

The Official USU Newsletter

the pulse

Volume 9, Issue 18 • October 1, 2014
www.usuhs.edu



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Editorial content is edited, prepared and provided by the USU Office of External Affairs unless otherwise indicated. The Pulse staff may include or exclude articles based upon news value, impact on the university and space availability.

Submissions

The Pulse is published biweekly on Mondays. The deadline for submissions is at 4 p.m. Tuesday prior to the publication date. Submissions can be sent to laura.bailey@usuhs.edu or by calling 301-295-3116.

Photo by MC3 Laura Bailey

**On the cover**

Dr. Laura Neely, the associate director of the Laboratory for the Treatment of Suicide-Related Ideation and Behavior at the Uniformed Services University of the Health Sciences, talks with a study participant during a follow-up booster session. See story page five

Migraine-sufferers at possible risk for Parkinson's, movement disorders later

by Sharon Holland, managing editor

Migraine sufferers may be at greater risk for developing Parkinson's disease or other movement disorders later in life, according to a new study published in the Sept. 17, 2014, online issue of *Neurology*[®], the medical journal of the American Academy of Neurology. Those who have migraine with aura may be at double the risk for developing these disorders.

"Migraine is the most common neurologic disorder in both men and women," said study author Ann I. Scher, PhD, professor of Epidemiology at the F. Edward Hébert School of Medicine, Uniformed Services University of the Health Sciences. "It has been linked in other studies to cerebrovascular and heart disease. This new possible association is one more reason research is needed to understand, prevent and treat the condition."

Scher and her colleagues from the National Institute on Aging, the University of Iceland, and the Icelandic Heart Association, studied 5,620 people between the ages of 33 and 65 for more than 25 years. At the beginning of the study, 3,924 of the participants did not suffer from headaches, 1,028 had headaches without migraine symptoms, 238 had migraine with no aura, and 430 had migraine with aura. They later assessed whether participants had any symptoms of parkinsonism or had been diagnosed with Parkinson's disease or had symptoms of Willis-Ekbom disease, a related disorder more commonly known as "restless legs syndrome (RLS)."

The study found that people with migraine with aura were more than

twice as likely to be diagnosed with Parkinson's than people with no headaches. A total of 2.4 percent of those with migraine with aura had the disease, compared to 1.1 percent of those with no headaches. People with migraine with aura had 3.6 times the odds of reporting at least four of six parkinsonian symptoms, while those with migraine with no aura were 2.3 times the odds of these symptoms. Overall, 19.7 percent of those with migraine with aura had symptoms, compared to 12.6 percent of those with migraine with no aura and 7.5 percent of those with no headaches. Women with migraine with aura were also more likely to have a family history of Parkinson's disease compared to those with no headaches.

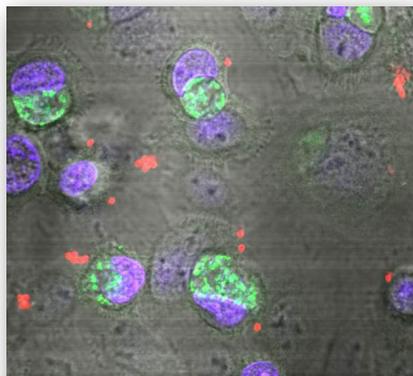
The risk of RLS was increased for people with all types of headache. A total of 20 percent of those with no headaches had RLS, compared to 28 percent of those with headaches with no migraine symptoms and 30 percent of those with migraine with aura.

"These findings suggest that there may be a shared vulnerability to migraine and parkinsonism in a small number of people. This could be related to dysfunction in the brain messenger dopamine, head injury, cerebrovascular disease, or some other mechanism. More research should focus on exploring this possible link through focused longitudinal studies," said Scher.

The study was funded by the National Institutes of Health, National Institute on Aging, the Icelandic Heart Association and the Icelandic Parliament.

USU awarded Sexually Transmitted Infections Cooperative Research Center grant from National Institute of Allergy, Infectious Diseases

by MC3 Laura Bailey, editor



Immunofluorescent microscopy showing the human endocervical cells coinfected with the bacteria that cause gonorrhea (red) and chlamydia (green). (Photo by Rachel Vonck Stankowski, Ph.D.)

The Atlantic Coast Sexually Transmitted Infections Cooperative Research Center, a collaboration between the Uniformed Services University, the University of North Carolina, Emory and Duke Universities, directed by Ann E. Jerse, Ph.D., professor of Microbiology and Immunology at USU, was awarded one of five Umbrella-19 STI CRC grants from the National Institute of Allergy and Infectious Diseases, Aug 2014.

Globally, more than 100 million individuals are infected with *Neisseria gonorrhoeae* each year and the incidence of chlamydia infections is similar, said Jerse. Here in the U.S. it is estimated that there are 19 million new STIs reported each year. Indiscriminate STIs are a growing problem everywhere including within the military population. With the recent U-19 award, the AC STI CRC is able to investigate their targeted focus.

“The AC STI CRC is unique among other STI CRCs due to its emphasis on high priority questions about the immunobiology of gonorrhea, the spread of antibiotic resistant gonorrhea, and the under-studied research area of gonorrhea and chlamydia co-

infection,” said Jerse. “STIs are prevalent in the military. Gonorrhea and chlamydia are the most frequently reported infections in the U.S. armed forces. Co-infection is also very common.”

According to Jerse, the AC STI CRC has two programmatic research goals, the first being an investigation of immunosuppressive mechanisms of gonorrhea during single infection and co-infection with chlamydia. This research is a vital not only to the discovery of a safe and effective vaccine, but also to addressing another elephant in the room – what to do if gonorrhea can’t be treated which subsequently increases the spread of HIV.

“Gonorrhea is now a superbug and there’s no single class of antibiotics now left to treat it,” said Jerse, whose laboratory at USU serves as the USU Department of Defense GC Isolate Reference Laboratory repository for antibiotic-resistant gonococcal strains. “It is resistant to everything. The AC STI CRC will look at how resistance mutations to specific antibiotics impact or alter the ability of the gonococcus to infect even when the antibiotic’s not around – basically how these mutations actually spread.”

Secondly, the group will investigate the genetic basis of the spread of antibiotic resistant gonorrhea.

“Due to the threat of untreatable gonorrhea, this research goal is of paramount importance because it could lead to identifying new drug targets and adjunctive therapies,” said Jerse. “These fitness studies will also help to predict the global

spread of certain mutations.”

Also included in the funding is the administration of two Developmental Research Proposals which extends research opportunities to the inquisitive young minds of the future. These research proposals will hopefully lure new talent to the front lines of the war on STIs.

“Providing such an opportunity is crucial to combating the problems of antibiotic resistant gonorrhea and the need for a gonorrhea vaccine, since doing so will attract promising new talent in the areas of antibiotic resistance and the immunobiology of gonorrhea,” Jerse said.

The next several months will no doubt have its challenges, but will ultimately lead to an increased understanding.

“It’s an opportunity to look at things that we’ve always wanted to look at,” said Jerse. “We have very good models set up and to be able to use them to study these questions is really exciting and satisfying. I think that the emphasis on antibiotic resistance is synergistic with the Global Emerging Infections Surveillance and Response System’s interest in antibiotic resistance. Also, researchers have been working on vaccines for gonorrhea for 10 years. It’s very slow. The information that comes from looking at host responses during gonorrhea and gonorrhea/chlamydia co-infection using the mouse models that we developed here at USU should give us some fundamental information that’s missing which would help to get these vaccines to work.”

USU faculty take part in congress on Soldier's physical performance

by MC2 Brittney Cannady, writer



Photo by MC3 Laura Bailey

Uniformed Services University faculty and staff recently participated in the 3rd International Congress on Soldier's Physical Performance in Boston, Mass. Hosted by the United States Army Research Institute of Environmental Medicine, the conference offered attendees an opportunity to exchange dialogue and research with more than 300 international experts in human performance optimization and military physical performance research. To stay current with the various threats soldiers face in the combat environment the congress offered information to help keep service members in the best state of physical fitness.

The ICSP, formed in 2005, aims to ensure optimal physical health and wellness for soldiers as they face current and emerging threats in combat environments.

Dr. Patricia Deuster and Army Col. (Dr.) Francis O'Connor served as invited speakers along with other members of the USU Consortium for Health and Military Performance who gave podium presentations on research related to fitness testing and injury prevention in the military community.

"We had a group of really great speakers at the congress," said Dr. Dianna Purvis, director, Strategic Operations and Special Projects for CHAMP.

"The USU tagline is 'Learning to care for others in harm's way,' we do that through human performance optimization which is everything skin in and skin out, everything from the physiology to service members' mental status, family and relationships.

"We look for ways to improve them and that was the value of us attending the congress," said Purvis, whose own presentation, 'Systematic Review of the Association of Fitness Components with Musculoskeletal Injury,' studied the correlation between physical fitness and musculoskeletal injury in athletic and military populations.

The three-day congress featured exhibits and poster sessions as well as a roundtable on the role of aerobic fitness in warfighter readiness. Congress discussions on nutrition, physical training and resiliency directly impact current research in human optimization of service members.

The CHAMP is a Department of Defense Center of Excellence for integration, translation, and education of all topics related to human performance optimization and total force fitness and is tasked with incorporating research for military operational applications and DoD policy development.

Unsung heroes help researchers combat suicide

by MC3 Laura Bailey, editor

Helping service members at risk for suicide is tricky even with all of the military training on suicide awareness and prevention. What happens when at-risk service members do not receive timely help and end up making a suicide attempt? Some help researchers in the Department of Medical and Clinical Psychology Laboratory for the Treatment of Suicide-Related Ideation and Behavior at USU.

“The work that we do in the lab heavily focuses on individuals who are already at risk and who desperately need evidence-informed treatment to get better,” said Dr. Marjan Holloway, associate professor of Medical and Clinical Psychology and director of the LTSRIB at the Uniformed Services University. “The suicide behavior that we deal with the most is a suicide attempt.”

The lab’s mission is to best understand why service members who think about suicide subsequently act on the suicidal thoughts that they have. The ultimate goal is to teach service members that suicidal urges can be overcome by having the right tools and coping strategies. Dr. Holloway and collaborators have developed several treatments for the prevention of suicide-related behaviors, such as an inpatient cognitive behavior therapy intervention called Post-Admission Cognitive Therapy. The new Veterans’ Affairs - Department of Defense Clinical Practice Guidelines for suicide refers to inpatient cognitive behavior therapy as a promising intervention under development that may help high-risk individuals while they are hospitalized. The details about how to implement the cognitive behavioral intervention, for outpatients and inpatients, are described in the new Air Force’s Guide on Suicide Risk Assessment, Management, and Treatment

put out by the LTSRIB in 2013, in collaboration with Air Force colleagues.

“Once service members who have attempted suicide consent to the study, we provide a specialized type of cognitive behavior therapy for suicide prevention, which is named PACT. PACT consists of approximately six to eight individual psychotherapy sessions, 90 minutes each, followed by telephone booster sessions from the patient’s therapist,” said Dr. Laura Neely, the associate director of the LTSRIB. “We focus on three phases. The first phase is about information gathering. We’re trying to understand their story, the thoughts, emotions and behaviors that led up to their decision to kill themselves. The second phase is skill building. We teach service members ways to manage whatever those triggers were for their suicidal thoughts and behaviors – things like emotion regulation and coping skills ... building hope. Then the third phase is about relapse prevention which is trying to re-write that suicide story, imagining future situations where they might feel suicidal again and how they can implement those new skills that they just learned. Finally, we work on developing a safety plan for when they leave the hospital.”

Other research findings are shifting the focus of patient treatment in an entirely new direction.

“Often times, psychological treatment is focused on the diagnosis,” said Holloway, “such as depression, Post-Traumatic Stress Disorder or alcohol dependence. Our lab is trying to change that. If a person has suicidal thoughts and/or behaviors, the psychiatric diagnosis, of course, matters but the diagnosis should not be the primary focus and in this case, we want to make sure that service members know how to manage a future suicidal crisis

– that they can keep themselves safe. That’s the most important thing. The diagnosis-related issue you can deal with at a later time when the person actually has a desire to live.”

Additionally, the LTSRIB is breaking new ground in an effort to provide guidance to military leadership.

“One of our current studies focuses on generating evidence-informed decision aids to Army behavioral health providers, chaplains, and leaders in terms of how to best manage future suicide-related events during deployment,” Holloway said. “For this purpose, we are conducting interviews and focus groups followed by survey research and a series of expert consensus meetings.”

The decision aids will provide guidance on issues such as when to return a weapon to an at-risk service member or when to medically evacuate a service member with suicidal thoughts from a deployment setting and even the very controversial issue of how to most sensitively handle a suicide and its impact on the military unit in the post-vention phase.

“We are trying to come up with lessons learned based on our conversations with Army behavioral health providers, chaplains, and leaders,” said Holloway. “Those lessons learned will help us in providing guidance for what should be systematically done in future situations when decisions about a suicidal service member need to be made within the stressful deployed setting.”

Continued on page six

Mindfulness training offers users a way to live in the 'here and now'

by MC2 Brittney Cannady, writer

Students and faculty at the Uniformed Services University learned the relationship between mindfulness and cognitive performance and ways to improve it through a lecture sponsored by the Consortium for Health and Military Performance.

With research gathered from resiliency training done in the military population, Dr. Amishi Jha associate professor of Psychology at the University of Miami shared her study 'Strengthening Attention and Working Memory with Mindfulness Training in High Stress Cohorts'. Mindfulness is defined as the state of active, open attention to the present where a person intentionally aware of their thoughts and actions. Events Dr. Jha labeled 'high stress intervals', such as caring for ill spouse or parents, prolonged injury, academic training or military deployment can all take a toll on mindfulness

and working memory.

"Mindfulness can be characterized by attention to the present moment and putting focus on the here and now, it's about holding steady in a stressful setting with clarity and calmness." said Jha. "What we learned was those individuals who did mindfulness training showed signs of healthier brains and depressive symptom reduction compared to those who didn't."

Research has shown the inability to tackle negative emotions associated with high stress events can also degrade physical health, pain tolerance and impede treatment for those suffering from post-traumatic stress disorder.

"For those in a combat environment having off-task thoughts during an ongoing task or activity where situational awareness is key can be very problematic." said Jha.

Techniques like meditation or breathing exercises can help focus on what an individual is currently experiencing by acknowledging both good and bad emotions without trying to force them to go away. Breathing exercises have been shown to strengthen mental capacities at risk of being degraded due to persistent stressors and decrease mind wandering over time. The Human Performance Resource Center, the education arm of CHAMP, offers a vast collection of tips, exercise tools and other help for service members and their families looking to explore the benefits of mindfulness and can be found at hprc-online.org/mind-tactics.



Courtesy of Human Performance Resource Center

Researchers combat suicide (continued from pg. 5)

Researchers at the LTSRIB are gaining ground against the war on suicide within the DoD and it is greatly due in part to the unsung heroes, service members – who in the midst of their worst days, find strength to help others by placing their trust in the hands of doctors trained in the PACT intervention by Holloway and Neely.

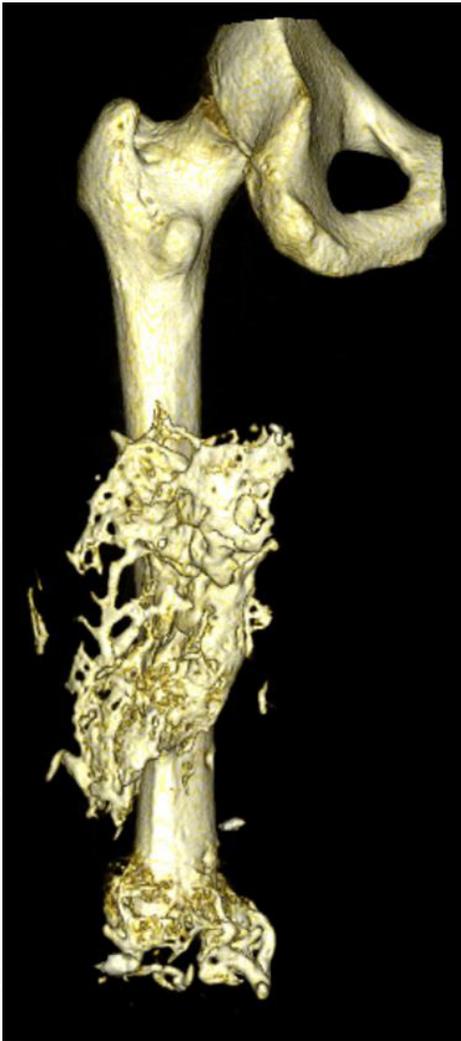
"The suicidal service members that we work with are research volunteers who agree to participate in one of our studies. They are playing an active role in terms of helping us determine what type of interventions would be best for individuals, similar to them, who attempt suicide," said Holloway. "I would say a number of service members who participate in our studies – they're doing

it, not necessarily because they want to get something out of it themselves, but it's because of that altruistic kind of mentality of wanting to help other service members who are suicidal. I think that is an amazing act, especially when you've been in such distress that you've thought about, and at times acted upon, killing yourself. The most rewarding part of our job as researchers is to work collaboratively with these suicidal service members to find interventions that work and to ultimately make a difference."

Possible new treatment in burn victims may hold promise for blast injured

by Sharon Holland, managing editor

Courtesy of Dr. Brad Isaacson, from *Annals of Biomedical Engineering*, Vol. 38, No. 9, September 2010 (2010) pp. 2968–2978



A possible new treatment for stopping bone growth in soft tissue following third-degree burns may also prove to be beneficial to combat troops suffering high energy orthopaedic trauma or blast injuries, according to an article in the Sept. 24, 2014, edition of *Science Translational Medicine*.

Navy Cmdr. (Dr.) Jonathan Forsberg, associate professor of Surgery at the F. Edward Hébert School of Medicine, Uniformed Services University of the Health Sciences (USU), and head, Department of Regenerative

Medicine at the Naval Medical Research Center, and his co-authors Dr. Eric Elster, professor and Chair, Norman M. Rich Department of Surgery at USU; Dr. Tom Davis, scientific director, Department of Regenerative Medicine, Naval Medical Research Center; and Dr. Jeffrey M. Gimble, Center for Stem Cell Research and Regenerative Medicine, Tulane University School of Medicine, suggest that findings by a team of scientists led by Dr. Benjamin Levi at the University of Michigan, also reported in the same issue of *Science Translational Medicine*, could pave the way for improved methods to prevent heterotopic ossification, or bone formation in soft tissues, a significant complication in battlefield wounds.

Third degree burns, like combat injuries, can cause bone to form in soft tissues where it normally does not appear, creating major problems for patients and their surgeons. Levi's team developed a mouse model to replicate the abnormal bone growth. The scientists then added a protein over the surface of the burn that removes energy molecules from the environment. The body's cells normally release this energy molecule when exposed to trauma like a burn. The presence of the molecule outside the cell signals the cell to turn on its bone-forming machinery. By removing this energy molecule from the environment, Levi's team has shown that the cell's bone-forming machinery is turned off and bone formation is substantially reduced. Forsberg

and his co-authors believe the process could be applied to military orthopaedic trauma patients, and suggest further exploration using a blast injury model that Forsberg's lab has recently developed. The frequency of HO formation from injuries sustained by improvised explosive devices and rocket propelled grenades in Operation Enduring Freedom and Operation Iraqi Freedom have been reported as high as 63 percent in the wounded warfighters. "Combat-related HO represents a key clinical problem that's emerged during the present conflicts—afflicting a higher percentage of combat-injured personnel than either traumatic brain injury or post-traumatic stress disorder. For many patients, combat-related HO represents a critical barrier; limiting return to duty or regaining functional independence," Forsberg. "The work by Dr. Levi's research team and ours in the Regenerative Medicine Department at NMRC is designed to address these gaps through multi-faceted, multi-investigator, and multi-institutional collaborations." "What impresses me about this study by Dr. Levi's group," said Gimble, "is how well findings based on civilian injuries and trauma can help the military address combat casualty care and vice versa. This just reinforces my growing appreciation of how well civilian and military medicine and surgery can complement each other!"

Final Frame



Photo by Thomas Balfour

Students from the class of 2018 as well as new graduate students of the F. Edward Hébert School of Medicine along with the incoming class of the Daniel K. Inouye Graduate School of Nursing participate in the official fall convocation at the Uniformed Services University Sep. 19.

