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Clinical insights from Providence Health & Services
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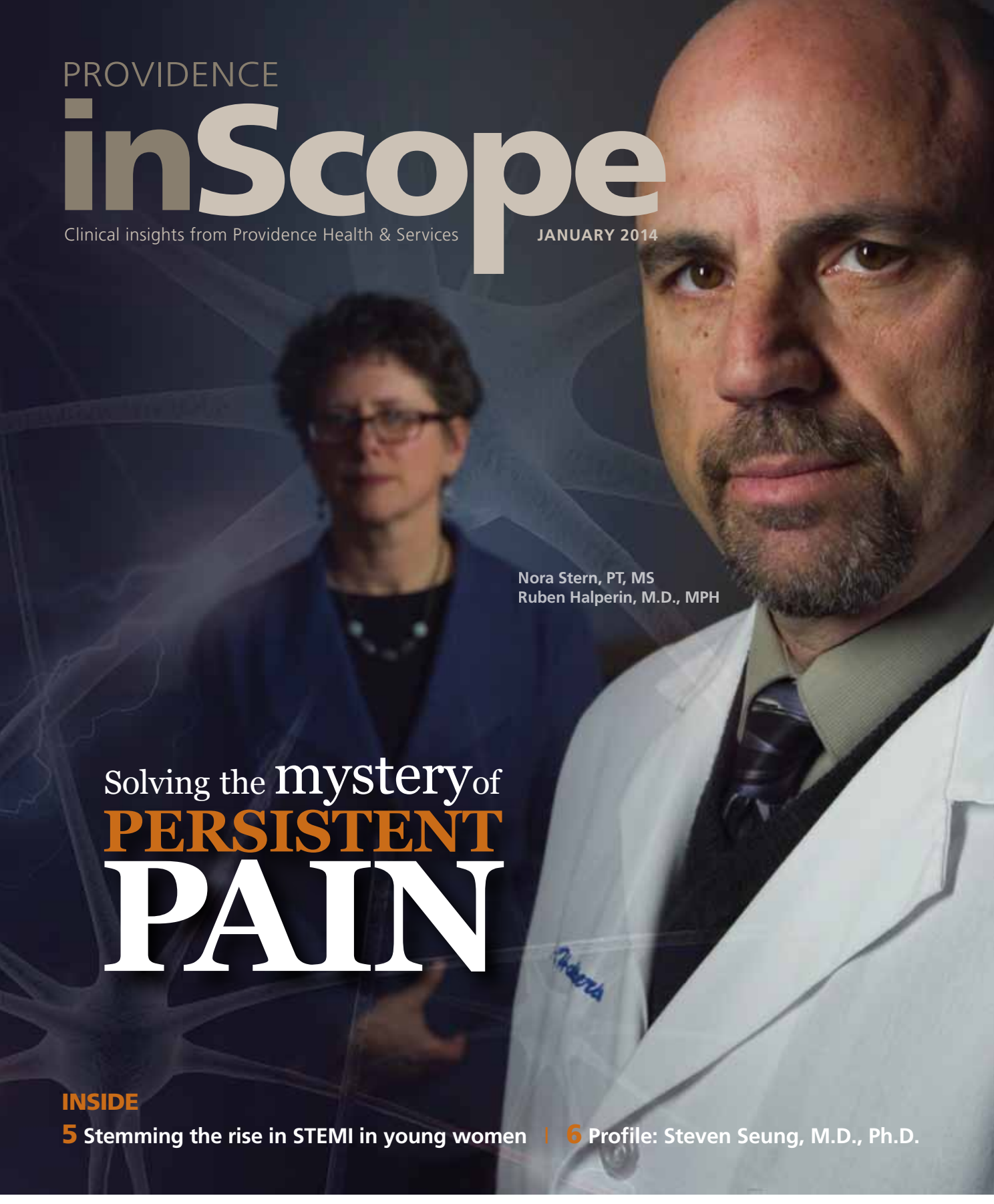

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Solving the mystery of PERSISTENT PAIN

INSIDE

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PROVIDENCE Health & Services

Rethinking persistent pain treatment

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Last spring college basketball fans watched in shock as University of Louisville guard Kevin Ware's leg appeared to snap in half during a bad fall. Perhaps even more surprising was that Ware felt no pain.

He said later that it wasn't until he saw his coach's eyes widen that he looked down to discover his shin bone sticking out of his skin.

Stories like this aren't rare. We've all heard about soldiers in the midst of a firefight who didn't know they were shot, or victims of natural disasters who were unaware they'd sustained a nasty gash until the crisis subsided. We've also heard about pain in limbs that no longer exist.

These examples provide powerful clues about the nature of pain. They also reveal that our understanding of pain, whether acute or persistent, has been deeply flawed. Current science reveals that the source of pain doesn't come from the body, as many of us were taught, but is an orchestrated output of the brain and nervous system.

This has major implications for treating people who have persistent pain, a term now used in place of chronic pain to reflect a growing awareness of pain and neuroplasticity. If we can help patients with pain retrain their brain and nervous system, we can help them improve their functionality and quality of life while also stemming the growing crisis of opioid dependency.

The brain's pain wiring

The medical and scientific community previously thought an injury activated pain receptors and that impulses were then sent to the brain via pain fibers. We believed the relationship was linear – a one-way path from the injured tissue to the brain.

Neuroscience now tells us that pain actually is a neural output of the brain that responds to a threat message. This may be the result of an injury or a different kind of stimulus. While the predominant threat message after an injury comes from nociception, there are always multiple inputs.

The brain has the ability to turn down the volume of pain as demonstrated by the basketball player and other examples. But the brain also can turn up the volume of pain even when there's no discernible physical injury or pathology.

Different kinds of stimuli, such as immune and autonomic changes, sensory homuncular and mirror neuron changes, can create electrical danger impulses. Psychosocial factors – such as fear avoidance, depression, anxiety, social chaos or stress – also can trigger these impulses.

(Continued on page 4)

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Retraining THE BRAIN

When patients misunderstand pain, they're more likely to "catastrophize" – to anticipate pain and perceive a greater threat of harm. These thoughts and emotions contribute greatly to persistent pain, as do a host of other factors, including depression, anxiety, poor body awareness, fear avoidance and lack of motivation.

Research has shown that by teaching patients about pain we can help them reduce catastrophizing, ease their fear of movement, and understand how their thoughts and actions influence their pain. Knowing that pain is an output of the brain and nervous system also helps patients understand the limits of opioids and the importance their own engagement plays in recovery.

Teach your patients about the nature of pain

When possible, reassure your patient that, while tissue pathology is not a concern, this does not mean that nothing's wrong. Help them understand the connection between their feelings and their pain. Use positive language that focuses on function rather than pain.

Encourage stress reduction through mindfulness

Meditation, relaxation and simple sensory awareness can help patients distinguish pain from other sensations, such as cold or pressure. They can develop these skills with a trained behavioral health or rehabilitation therapist or by listening to mindfulness recordings online.

Kinesthetic awareness work, such as yoga, tai chi or Feldenkrais, can help people with pain become more aware of their body sensations as something other than pain. This can restore a more normal sensory homuncular representation and make pain less of a focus in their lives.

Get them moving

Fear of harm causes many people with persistent pain to avoid activity, which can lead to severe deconditioning. It's important for people living with pain to slowly become active again and to recognize that minor discomfort doesn't mean they're injuring themselves.

At Providence Rehabilitation Services' Persistent Pain Program, we coach patients to become moderately active for about a week to get their bodies adjusted and then to steadily increase their activity.

Screen for depression and anxiety

A patient who scores high on a PHQ-9 (depression) or on a GAD-7 (anxiety) scale may benefit from a behavioral health referral. Persistent pain also is common in people with post-traumatic stress disorder, so if you suspect PTSD, we recommend early referral for behavioral health. ■

An Rx for persistent pain

Providence offers written material, a video and classes to teach patients about pain. Think of these resources as prescriptions – as actual treatments for pain – and refer to them as such.

Providence Rehabilitation Services
Persistent Pain Program* 503-215-6202

Pain education classes 503-574-6595

Providence Behavioral Health 503-574-9235

Chemical dependency 503-574-9200

Contact us at knowaboutpain@providence.org or visit www.ProvidenceOregon.org/aboutpain.

**Indicate "persistent pain" on the referral form.*

FOR PHYSICIAN REFERRALS, SEE PAGE 7.

(Continued from page 2)

When the impulses persist, they can keep the nervous system in a hyper-receptive state called central sensitization. Input that normally wouldn't be perceived as noxious, such as a light touch, can be interpreted as dangerous, causing the brain to send pain signals. The pain is real even if there is no tissue or pathology involved.

Understanding danger signals

Why does this happen? It has to do with the brain's response to danger and to the interactions among many parts of the brain, each of which provides different types of input and processing.

The thalamus is particularly important in processing the danger signal. It acts as a kind of switchboard, processing different types of inputs – sensory, immune, neuroendocrine, autonomic and emotional – from the body to the brain.

With persistent pain, the thalamus can continually activate the fight-or-flight response and generate ongoing autonomic output.

The neuroendocrine system is responsible for the release of cortisol, which protects the body in times of stress. Persistent release of cortisol, however, can carry a high cost, including slower healing, depression and anxiety. Cortisol also activates the body's immune response, releasing proinflammatory cytokines, which can create a sensation of pain.

In the somatosensory cortex, there is a representation of the parts of the body called the sensory homunculus, which tells us where the sensation is experienced. The homunculus depends on usage. Parts of the body used more for sensation – such as the lips, hands and face – have a disproportionate size and brain representation.

With persistent pain, imaging studies have found "smudging" among those heavily used areas, making it difficult to tell them apart. This helps explain how persistent pain can present in a more generalized manner – even to previously unaffected areas.

Involvement of all these systems means proper treatment of persistent pain requires a multidisciplinary approach (see page 3). Addressing only part of the problem, as we have done for years, is no longer adequate. It's time to re-educate ourselves and our patients and to help them restore function and live without pain. ■

How the brain affects pain

	Increases pain	Decreases pain
Planning movement Premotor cortex	Fearing that movement will cause pain	Realizing pain does not equal injury
Attention and focus Cingulate cortex	Concentrating on pain	Focusing on other activities and interests
Problem solving Prefrontal, frontal cortex	Failing to understand pain or to seek answers	Knowing what to do to decrease pain
Fear Amygdala	Worrying about pain worsening; losing control of life	Looking forward to making changes
Fear avoidance Primary motor cortex	Altering, decreasing physical activity	Moving, strengthening
Stress Thalamus	Living with chronic, unmanageable stress	Managing stress through relaxation, other techniques

Mythbusting painkillers

Opioids can be useful in relieving pain especially in acute situations. For long-term pain, however, studies have found that:

- Patients with chronic low back pain benefitted as much from placebo as from opioids in the long term.
- Lifetime substance abuse (up to 54 percent) has been seen in long-term opioid users.
- Chronic opioid use can lead to psychological stress, unhealthy lifestyle, more health care visits and increased use of sedatives.
- Long-term opiate use for pain is associated with a decline in physical activity, lower employment and lower self-rated quality of life.

The prescription drug crisis

6.4% Oregonians who use prescription drugs recreationally

4.6% Recreational use among all Americans

13% Mortality from prescription-drug overdose in Oregon

Source: "Prescription Drug Abuse 2013," Trust for America's Health

Heart attacks striking women at younger ages

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Denise had just enjoyed a Memorial Day family picnic when she was overcome with nausea and a burning sensation in her chest. She took some ibuprofen and waited for relief. Instead, her symptoms got worse. She came to the emergency department, where an EKG showed that she was having an acute inferior ST-segment elevation myocardial infarction, or STEMI.

Until that moment, Denise had no reason to be alarmed. She was only 37 years old.

It's now widely, if not universally, known that heart attack symptoms are different for women than for men. New data suggest, however, that heart attacks are striking women at a younger age.

Based on data from France, the number of heart attacks in women younger than 50 grew from 3 percent in 1995 to 11 percent in 2010. Research published in 2012 in the Journal of the American Medical Association shows the proportion of women suffering from acute heart attacks who present without chest pain is significantly higher than for men – 42 percent compared with 31 percent.

Common risk factors for younger women include obesity, dyslipidemia and smoking, which increases heart attack risk by 11 times. Women with certain connective- tissue diseases who use oral contraceptives also are at higher risk.

Atherosclerotic heart disease seems to be increasing in younger women, but it's important to be aware of other less common causes of acute heart attacks in women. There is a higher risk of spontaneous coronary dissection in women, with a significant number occurring during pregnancy. Similarly coronary vasospasm and vasculitis, lupus or other connective-tissue diseases contribute to a higher risk of MI at a younger age.

In Denise's case, her heart attack – caused by a critical blockage in her right coronary artery – was a wake-up call. She enrolled in an outpatient cardiac rehab program, learned the principles of healthier eating and complied with her medical therapy. She says she feels better now than she did for years before her heart attack.

There is cause for both hope and concern when looking at data related to young women and heart attacks. While things turned out well for Denise, it's critical for those of us caring for patients to help increase awareness of the risks and symptoms of heart disease in women. ■

Hidden signs for women

While gripping chest pain is more common in men, women are more likely to present with these signs:

- Shortness of breath
- Nausea, sweating, vomiting or flu-like symptoms
- Squeezing, fullness or pain in the center of the chest
- Pain in one or both arms, back, neck, jaw or stomach
- Fatigue that is new or sudden

Providence Medicare plans earn overall 5-star rating

The Centers for Medicare & Medicaid Services has awarded Providence Health Plan the highest rating for its Medicare Advantage plans. The 2014 rating is based on more than 50 care and service quality measures across five categories, including illness prevention, chronic condition management, member satisfaction, customer service and pharmacy services.

FOR PHYSICIAN REFERRALS, SEE PAGE 7.

Steven K. Seung, M.D., Ph.D.
Director, Gamma Knife Center of Oregon, Providence Cancer Center
Radiation oncologist, The Oregon Clinic

Clinical focus
Gamma Knife and stereotactic body radiotherapy for melanoma; brain tumors; and lung, esophageal, and head and neck cancers

Distinctions
Published in more than 18 peer-reviewed journals; named "top doctor" for cancer by Portland Monthly magazine and Castle Connolly Medical; inducted as Fellow of the American College of Radiology

Past lives
Doctoral degrees from University of Chicago Pritzker School of Medicine; residency at University of California, San Francisco

What breakthroughs have occurred in radiation therapy during the past 10 years?
For years Gamma Knife has been the gold standard for stereotactic radiotherapy to treat brain tumors, but now radiosurgery is being used successfully for extracranial disease. Stereotactic body radiotherapy, or SBRT, has dramatically changed how we approach early-stage lung cancers and oligometastatic conditions. The latest exciting trend is to combine ablative radiation therapy via SBRT with immunotherapies.

How many patients does Gamma Knife Center treat?
We've treated more than 1,900 patients since the center opened in 2001. The SBRT program, which began when Providence Cancer

Center opened in 2008, has treated more than 350 patients.

What makes a good candidate for these treatments?
The selection criteria involve the size of the tumor, its location, the patient's performance status and the state of extracranial disease. Each case is evaluated on its own merit.

Do you have a hidden talent?
I have no talent, but I am known to sing to my patients during their Gamma Knife treatments. Since their heads are bolted down to the table, I have a captive audience. Also, during the Vietnam War, I entertained Korean soldiers as part of a Korean folk dance troupe. I don't dance on stage anymore (a good thing), but I have been known to do the Gangnam Style dance at work.

What about you would surprise people?
I can appear gregarious, but I'm an introvert who prefers to be alone or with my family. I don't like social situations, and parties drain me so it helps if they serve good pinot noir.

What's your medical philosophy?
I pray every morning for the wisdom to do the right thing for each patient. I often joke that God heals; I just collect the bill. But I believe that as health care providers, our skills are a gift. I can't take all the credit when my patients do well.

You can earn CME credit by watching selected Providence medical grand rounds online.

FEATURED THIS MONTH

Adult Congenital Heart Disease
Aly Rahimtoola, M.D., FACC, cardiologist
Providence Heart and Vascular Institute

To view the webcast, go to www.eventbuilder.com/providence/cme and follow the instructions, or call 503-215-6088.

Providence Portland Medical Center designates this enduring material educational activity for a maximum of 1 AMA PRA Category 1 Credit.™

noteWorthy

Cancer center welcomes executive medical director

Medical oncologist **Kevin Olson, M.D.**, has joined Providence Cancer Center as executive medical director. He will focus on expanding the center's clinical programs throughout the region and will work closely with Walter Urba, M.D., Ph.D., director of cancer research.

Dr. Olson is former chief medical officer for Compass Oncology and is an active leader in US Oncology, a national cancer practice-management company.

Brain trust: Neurologists join Providence

Providence Brain and Spine Institute welcomes three new board-certified, fellowship-trained neurologists. They are, from left, **Elise Anderson, M.D.**, general neurology and movement disorders; **Ghazaleh Jafari, M.D.**, general neurology, neuromuscular conditions and electrophysiology; and **Andrew Rontal, M.D.**, general neurology and stroke treatment. To refer a patient, call 503-215-8580.

Providence Medical Group names COO

Experienced hospital executive **Will Mowe** has been named chief operating officer for Providence Medical Group. Mowe has served in leadership positions at Legacy Medical Group, Pacific Medical Group, The Oregon Clinic and Kaiser Permanente. He holds a master's degree in health policy and management from Harvard University.

Pediatric cardiology coverage expands

Pediatric Cardiology Center of Oregon now offers weekly outpatient clinic appointments on the Providence St. Vincent Medical Center campus. Pediatric cardiologists see patients on alternating Thursdays and Fridays from 12:30-3 p.m. in Suite 598 in Mother Joseph Plaza. Call 503-280-3418 to refer patients. The specialists also are available to round on hospital patients.

Andrew Hoyer, M.D., is a new member of Providence's medical staff, having joined Pediatric Cardiology Center of Oregon earlier this year. Dr. Hoyer joins **Peter Chang, D.O.**, **Douglas King, M.D.**, **James Kyser, M.D.**, and **Marc LeGras, M.D.**

Referral RESOURCES

When your patients need advanced care, Providence makes it easy for you and your staff to find the appropriate referral resources.

Brain and Spine Institute
Portland area: 503-216-1055
Spine Institute-Southern Oregon: 541-732-7746

Cancer Center
Portland area: 503-215-6014
Southern Oregon: 541-732-7000

Children's Health
503-574-6595

Heart and Vascular Institute
503-216-2088

Orthopedic Institute
503-893-7401

Transfer Center
Emergency services
Statewide: 888-777-9599
Portland area: 503-216-PROV (7768)

Resource Line
General information
800-562-8964

www.providence.org/oregon

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Gamma Knife Center of Oregon

Our center was the first in Oregon to use the noninvasive Gamma Knife Perfexion, which precisely focuses beams of radiation to destroy tumors with minimal damage to surrounding tissue. Services have since expanded to treat metastatic disease through stereotactic body radiation therapy.

Our Gamma Knife specialists are experienced in:

- Acoustic neuromas
- Arteriovenous malformations
- Brain and skull base tumors
- Essential tremor
- Trigeminal neuralgia
- Metastatic melanoma
- Lung cancer and other cancer metastases

Neurosurgeons, radiation oncologists and neurotologists credentialed in Gamma Knife are invited to treat patients at the center.

Gamma Knife Center of Oregon
Providence Cancer Center on the campus
of Providence Portland Medical Center
503-215-6800 or 888-455-8525

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