
- 2014 - Discovered** that military deployment to the First Gulf War was not a risk factor for developing MS.
- 2017 - Found** that high dosage of tacrolimus can significantly slow brain atrophy, reduce falls, and improve walking times in some MS patients.

(Continued on back)

Government often pays twice for Veterans' blocked-artery treatments

The federal government is losing millions of dollars by paying twice, in many cases, for Veterans' medical procedures, found a study by VA and University of Pennsylvania researchers.

The study, which focused on one category of procedures—coronary revascularization—appears in the April 6, 2020, issue of JAMA Network Open.

The Veterans Health Administration is the largest health care system in the country. It provides health care to some 9 million enrolled Veterans each year. Many Veterans also get health care through Medicare. More than a million Veterans are enrolled in both Medicare Advantage and VA health care. Previous research found that about half of patients enrolled in VA and Medicare Advantage received services from both.

When these dually enrolled patients have coronary revascularization procedures at VA hospitals, the government ends up paying double. The extra costs for VA over a four-year period came to \$215 million, according to the new study.

Private health insurers get paid up front by Medicare

Medicare Advantage is also known as Medicare Part C. With this program, Medicare benefits are provided through private health insurers. These insurance companies contract with Medicare, which pays a fixed monthly amount to the private company to provide comprehensive care to enrollees.

Medicare pays these companies up front and does not control where patients are actually getting their medical care. When Veterans are treated at a VA hospital or clinic, they may receive services that Medicare has already paid others to provide.

When a VA patient is also covered by private insurance, VA usually collects reimbursement from



Photo © iStock/KentWeakley

Coronary revascularization is done in either of two ways: coronary artery bypass graft surgery, or stenting and angioplasty.

the insurance company. But VA cannot collect money from Medicare Advantage. Medicare plans are prohibited by law to make payments for services already paid for by another government entity.

While the current study looked only at one type of medical procedure—revascularization—past analyses have determined that the duplicate spending can cost VA upwards of \$3 billion per year.

Study included data on nearly 19,000 Veterans

Researchers from Corporal Michael J. Crescenz VA Medical Center and the University of Pennsylvania studied data on nearly 19,000 Veterans enrolled in both VA and Medicare Advantage who had coronary revascularization between 2010 and 2013.

Coronary revascularization aims to restore blood flow to the heart when a patient has blocked arteries. It is usually done in one of two ways. One is a coronary artery bypass graft, a surgery in which an artery from elsewhere in the body, usually the leg, is implanted to redirect blood flow around a blocked artery. The other is percutaneous coronary intervention, a nonsurgical procedure to treat narrowed coronary arteries. It uses stenting and angioplasty—when a balloon is threaded into an artery and inflated—to widen a constricted artery.

Read more at www.research.va.gov/currents ★



Dr. Mabelle Pardue performs an electroretinogram on Army Veteran Michael Brooks, who participated in her study

Researchers take new approach to detect, treat eye disease that can lead to blindness

A VA pilot study has shown the benefits of a hand-held device to detect early-stage diabetic retinopathy and a neuroprotective drug to potentially reverse the symptoms.

Anyone who has diabetes can develop diabetic retinopathy, which is caused by damage to the nerve cells and blood vessels of the light-sensitive tissue in the back of the eye—the retina.

A potentially devastating eye disease, diabetic retinopathy is a leading cause of blindness among working-age Americans. “This means vision loss is disrupted when these people are at the peak of their wage-earning potential,” says Dr. Mabelle Pardue, associate director of the Center for Visual and Neurocognitive Rehabilitation at the Atlanta VA Medical Center.

Pardue thus set out to learn more about how diabetic retinopathy develops and to determine the first signs of retinal problems, with an eye on spotting early defects in the retina and treating them right away. She led a pilot study that involved the use of a hand-held portable electroretinogram (ERG) device to detect pre-clinical, or early stage,

diabetic retinopathy and a neuroprotective drug to treat patients who are showing signs of the condition.

An ERG records the electrical activity of light-sensitive cells in the eyes in response to a flash of light. The response, known as the oscillatory potential, is a characteristic waveform that can be measured to determine changes in size or timing.

The drug, levodopa (commercial name Sinemet), is considered the most potent medication for treating Parkinson's disease but isn't approved by the U.S. Food and Drug Administration for diabetic retinopathy. Levodopa in the brain leads to the formation of dopamine, a chemical that transmits information between nerve cells and helps regulate movement, attention, learning, and emotional responses. Animal studies have suggested that a lack of dopamine may be behind early functional deficits in patients with diabetic retinopathy.

In her study, Pardue and her team found that the portable device, called the RETeval, has the sensitivity to detect early retinal dysfunction in diabetic patients prior to "clinically recognized vascular changes," which are retina damage caused by abnormal blood flow.

"These data demonstrate the potential to use this approach as a new screening method for diabetic retinopathy that would detect retinal defects much earlier than the currently used fundus photography," the researchers write. That procedure calls for photographing the rear of the eye, which is also known as the fundus, and recording activity in the retina.

The researchers also determined that treatment with levodopa can restore inner retinal function to normal levels within two weeks and can continue to provide benefit for at least two weeks after the treatment is stopped.

The results appeared online in February 2020 in the journal *Diabetes*, published by the American Diabetes Association.

Critical to detect diabetic retinopathy in early stages

Pardue says this is the first time the RETeval has been tested in combination with levodopa for patients with pre-clinical diabetic retinopathy. It's critical to detect the condition in its early stages, which is in the first five years after a patient is diagnosed with diabetes, and then to treat it right away, she notes. The "rule of thumb," she says, is most people don't get vascular changes until they've had diabetes for about 15 years.

"These data demonstrate the potential to use this approach as a new screening method for diabetic retinopathy that would detect retinal defects much earlier than [current technology]."

"Let's say we're able to detect diabetic changes in the eye within the first five years," says Pardue, who is also a professor at the Georgia Institute of Technology and Emory University, both in Atlanta. "That's still around 10 years before it's clinically diagnosed. That's a big difference. When you're at that late stage of the disease, a lot of drugs, no

matter how good they are, just aren't going to be able to treat it effectively because the disease has progressed too far. So there are sweet spots where diseases are reversible and treatable. In situations where you pass that line, it's really hard to bring things back or even stop the disease because a cascade of events are going to lead to it progressing. To put the brakes on at that stage is really difficult."

Diabetic retinopathy, which usually affects both eyes, is the most common diabetic eye disease. At first, the disease may cause no symptoms or only mild vision problems. But it can worsen and lead to vision loss over time. The longer one has diabetes, the greater the risk of developing diabetic retinopathy.

In some people with the disease, blood vessels may swell and leak fluid. In others, normal new blood vessels grow on the surface of the retina.

Read more at www.research.va.gov/currents ★



Drs. Regina McGlinchey and William Milberg, directors of VA's Translational Research Center for TBI and Stress Disorders (TRACTS), review MRIs.

VA's TRACTS program seeking breakthroughs on traumatic brain injury

VA's Boston-based Translational Research Center for TBI and Stress Disorders (TRACTS) has been working to increase understanding of the long-term impact of traumatic brain injury on the physical and mental health of post-9-11 Veterans.

Chris Riga knew something wasn't right.

While standing for a few minutes at a ceremony in Afghanistan in 2005, the Army Ranger suddenly felt like he was losing his balance. "It almost felt like I had vertigo or something like that," he says. "I was unstable and had to lean on something." Riga was exposed to a series of roadside blasts while serving in Afghanistan and Iraq from 2001 to 2014. He wasn't diagnosed with brain trauma until leaving the service. But just being in the vicinity of explosions has left him with challenges today. In addition to an unsteady gait that causes an occasional loss of balance, he experiences short-term memory loss.

"When I get that vertigo-like feeling, I'll usually hold onto or lean on something," says Riga, who is 55 years old. "The short-term memory issues are easily solved by writing things down or taking notes. I've always used stickies as reminders.

I keep them all over my desk and put them in my wallet and pockets. One of the greatest inventions is the smart phone. You can set alerts on the phone as reminders.”

Struggles with balance and memory are potential symptoms of mild traumatic brain injury (mild TBI), the focus of the VA program in which Riga is enrolled: The Translational Research Center for TBI and Stress Disorders (TRACTS). The initiative is aimed at understanding the long-term impact of TBI, the signature injury from the conflicts in Iraq and Afghanistan, on the physical and mental health of post-9-11 Veterans. Improved medical care has enabled many troops to survive with brain injuries, hence the urgent need for advancements in research efforts and treatment options.

Most TBI injuries are considered mild. But even mild TBI, also known as a concussion, can involve headaches and long-term effects on thinking ability, sleep, mood, focus, balance, and memory.

'Accelerated cognitive aging'

TRACTS, based at the VA Boston Healthcare System, is carrying out one of the most comprehensive VA studies on blast injuries on post-9-11 Veterans. Since the program was launched more than a decade ago, about 850 Veterans have participated in its flagship project: a prospective long-term cohort study that includes an assessment of psychological and brain trauma. Of the 850 Vets who have completed the assessment once, nearly 500 have returned for a second time and close to 70 a third time, helping researchers learn if the participants have experienced changes in brain structure and function as they age.

The average age of the Veterans who have been in the program is 32, and the age range for the first evaluation has been 18 to 65.

“It’s very special that we’ve had so many people return,” says Dr. Regina McGlinchey, the director of TRACTS. “We conduct this as an aging study, so the

"We can look at a person's trajectory across his or her life span, as opposed to doing group analyses where you compare one big group of people to another."



Photo courtesy of C. Riga

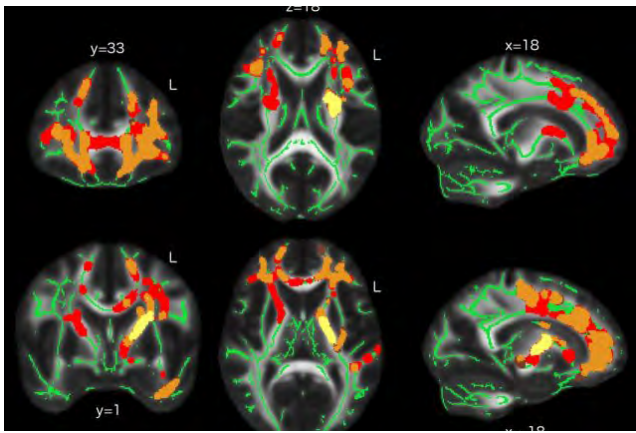
Former Army Ranger Chris Riga was exposed to a series of roadside blasts while serving in Afghanistan and Iraq from 2001 to 2014.

benefit of having longitudinal data is that we can look at a person’s trajectory across his or her life span, as opposed to doing group analyses where you compare one big group of people to another. Our approach is very different and much more powerful.

“TBI is a risk factor for Alzheimer’s disease and other types of dementia, but the impact doesn’t have to be that drastic to affect a person’s life,” she adds. “We can see declines in other cognitive functions in young people, such as memory, that we wouldn’t ordinarily see until someone is much older. We call this accelerated cognitive aging.”

The patients in TRACTS have been evaluated at the Boston VA and the Michael E. DeBakey VA Medical Center in Houston. About two-thirds of the Veterans have undergone at least one assessment in Boston. The program is eligible for a five-year funding renewal in 2023.

Data from the TRACTS cohort study have been the basis for more than 100 published papers that explore the impact of TBI and other conditions, such as PTSD, depression, and substance abuse. TRACTS has 35 primary researchers, plus other investigators who are affiliated with the program.



Brain scans that were part of a 2015 TRACTS study documented that blast exposure may lead to change in brain structure even in the absence of outward concussion symptoms.

The TRACTS assessment is based on a 10-hour battery of tests that was compiled by the TRACTS team at the Boston VA. Psychiatrists and psychologists interview Veterans about their exposure to blasts and traumatic events and to determine, for example, if they also have a history of PTSD, depression, or substance abuse. The clinicians also test the Veterans' cognitive skills and administer MRI (magnetic resonance imaging) brain scans. Plus, the patients provide a blood sample that is evaluated for standard measures, such as glucose and cholesterol, as well as genetic and methylation analysis. Methylation can change the activity of a DNA segment without changing the sequence.

Being in the vicinity of a blast

One of the tests in the 10-hour battery is a lifetime assessment of head injuries. It allows researchers to determine which Veterans were exposed to blasts, how many explosions they were exposed to, and their distance at the time from the blasts.

"We can also determine whether blast exposure resulted in a TBI doing a very careful re-creation with the patients about whether they had concussion-like

symptoms at the time of the blast," says McGlinchey, who is also a professor of psychiatry at Harvard Medical School. "For example, one can have a loss of consciousness, memory impairment, or a feeling of confusion or of having your bell rung, so to speak, at the time of the blast. We also look at pre-military service for things like childhood head injuries and at whether the Veterans sustained injuries after separating from the service. In addition, we do a lifetime comprehensive assessment of PTSD, and whether there are anxiety disorders, depression, or substance use."

McGlinchey and the co-director of TRACTS, Dr. Bill Milberg, are very interested in studying the potential brain trauma that emerges from being in the vicinity of a blast but does not necessarily involve a concussion, as is the case with Chris Riga.

"When we look at brains, one of the consistent findings is that blast exposure actually has a larger effect on the brain than the concussion itself," says Milberg, who is also a professor of psychiatry at Harvard Medical School. "We've accumulated enough data to see people who've been exposed to a large blast or a close blast who really don't seem to suffer a concussion at the time of the blast. Yet, they have enduring changes in their brain. Those enduring changes are both structural and functional. That's very important. If they've had blast exposure, they're also more likely to have long-term consequences in their cognitive functions, as well, whereas we don't see that from concussion alone."

If studying the issue of proximity to blasts is not "the most important aspect of TRACTS, it's a close second," says Riga, who commanded a special operations task force in Afghanistan that included members from the Army, Navy, and Marines.

[Read more at www.research.va.gov/currents](http://www.research.va.gov/currents) ★

Environmental service workers are important element in infection control design

VA anthropologist Dr. Jennifer Van Tiem says she often spends part of her day just "hanging out."

While you might guess that she is talking about hanging out with friends, she actually means observing and talking with the people around her and taking field notes for research.

Van Tiem is a VA researcher working for the Health Services Research and Development Center for Access and Delivery Research and Evaluation (CADRE) at the Iowa City VA Health Care System.

She and her coauthors recently published a paper in the *American Journal of Infection Control* that highlighted the importance of asking environmental service workers for their perspectives on infection control in community living centers.

The researchers interviewed 40 staff members at five different VA community living centers across the U.S. Staff roles included: epidemiologists, infectious disease specialists, nurse managers, nursing assistants, and environmental service workers, sometimes referred to as housekeeping staff.

Their aim was to assess staff members' knowledge, attitudes, and beliefs concerning infection prevention and resident-centered care in community living centers.

Veterans who live in long-term care facilities are at high risk of developing a drug resistant infection

Methicillin-resistant *Staphylococcus aureus* or MRSA infection prevention practices designed to combat infections like MRSA were first developed for patients in acute care settings like hospital ICUs. However, these practices are more difficult to implement in long-term care facilities, where staff strive to create a home-like setting for residents.

The researchers found that staff felt challenged by the need to maintain effective infection control while



Photo by Mitch Mirkin

Karen Curtis, with Environmental Services at the Baltimore VA Medical Center, cleans a patient's room in the hospital's intensive care unit. (Photo taken before 2020 pandemic.)

still providing a home-like environment for residents that facilitated social interactions. They also found that environmental service workers had a unique way of thinking about infection control that typically was not considered by their team members.

"Our findings suggest that infection control team members may find environmental service workers to be natural, untapped allies in identifying opportunities to improve infection control policies in community living centers," wrote the study authors.

VA community living centers serve the dual purpose of providing a home for older Veterans who need assistance with activities of daily living and providing skilled nursing care.

Unlike an acute care setting in a hospital, Veterans' rooms are not just where they receive care. They are also a personal space that contains pictures, mementos, and other important belongings. Veterans spend time with friends in their rooms, and often share a bathroom with another resident.

Read more at www.research.va.gov/currents ★



Dr. Gary Gilkeson, an Air Force Veteran.

VA Researchers Who Served: Dr. Gary Gilkeson

Dr. Gary Gilkeson, an Air Force Veteran, is a physician in the rheumatology division at the Ralph H. Johnson VA Medical Center in Charleston, South Carolina. He focuses his research on the causes of and treatments for the disease lupus, a long-term disorder in which the body's immune system becomes hyperactive and attacks normal, healthy tissue. Symptoms include inflammation, swelling, and damage to the joints, skin, kidneys, blood, heart, and lungs. He previously served as the chief of rheumatology at the Charleston VA and at the VA hospital in Durham, North Carolina. He has authored more than 250 peer-reviewed papers and is also an associate dean at the Medical University of South Carolina. In the 1980s, he served as a medical officer at Carswell Air Force Base in Texas for four years and in the Air Force Reserve for two years.

What motivated you to join the military?

I joined the military because of the physician education program, which provided me the funds to go to medical school. I enjoyed the opportunity to pursue my career while serving my country.

What inspired your research career?

I completed some research papers while I was a student at the University of Texas Southwestern Medical School and began doing research again when I was a rheumatology-immunology fellow at Duke University in North Carolina. I enjoyed the intellectual challenge of research, the potential to improve the lives of people with lupus, and the opportunity to continue to see patients while doing research.

Did you have mentors who inspired you in life, the military, or your research career?

One of the mentors who inspired me in my research career was Dr. Jim Willerson, a professor at the University of Texas Southwestern Medical School. Another professor, Dr. David Pisetsky, inspired me during my fellowship at Duke University. Many other colleagues and mentees were also very important in my research career. In the military, my colleagues at Carswell Air Force Base inspired me, including Dr. Tim Carlos, Dr. Jose Gutierrez-Nunes, and Dr. David Wilkes, among others. A colonel, Dr. Dale Cloyd, was a great medicine chief at Carswell and exemplified what it took to be a soldier and a doctor. He mentored us in how to achieve that balance.

Describe your military experience.

I served four years at Carswell Air Force Base as a general internist (1982 to 1986). It was a teaching hospital with a physician assistant program and a family medicine residency. Doing internal medicine clinics, attending on the in-patient wards, and teaching the residents and physician assistant students was a challenging and gratifying position. I also temporarily served four- to six-week stints as a relief physician at March Air Force Base in California, Minot Air Force Base in North Dakota, and Loring Air Force Base in Maine. During my time at Carswell, I became attracted to rheumatology as a specialty due to the patients I saw there. I strongly believe that the military training I received was key to me developing a leadership style and an understanding of how to work with people.

What kinds of research are you involved in? How does it potentially impact Veterans?

My whole research career has been focused on trying to find the cause of and treatments for the disease lupus. I've been concentrating, for example, on the reason women are nine times more likely than men to contract the disease. My colleagues and I

investigate the differences between men and women with the immune system, which impacts disease areas including responses to vaccines and infections. We are also pursuing research in using mesenchymal stromal cells—from which bone, cartilage, and fat are derived—for treating refractory lupus, a failure to obtain clinical remission after immunosuppressive therapy. If successful, these cells will provide a new therapeutic option for autoimmune diseases. We are expanding to other disease areas. There are rising numbers of women and minorities in the armed forces, leading to increases in patients with lupus and other autoimmune diseases in our clinic at the Ralph H. Johnson VA Medical Center.

Did your military experience inspire you to pursue a career as a VA researcher? Is your military experience connected in some way to your VA research?

My military experience influenced me to be engaged with VA both in a research and a clinical sense. My military experience led me to choose rheumatology as a sub-specialty and to pursue a career as a physician-scientist. I find that Veterans appreciate seeing a physician who is also a Veteran and has a handle on the challenges of serving in the military.

How do you feel about the possibility of making life better for Veterans through your research?

I hope that my research has impacted the lives of Veterans and non-Veterans with lupus. I have used the discoveries of others to advance the understanding of lupus, and I hope that my research findings will be followed by others to develop new treatments and findings. My clinical care at both the VA in Charleston and the VA in Durham has impacted the patients we see with rheumatic diseases.

Read more at www.research.va.gov/researchers_whoserved ★

Intimate partner violence in middle aged and older women

Middle-aged and older women VA patients who screened **positive** for **intimate partner violence** were found to be at **increased risk** for several mental health conditions, relative to women who screened negative.

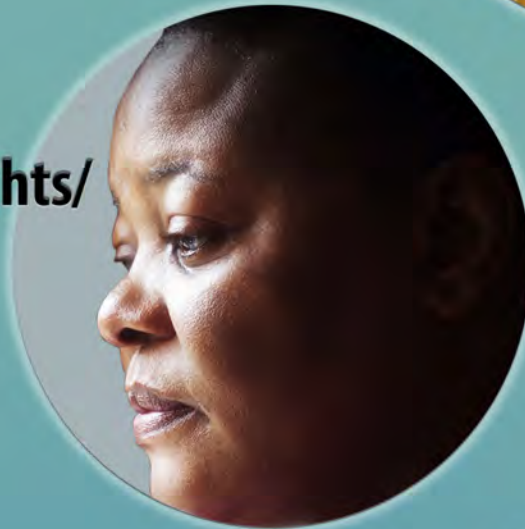
Anxiety



Depression



**Suicidal thoughts/
behavior**



PTSD



**Substance
use**



From a database study of 4,481 female VA patients age 45 or older who were screened for IPV between 2014 and 2016. For more details, see ["Association of Health Conditions and Health Services Utilization with Intimate Partner Violence Identified via Routine Screening in Middle-Aged and Older Women," JAMA Open Network, April 2020](#). Infographic by VA Research Communications, March 2020. Photos for illustrative purposes only. © iStock/ands456, lucentius, Ridofranz, Juanmonimo, PredragImages.

Overprescribing of opioids by U.S. dentists

10%

of U.S. opioid prescriptions are written by dentists

New study findings:

29%

of these prescriptions exceed the recommended dose

53%

exceed the recommended days' supply



Results based on study of nearly 543,000 U.S. commercial dental patient visits between 2011 and 2015, led by VA's [Center for Health Equity Research and Promotion](#) and the University of Pittsburgh. From "[Overprescribing of Opioids to Adults by Dentists in the U.S., 2011-2015](#)," *American Journal of Preventive Medicine*, Feb. 3, 2020. Infographic by VA Research Communications, February 2020. Photo: © iStock/mladenbalinovac.

Check out more VA Research infographics at:
www.research.va.gov/pubs/infographs

The high burden of 'subthreshold' PTSD

- Those with **subthreshold PTSD** have some PTSD symptoms but not enough to meet the criteria for a PTSD diagnosis.
- The findings below are based on data from the [National Health and Resilience in Veterans Study](#).

PTSD Level	Lifetime prevalence during that time	Point prevalence
Subthreshold PTSD	22.1%	13.5%
Probable PTSD (meets full diagnostic criteria)	8.0%	4.3%

Conclusion: "The results of this study suggest that a **strikingly high proportion** of U.S. veterans – approximately one in three (subthreshold plus full diagnostic PTSD) – experience clinically significant PTSD symptoms in their lifetime."

Source: "High burden of subthreshold PTSD: Post-traumatic stress disorder in VA military veterans," *World Psychiatry*, June 2016. Infographic by VA Research Communications, January 2018. Photo for illustrative purposes only. Photos © iStock/MTMCOMS

Individual Placement and Support for Veterans with PTSD

- Individual placement and support helps Veterans with PTSD find **employment through job coaching** based on their interests and backgrounds, rather than traditional one-size-fits-all vocational rehabilitation and transitional work placements.
- The results below are from the Veterans Individual Placement and Support Towards Advancing Recovery (VIPS-TAR) study of 511 Veterans.

	Transitional Work	Individual Placement and Support
Found steady work	23%	39%
Found competitive jobs	57%	65%
Average income for study period	\$10,989	\$14,642

Conclusion: "Individual placement and support is more successful (than transitional work) at helping unemployed Veterans with PTSD obtain and sustain competitive employment."

Source: "Effects of Evidence-Based Supported Employment on Achieving Steady Work among Veterans with Posttraumatic Stress Disorder: A Randomized Controlled Trial," *JAMA Psychiatry*, Feb. 28, 2018. Infographic by VA Research Communications, February 2018. Photo for illustrative purposes only. © iStock/Steve Johnson (VA11E)

Firearm training among U.S. adults

Findings from a study by VA researchers and colleagues

- The percentage of U.S. firearm owners who reported receiving formal firearm training showed little change between 1994 (56-58%) and 2015 (61%).
- The most commonly reported combination of training topics was **safe handling, safe storage, and accident prevention**.
- Only 15% of owners said their training covered **suicide prevention**.
- Conclusion:** The proportion of U.S. firearm owners with formal fire arm training has not meaningfully changed in two decades. Training programs vary widely. Efforts are needed to standardize and evaluate the effectiveness of training.

Source: "Examining the Burden of Unintentional Firearm Injuries: Key Findings from the 2015 Data," *Journal of the American Medical Association*, June 19, 2017. Data by researchers with University of Pittsburgh, University of Colorado, Boston College, Queen's University, and the University of North Carolina. Photo for illustrative purposes only. © iStock/Steve Johnson (VA11E)



RESEARCH CURRENTS

Research News from the U.S. Department of Veterans Affairs

Exercise boosts quality of life after liver transplant

Exercise can improve quality of life after a liver transplant, found a review including a VA Pittsburgh researcher. Physical fitness and frailty often improve slowly and may even deteriorate after a liver transplant. Based on a review of the available literature, researchers found that an exercise program can improve both fitness and quality of life

for transplant patients. In addition to combating muscle loss and frailty, exercise can counteract post-transplant metabolic syndrome, which causes complications such as diabetes and hypertension. Exercise can improve post-transplant quality of life through both better health and increased social support. The researchers suggest that a tailored exercise program be part of post-transplant care. (*Liver Transplant*, March 3, 2020)






Photo courtesy of University of Minnesota



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