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SPECIAL SECTION

NEUROREHABILITATION

GUEST EDITOR JON A. MUKAND, MD, PhD

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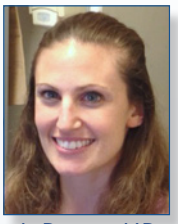
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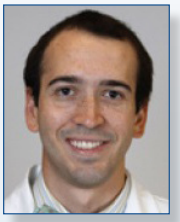
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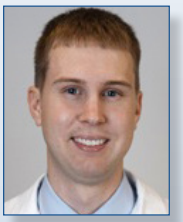
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On the cover: Cover photo of patient in rehabilitation doing balance exercises under the direction of physical and occupational therapists, courtesy of Brett Davey and Southern New England Rehabilitation Center.

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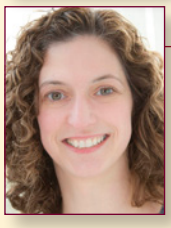
IN THE NEWS

PEOPLE/PLACES



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PUBLIC HEALTH

End-of-life discussions

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Medicare recently approved a billing code for end-of-life discussions. I am unsure why this discussion is, other than symbolically, different than discussions we routinely have over lifestyle, nutrition, compliance, or the nature of whatever illnesses or social problems are afflicting the patient. The news media took a different slant, deducing that there will now be a marked increase in end-of-life discussions with patients. I doubt this will occur for several reasons. The first is that I have a hard time believing that doctors are not having these discussions now simply due to the lack of a billing code. We return our patient phone calls although we don't get reimbursed. We don't charge extra if a visit exceeds the allotted time. We aren't lawyers. We serve our patients' needs once they put their foot in the door.

We know that hospice services are markedly underutilized, which, I think, is true for the same reason end-of-life discussions are apparently not too common. The problem is that these discussions are often painful and delicate. They require an almost "official" change from a medical/scientific practitioner/counselor role to a pastoral role. This is often not easy. It is difficult for most of us to tell a patient or family that the end is near. We worked together, "fought the good fight" for years or decades, but now, as one always knew it would happen, the imminence of death has become tangible. Of course, the patient and the family knew it would happen, but they often never envisioned "giving up," and sometimes seem surprised that that time has arrived.

Living with illness is often envisioned as a fight, and, in many ways it is. One endures, one accommodates, one takes medicines or other treatments to "fight back." Patients are encouraged to "not give in." We read and hear about patients' courageous fights against cancer and, less often, other disorders. With these metaphors used almost nightly in the television news as we make one "significant" advance against cancer or Alzheimer's disease each day, leaving the audience wondering why people they know seem to still be dying from these seemingly cured diseases. One can view end-of-life discussions as being focused on "death with dignity," or as "throwing in the towel." "I'm not ready to throw in the towel," is not an uncommon response by a spouse or child. Introducing the end-of-life discussion automatically indicates a prognosis.

There is no "best" way to approach the introduction of a discussion on hospice. In some ways, I think of it as being similar to the discussion of brain autopsies. The best time to get a brain autopsy is at the first meeting, before death is on the horizon, when a patient can take an objective view, envisioning the event as taking place so far in the future that the decision does not seem to really be about him but more about a science-fiction edition, future-him. Once a patient nears his death, I find it quite difficult to request an autopsy. After all, the patient is clearly not going to benefit from it. Hospice care, although quite different, brings up similar issues to the autopsy request, if the autopsy request is made near the end. I have not thought about discussing hospice care early on, partly, I suspect, because I've not read suggestions to do so. There have been many articles about hospice and its under-utilization, including articles in this journal, solicited by myself. While I certainly recall being told that we ask for hospice too little and too late, I don't recall being encouraged to discuss it early on. The development of palliative care provides a bridge, however, towards hospice care, that is much easier to discuss.

Why are end-of-life discussions so difficult? I claim no great expertise in this area, although I've certainly given it a lot of thought, but probably no more than most readers of this column. Those of us with clinical practices in adult medicine have experienced the death of our patients. We expect it. Those of us who deal primarily with older patients obviously experience this a lot more

frequently than the average primary care physician. I often lose one or two patients a week. This has not inured me to the sadness of the loss and the concern that I had been unable to make the last bit of time more enjoyable, or at least, less difficult.

I am aware that I am possibly letting down my patients by not being as forthright as I might be when I avoid end-of-life discussions. From our initial meeting I try to encourage the idea that we are a team, working together to enhance quality of life. In my line of work there are no cures. We "manage" a condition. Part of management requires the patient and family making accommodations as the disease progresses. This usually takes place on its own, just as aging people accommodate to their increasing constraints. I may have to encourage use of a cane or walker, but not usually. I may note the importance of always grasping the railing when walking on stairs, but patients and families already know this. Approaching death is, of course, quite different. The only thing I know is that there is no single "best" way to do this.

I have a firm belief, however, that a new billing code is not part of the solution. ❖

Author

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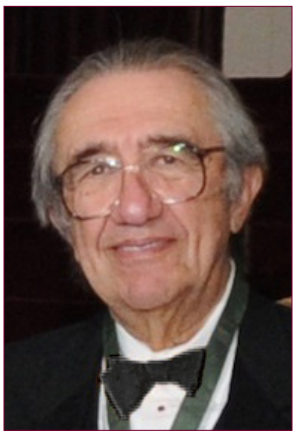
Disclosures on website

Aid in Dying: Considering the Options

Support grows as CA becomes fifth state to pass legislation in cases of terminal illness

HERBERT RAKATANSKY, MD



California recently became the fifth state to legalize physician-assisted suicide (PAS), with the likelihood that other states will follow.

Ninety percent of attempted and 95% of completed suicides occur in persons who have a diagnosis of mental illness and the Diagnostic and Statistical Manual of Mental Disorders (DSM-V) designates suicidal behavior itself as a separate diagnosis. Thus all suicide could be considered an illness. Suicide as a political statement, self sacrifice in battle and similar situations are exceptions. But this categorization does not adequately describe PAS.

The concept of suicide as an illness is of recent origin. Physician-assisted suicide in the context of incurable terminal illness is controversial.

Ancient philosophers had opinions about the morality of suicide, but they did not think of it as an illness. They thought of it as criminal in some cases or justified it in other situations including, but not limited to "shame at having participated in grossly unjust actions" or "extreme and unavoidable personal misfortune" (Plato c.427 BC–c.348 BC).

The development of "institutionalized Christianity" introduced a moral proscription of suicide. St. Augustine (354–430) formalized this prohibition, citing the fifth commandment of "Thou shalt not kill" and applying it to one's self. This attitude was persistent in Protestants as well, though some suggested that God might forgive.

Some philosophers thought that since the scriptures do not specifically prohibit suicide and since acts such as martyrdom are actually praiseworthy, suicide was not uniformly wrong (John Donne 1572–1631). The philosopher John Locke (1632–1704) believed that humans possessed God given "natural liberty, but that liberty did not include the liberty to destroy oneself."

David Hume (1711–1776) concluded otherwise. He stated: "Suicide does not necessarily violate any duties toward other people." And he believed that "Sickness, old age, and other misfortunes can make life sufficiently miserable that continued existence is worse than death." Immanuel Kant (1724–1804), however, felt that our morality derived from an inherent "moral will" and that to destroy that is to destroy morality itself.

Although there are situations in which our society mirrors the opinion of Hume and approves of suicide, including the increasing approval of physician-assisted suicide (PAS) in terminal illness, we generally think of suicide in the medical model and assume that persons with serious suicidal ideation are mentally ill. We spend money to rescue persons attempting suicide and forcibly confine them to prevent them from harming themselves. While many suicides are the result of serious mental illness such as depression, others are more situational. A teenager with relationship problems may react by attempting suicide. While this may be an exaggerated situational reaction, it often does not indicate a mental illness.

The AMA prohibition on physician assistance in suicide is based on the premise that physicians should use their medical knowledge and skills only to further the patient's best interests. Historically, medical paternalism espoused the view that the "doctor knows best." The concept of patient autonomy has risen rapidly in recent years and puts the patient at the center of medical decision-making. It can be argued that a person with a terminal disease who does not have co-existing psychiatric illness has a right to decide what actions are in his/her best interest.

However, there are respected philosophers who believe that suicide violates basic moral values. Also opposed to suicide are some religions that believe that our body belongs to God and individuals have a duty to protect it.

Suicide, physician-assisted or not, by a terminally ill, mentally healthy person is situational rather than due to a psychiatric illness. The terminally

ill person may believe, for a variety of reasons, that death would result in a benefit to themselves and the community. "Physician-assisted dying," a term suggested recently in the New York Times, is less stigmatizing. The disease is the real culprit.

The personal belief systems of doctors also are important. Doctors may or may not believe that suicide for any reason is immoral. Doctors may or may not believe that PAS endorses patient autonomy and enhances the public welfare. Doctors should not violate their own conscience or deeply held beliefs. Doctors have no duty or obligation to participate in PAS.

Attention must be directed to the issues of financial incentives influencing both patients and insurance companies. Incentives encouraging PAS should be illegal. Laws permitting PAS should address these issues.

The medical profession should not deny doctors the right to act in the best interests of their patients. But who decides what those interests are? We recognize the right of adult, competent patients to accept or refuse any medically appropriate treatment. The question is whether prescribing lethal medications to a patient with a terminal disease is medically appropriate. We have seen that there is significant support for the view that prescribing lethal medications to a patient with an untreatable terminal disease is medically appropriate when the patient decides that PAS is in their best interest.

Medical professional societies should consider adopting a neutral stance about the morality of PAS. The policy of medical professional societies could mirror the AMA policy on abortion: "to obey the law." Interestingly, the Rhode Island Medical Society (RIMS) adopted neutrality back in the 1990s and it remains our policy to this time.

[See Heritage, page 88: 1996: RIMS adopts a neutral stance on physician-assisted suicide]

Sigmund Freud (1856–1939), who proposed the view that suicide was due to pent-up aggression, suffered from painful and untreatable oral cancer. He extracted a promise from his doctor, Max Schur, to not "torment me unnecessarily." Forty years earlier Freud wrote: "I have one wholly secret entreaty: only no invalidism, no paralysis of one's powers through bodily misery." He ultimately found himself in exactly that intolerable terminal situation. "Now it is nothing but torture and makes no sense," he told his doctor. Three doses of morphine, provided with the approval of his daughter, ended his suffering. His biographer, Peter Gay, concluded, "The old stoic kept control of his life to the end."

Should our patients have the same choice? ❖

Author

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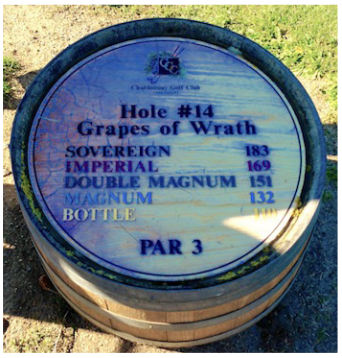
We are read everywhere



BERKELEY AND NAPA, CALIFORNIA

Ken Korr, MD, of Barrington reads the November issue of the *Rhode Island Medical Journal* while visiting friends in the Berkeley Hills in Berkeley, CA. He also found time to continue reading RIMJ while waiting in his golf cart to tackle the "Grapes of Wrath" Par 3 at the Chardonnay Golf Club, a spectacular course that winds its way through Napa vineyards. Below, the sun drops beneath the Golden Gate Bridge into San Francisco Bay. To the right is the Marin Headlands.

Wherever your travels take you, be sure to check the latest edition of RIMJ on your mobile device and send us a photo: **mkorr@rimed.org.**

Neurorehabilitation: achieving recovery after neural injuries

JON A. MUKAND, MD, PhD
GUEST EDITOR

A variety of neurological conditions can lead to disability, pain, and a decline in quality of life. As the American population ages, the prevalence of neurological disability will increase due to conditions such as stroke and Alzheimer's disease. Recent data show that about 800,000 strokes occur annually in the United States and someone dies of a stroke every four minutes.[1] Stroke survivors have to contend with outcomes ranging from mild impairments to total dependence. In the younger population, there is an epidemic of concussion related to sports. Every year about 182,000 football players sustain at least one concussion, primarily in youth (99,000) and high school (80,000) programs, or about 1 in 30 youth players and 1 in 14 high school players. Brain damage at this early stage of life has adverse effects for a long time.[2]

My perspective on neurological disability is that of a rehabilitation medicine specialist and medical director of the Southern New England Rehabilitation Center (SNERC) and the Sargent Rehabilitation Center (SRC). SNERC follows Medicare criteria for acute inpatient rehabilitation (medical stability, ability to tolerate three hours of therapy/day, goals and potential for progress, etc.); the center treats adults with neurological conditions including strokes, brain injuries, spinal cord injuries, Parkinson's disease, and multiple sclerosis. SRC is an outpatient facility that treats these conditions, especially stroke and brain injuries, as well as a variety of pediatric neurological problems (developmental delay, autism, learning disabilities, etc.).

This issue of the *Rhode Island Medical Journal* focuses on neurorehabilitation. In the first article, Marilyn Serra (a speech language pathologist by training and the president of SRC) and I discuss the pathophysiology of and rehabilitation after sports concussions. The second article is by Amanda Dragga, a speech language pathologist at SNERC, who describes treatments for speech, swallow, and cognitive problems after a stroke. As a clinician and faculty member of the Orthopedic Surgery department at Brown University, I often collaborate with the orthopedic residents. Therefore, I'm pleased that some of these surgeons-in-training have contributed articles on orthopedic complications during neurorehabilitation. For instance, orthopedic surgeons can help with procedures such as tendon lengthening for spasticity when conservative measures are not working. In some cases, heterotopic ossification after a brain or spinal cord injury may require surgical intervention, so collaboration with orthopedic surgeons is important in neurorehabilitation. Back pain and radiculopathy are common conditions in the outpatient setting, but on occasion there can be concomitant conditions such as ruptured hamstring tendons, as described in a case report.

During the difficult process of neurorehabilitation, I admire my patients, their families, and their clinical team as they contend with challenging disabilities. Inpatient facilities such as the Southern New England Rehabilitation Center and outpatient centers such as Sargent Rehabilitation Center offer a therapeutic haven for people with disabilities who wish to improve their independence and quality of life.

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Guest Editor

Jon A. Mukand, MD, PhD, Medical Director, Southern New England Rehabilitation Center & Sargent Rehabilitation Center; Clinical Assistant Professor, Rehabilitation Medicine, Alpert Medical School of Brown University, Tufts University.

Concussions and Brain Injuries in Youth Sports

JON A. MUKAND, MD, PhD; MARILYN F. SERRA, MS, MEd, CCC-SLP

After Zackery Lystedt's brain injury, "he couldn't speak for nine months," his father said. Thirteen months later, "he could move his left arm a little; it took two years to get rid of the feeding tube and four years before he could move his right leg purposefully." Zackery had suffered a concussion during a high school football game in 2006, but "was twice returned to play and collapsed 60 seconds after the game was over."[1] The school district settled a lawsuit for $14.6 million.[2]

About 1.6–3.8 million sports-related concussions occur every year,[3] and a recent study found that "182,000 football players may sustain at least one concussion annually in youth (99,000), high school (79,640), and NCAA football programs (3,905)," or about 1 in 30 youth players and 1 in 14 high school players.[4] Symptoms may appear mild but the injury can lead to life-long problems with physical function, concentration, memory, behavior, and emotion. Tragically, among high-school football athletes there were eight fatalities directly related to brain injuries in the 2013 season.[5]

At present, all fifty states have sports concussion laws modeled after the 2009 law in Washington that resulted from Zackery Lystedt's tragedy. Every law includes three components: education about the nature and risk of concussion and head injury for coaches, athletes, and parents/guardians; removal from play after a suspected concussion; and return to play with the approval of a trained and licensed practitioner.[6]

Definition of Concussion

The 4th International Conference on Concussion in Sport in 2012 (ICCS) defined a concussion as a complex process induced by biomechanical trauma, with the following common clinical, pathologic, and biomechanical features:[7]

1. Concussion typically causes short-lived impairment of neurological function that resolves spontaneously, but symptoms and signs may evolve over minutes to hours.
2. Concussion may cause neuropathology, but the symptoms reflect functional rather than structural changes, so standard neuro-imaging is normal.
3. The graded set of clinical symptoms may or may not involve loss of consciousness. Symptoms typically resolve in a sequential manner, but may be prolonged in some cases.

Symptoms of a Concussion

Symptoms after a concussion can be somatic, cognitive, or emotional – in varying combinations. The injured athlete may feel "dazed" or "stunned," and may experience headaches, nausea, vomiting, impaired balance, visual problems, photosensitivity, phonosensitivity, and fatigue. Cognitive problems include mental "fogginess," slow information processing, slow speech, slow reaction times, impaired concentration, amnesia, and memory deficits. There may be emotional changes such as lability, irritability, anxiety, and sadness. Sleep patterns may also be affected, due to insomnia or drowsiness.

Warning signs of a more severe injury – intracranial bleeding, edema and impending herniation – include a severe headache, altered mental status, slurred speech, vomiting, a skull fracture, or a focal neurologic deficit such as diplopia. In these situations, prompt emergency evaluation is necessary.

Pathophysiology of Concussion

Trauma displaces the brain within the skull; compresses neural tissue; accelerates, decelerates, and rotates the brain within the hard casing of the skull; and causes a coup as well as a contre-coup injury. Cortical pathways are disrupted, as seen on diffusion tensor tractography, especially with frontal lobe connections;[8] damage to the brainstem's reticular activating pathways alters consciousness. Pathologic changes include neuronal swelling and axonal disruption. Biochemical abnormalities include a sterile inflammatory response and metabolic changes. Injury to the young brain may also be related to elasticity of the skull sutures and the presence of vulnerable unmyelinated fibers in white matter tracts. Diffuse axonal injury involves mechanical disruption of the axon's cytoskeleton and axonal transport as well as axonal swelling, proteolysis, disconnection, and reorganization. Disruption of neural membranes affects ion channels, leading to potassium efflux, the release of glutamate, higher energy (ATP and glucose) consumption, increased lactate, increased Na-K pump activity, suppressed nerve activity, decreased blood flow, a hypometabolic state, and eventual cell death. Mitochondrial dysfunction and demyelination are also involved in diffuse axonal injury.[9]

Immediate Evaluation of a Concussion

If there are <u>any</u> symptoms of a concussion, the ICCS guidelines are clear:[7]

A. The player should be evaluated and treated by a physician or other licensed healthcare provider and a cervical spine injury should be excluded.

B. If no healthcare provider is available, the player should be removed from the field and promptly sent to a physician.

C. Once the first aid issues are addressed, the concussive injury should be assessed with the SCAT3 or similar tools.

D. The player should be closely monitored for the initial few hours following injury.

E. A player with diagnosed concussion should not return to play on the day of injury.

Assessments after a Concussion

The Standardized Assessment of Concussion (SAC) is an effective, 6-minute tool for assessing orientation, concentration, immediate memory, and delayed recall. Laypersons may use the SAC at athletic events to identify a concussion, and the test has a sensitivity up to 94% and specificity up to 91%.[10,11] A modified version for use in emergency departments has also been developed, with the addition of a Graded Symptom Checklist (headache, nausea, vomiting, blurred vision, etc.) and Neurologic Screening (amnesia, strength, sensation, coordination).[12]

Concussion in Younger Athletes

Although most (80–90%) concussions resolve within 7– 10 days, the recovery process can be longer and more complicated in children and adolescents.[13] Furthermore, younger athletes have a higher risk of severe symptoms and cognitive decline.[14] This age difference in recovery and prognosis is probably related to the ongoing development of a child's brain. The primary senses, motor skills, and language are well developed by age ten. Frontal lobe maturation, however, goes on during the teenage years and even into the early 20s; these brain functions include abstraction, reasoning, judgment, insight, and emotional control.[9] Consequently, achieving optimal recovery is critical for helping students with concussions.

Due to the more complex recovery process in young athletes, they need protection when they are most vulnerable. Recurrent concussions are especially destructive to the brain and are more likely during the first ten days after a concussion or if the athlete has had a previous concussion.[11] We recommend waiting at least seven days until return to play, regardless of the nature of the injury, because the long-term risks far outweigh any short-term benefits of the sport.

A Model of Concussion Care

Sargent Rehabilitation Center has a Concussion Management Clinic with a team of rehabilitation professionals for evaluation and treatment of student athletes. After a medical evaluation by the athlete's primary physician, Sargent's team evaluates cognitive function (concentration, memory, executive function, etc.) as well as behavioral, emotional, and physical changes. With the community school team, a comprehensive survey of the student in the classroom and extra-curricular activities is performed. Concussion management includes short-term rehabilitation, school preparedness, and prevention of another concussion as well as monitoring and management of re-emergent symptoms.

The concussion clinic offers baseline/pre-season Immediate Post-concussion Assessment and Cognitive Testing (ImPACT) to school systems (**Figure 1**). This online test of attention span, memory, non-verbal problem solving, and reaction time is also used for follow-up evaluations in case of a brain injury. Among athletes with suspected concussions, the test was 91.4% sensitive and 69.1% specific. Notably, with athletes who denied symptoms but had a suspected concussion, ImPACT testing yielded 94.6% sensitivity and 97.3% specificity.[15] The NeuroCom SMART EquiTest CDP® is used by the clinic's therapists to assess and retrain balance mechanisms with visual biofeedback (**Figure 2**). This system uses a stable or unstable surface (with a dynamic force plate) in a static or dynamic visual environment. Computerized protocols such as the Sensory Organization Test (SOT) measure the ability to maintain equilibrium with changes in

Figure 1. Visual-perceptual testing with the ImPACT test

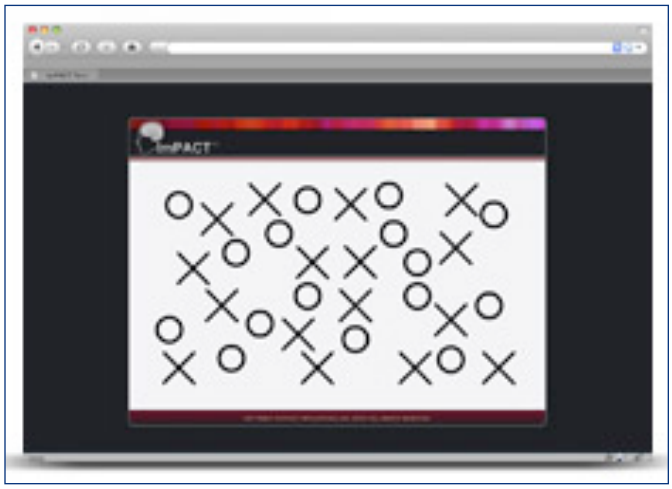

Figure 2. Balance testing with the NeuroCom SMART EquiTest CDP®

somatosensory or visual input or both. The SOT identifies concussions with a sensitivity of 48%–61% and specificity of 85%–90%.[16, 11] Combining the ImPACT and Neurocom tests yields even better sensitivity and specificity for concussions, as the two assessments encompass cognitive, cerebellar, and visual brain pathways. The clinical program at the Concussion Management Clinic is described in the following case report.

Case Report

A sixteen-year-old male named "John" suffered a concussion due to a head butt in a soccer game. Two weeks later, he obtained physician clearance to return to school and the soccer field, but had decreased cognitive and physical functioning: an awkward gait and difficulty with comprehending texts. On the fourth day of his return, he fell and could not remember if he hit his head. Three weeks after the soccer injury, John fell down the stairs in his house and was diagnosed with a second concussion. Subsequently he had memory problems and severe headaches.

Unable to attend school, John was referred to Sargent Center and the intake committee determined that he was appropriate for the Concussion Management Clinic. His evaluations were scheduled in short sessions to accommodate his headaches and associated fatigue. John was provided educational, speech, and physical therapy three days a week. His progress was closely monitored by Sargent's medical and nursing services. A coordinated plan of treatment and school management was developed by the concussion clinic and his school. The clinic staff also provided ongoing support to the family. After six weeks, John's balance issues had resolved and the concussion clinic and school teams coordinated a return to school, three days a week for two hours each day.

The school was trained to reinforce the rehabilitation strategies for John to improve his memory, attention, processing speed, and balance. Over the next month his school attendance increased to five 2-hour days. The concussion clinic staff and the school continued working on John's class instruction, learning strategies, and problem-solving. Four months after starting at the concussion clinic, he returned to school full-time. With educational accommodations, he successfully advanced to the next grade.

This case report describes a male soccer player, but girls are at especially high risk in this sport. A prospective study of female soccer players (ages 11-14) found 59 concussions during 43.7 thousand hours; a cumulative incidence of 13.0% per season; and a duration of concussion symptoms for an average of 9.4 days. About 30% of concussions were due to heading the ball. Longer recovery times occurred with the presence of light sensitivity, emotional lability, noise sensitivity, memory loss, nausea, and impaired concentration. Unfortunately, almost 60% of athletes kept playing in spite of their symptoms and only 44.1% sought medical attention.[17] (These data raise important questions about the necessity, value, and risks of heading the ball in youth soccer.)

Rhode Island School and Youth Programs Concussion Act & Education

This law (2010, 2014) requires the Departments of Education and of Health to work with the Rhode Island Interscholastic League to educate coaches, teachers, school nurses, youth athletes, and parents/guardians about concussion and head injury (C & HI).[18] To play sports after an injury, an information sheet must be signed by the athlete and the parent/guardian. All coaches, school nurses and volunteers must take a training course and an annual refresher on C & HI. Teachers and teachers' aides are strongly encouraged to complete a training course. School districts are encouraged to arrange baseline neuropsychological testing. Parents/guardians should receive information about C & HI before the season and should acknowledge receipt of that material. Any "youth athlete who is suspected of sustaining a concussion or head injury in a practice or game shall be removed from competition." The athlete "may not return to play until an evaluation by a licensed physician who may consult with an athletic trainer, all of whom shall be trained in the evaluation and management of concussions. The athlete must receive written clearance to return to play" from that licensed physician.

To help compliance with the RI Concussion Act, Sargent's Regional Resource Center offers conferences and workshops on health care, education, policy, and the law. The target audience includes families, physicians, nurses, coaches, athletic directors and trainers, teachers, rehabilitation specialists, psychologists, counselors, social workers and school administrators. Education does reduce injuries. In a recent study of education about injury prevention, some coaches was not educated, another group received the Heads Up Football coaching program (HUF), and a third was educated about the HUF and also given the Pop Warner Football (PW) guidelines to restrict contact during practice. Among football players (ages 11 to 15), the concussions during practice were much lower in the HUF + PW group (0.14/1,000 athlete exposures (AEs)) compared to the non-educated cohort (0.79/1000 AEs).[19]

Education about injury prevention is especially important in youth football. These athletes are vulnerable to the second-impact syndrome, in which the patient with a brain injury has ongoing symptoms – and then has another head injury. Forensic studies suggest that the second trauma worsens the initial damage, which predisposes the brain to a more intense pathophysiologic response and leads to diffuse cerebral edema, brainstem herniation, and death.[9]

Conclusion

Sports offer many benefits to students, but their well-being and cognitive, emotional, and behavioral potential should never be compromised. Zackery Lystedt's story is tragic, and there are thousands of other student athletes whose lives have been damaged by concussions to a less severe extent. Health care professionals have the responsibility to effectively and ethically manage the epidemic of youth sports concussions and brain injuries.[20]

Suppliers

ImPACT Test: https://www.impacttest.com/products/?The-ImPACT-Test-2

Neurocom: http://www.natus.com/documents/015368A_SMART_EquiTest_EN-US_lo-res.pdf

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The Role of Speech-Language Pathologists in Stroke Rehabilitation

AMANDA DRAGGA, MS, CCC-SLP

INTRODUCTION

According to the American Heart Association's *2015 Heart Disease and Stroke Statistics Update,* stroke is the fourth leading cause of death in the United States (129,000 people per year) as well as a major cause of long term disability.[1] In addition to the physical impairments caused by stroke, many individuals may experience changes in their cognitive, communication, and swallowing abilities. A speech-language pathologist (SLP) is trained to evaluate and treat these types of disorders and is an integral part of the rehabilitation team in an acute inpatient rehabilitation facility (IRF). This article will provide a brief overview of these disorders and a description of the SLP's role in stroke rehabilitation.

COGNITION

"Cognition" refers to an individual's thinking skills, and includes the ability to concentrate on one or more tasks simultaneously, to recognize frequently encountered people and remember daily routines, to make decisions and solve problems, and to organize and carry out a sequence of steps to complete a task. Impairments in one or more of these areas can impact an individual's ability to safely and effectively perform activities of daily living.[2] A data collection study of the South London Stroke Register between the years of 1995 and 2010 suggested that the prevalence of cognitive impairment following stroke was around 22% at three months post-stroke and at annual follow up.[3] It should be noted that for the purposes of this study, patients with severe aphasia, dysarthria, deafness, or visual impairment were excluded because they could not undergo formal cognitive testing; therefore, this figure may be a significant underrepresentation of the true prevalence of cognitive impairment secondary to stroke. Following a patient's admission to an IRF, the speech-language pathologist conducts an evaluation to identify the cognitive domains most severely affected by the stroke. This evaluation includes both informal testing and formal assessment measures such as the Cognitive Linguistic Quick Test (CLQT), the Assessment of Language-Related Functional Activities (ALFA), and the Brief Cognitive Assessment Tool (BCAT). The CLQT has tests such as clock drawing, generative naming of animals, and remembering details of a short narrative. In the ALFA, tests include simple math, understanding medicine labels, and transcribing phone messages. Based on the patient's performance, the SLP then develops an individualized treatment plan, which may involve exercises to improve attention, memory, problem solving, executive functioning, and visuospatial skills. Treatment examples include using a memory log to improve recall of daily events; training in the use of environmental aids to assist with orientation; and using spaced retrieval training to improve the acquisition, retention and generalization of trained information and/or skills. In this particular method, individuals are trained to recall a specific target over gradually increasing time intervals. The SLP may also work in conjunction with the occupational or physical therapist to address the targeted cognitive skills in a functional context, such as preparing a meal or purchasing an item from the gift shop. These tasks are highly functional and require many cognitive skills including planning, organization, sequencing, divided attention, self-monitoring, problem solving, and memory.

APHASIA

A stroke on the left side of the brain often results in aphasia. This impairment in language may affect an individual's ability to speak, understand, read or write. Aphasia is present in 21%–38% of acute stroke patients.[4] It is estimated that in the United States there are 80,000 new cases of aphasia each year and a total of one million people suffer from aphasia.[5] Research has suggested that greater frequency and intensity of aphasia treatment leads to better recovery of language.[6] Clinical practice guidelines suggest that individuals with stroke-induced aphasia should receive SLP treatment between two to eight hours a week, and treatment initiated early in the recovery process is more effective than when initiated later.[7] Therefore, patients with stroke-induced aphasia may benefit from the more intense therapy schedule at an IRF, where individuals with aphasia receive a minimum of five hours of speech therapy per week. Depending on the type of aphasia, treatment may focus on word retrieval exercises, sentence formulation, following auditory or written directions, or training with alternative and augmentative communication aids. In some cases, patients with expressive aphasia may benefit from script training, which involves the rehearsal of specific responses to facilitate communication of basic wants and needs.

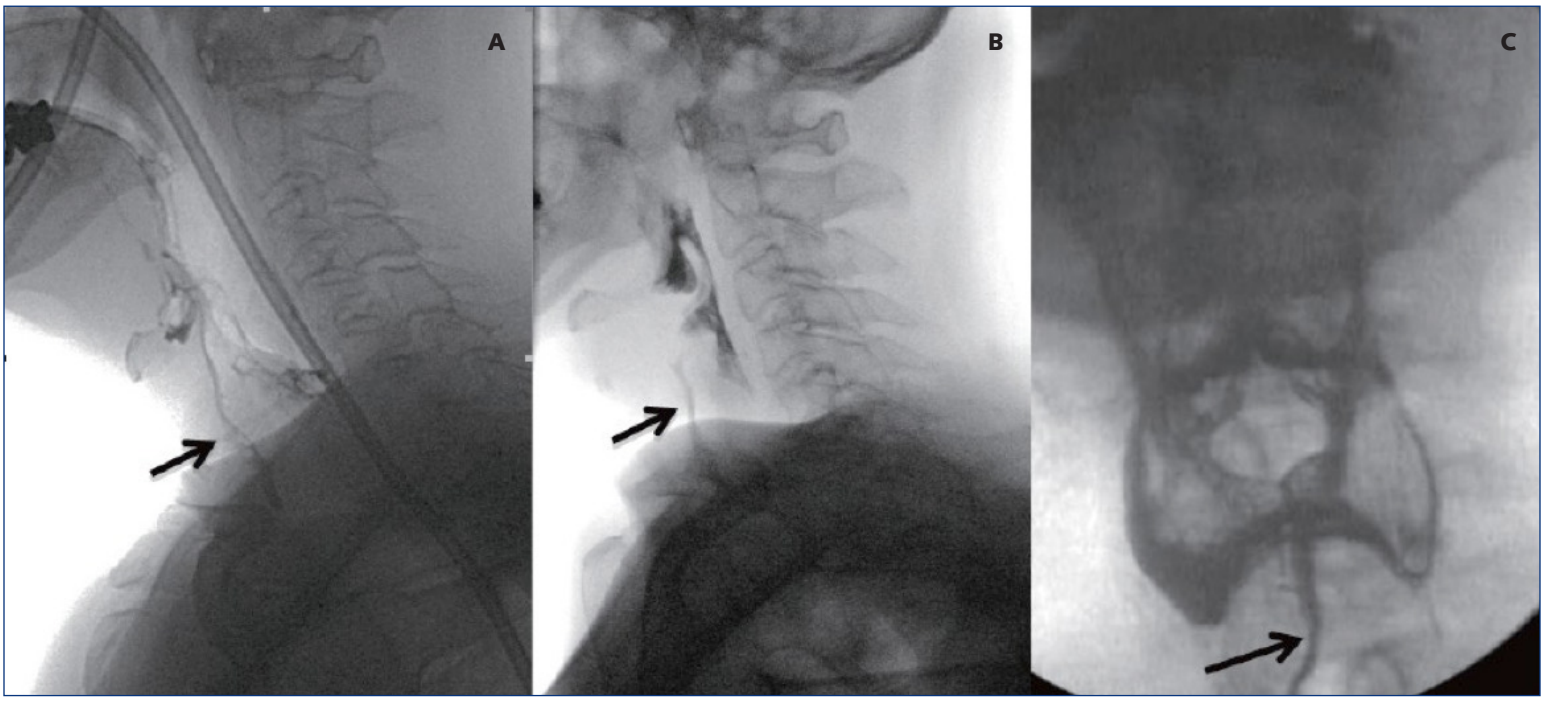
DYSPHAGIA

SLPs in the inpatient rehabilitation setting also evaluate and treat dysphagia. A person with dysphagia may have difficulty with the oral, pharyngeal, or esophageal phases of swallowing, and this can occur with liquids, solids or both. A 2009 study conducted by Falsetti et al. found that dysphagia occurred in more than one-third of consecutive patients admitted to a neurorehabilitation hospital following stroke; however, other studies have found a wide incidence, between 29% and 81%. Between 22% and 52% of individuals with dysphagia experience aspiration of material into the airway, and nearly half of aspirations in patients with stroke are silent. The presence of dysphagia has been linked to malnutrition, dehydration, pulmonary infections, prolonged hospital stays, and death.[8] When a patient is suspected of having dysphagia, an SLP will conduct a clinical bedside assessment, but in some cases, that is not sufficient, especially if aspiration is silent. One of the greatest benefits of an IRF in a hospital setting is the on-site availability of a videofluoroscopic swallow study (VFSS). The VFSS is considered the "gold standard" of swallowing assessments and allows the SLP to objectively assess the patient's swallowing function and to establish the safest and least restrictive diet textures (**Figure 1**). This minimizes the patient's risk of aspiration and the associated complications. The VFSS is conducted in conjunction with a radiologist and allows the SLP to assess the oral, pharyngeal, and upper esophageal phases of the swallow mechanism with a variety of liquid and solid textures, along with compensatory strategies that may improve the patient's swallowing safety. For example, a patient with a delayed swallow trigger or reduced epiglottic deflection may benefit from the use of a "chin tuck" or "chin-down" posture while swallowing. This strategy widens the valleculae and places the epiglottis in closer proximity to the posterior pharyngeal wall. In some cases, the implementation of this strategy enables the patient to safely swallow thin liquids, avoiding the need to restrict the diet with thickened liquids. The VFSS allows direct visualization of how patients respond to food and liquids of various textures and to compensatory strategies. In contrast, empirical trials could lead to silent aspiration and to pneumonia. Once the cause of the dysphagia is established, the SLP develops a treatment plan which may consist of strengthening exercises for the oral, laryngeal, and pharyngeal musculature as well as compensatory strategy training.

CONCLUSION

After a stroke, patients often experience impairments of their cognitive, communication, and swallowing functions, which worsens their disabilities and quality of life. In acute inpatient rehabilitation facilities, speech-language pathologists offer advanced clinical techniques for the evaluation and treatment of these conditions as well as essential therapeutic time for the complex rehabilitation process after a stroke.

Figure 1. Three patients with aspiration at different points of swallowing: before (A), during (B), and after (C) elicitation of the pharyngeal swallow.



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Low back pain, radiculopathy, and bilateral proximal hamstring ruptures: a case report

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ABSTRACT

Low back pain (LBP) is a common complaint in the United States, with an incidence of 6.3%–15.4% and yearly recurrence in 54%–90% of patients.[1] Trends show more frequent diagnostic testing, opioid use, and surgical intervention as the incidence of LBP increases.[2] LBP is defined as pain at and near the lumbosacral region that can vary with physical activity and time.[3]

LBP is usually related to pathology of muscles, ligaments, spinal column joints, nerve roots, and the spinal cord. During the assessment of LBP, practitioners must also consider less common causes of pain in that region. For instance, patients with indolent or nighttime pain may have infectious or malignant processes. Referred pain from injuries to pelvic musculature or abdominal contents should be considered, especially following a traumatic event. One of these injuries, which can present as acute low back pain, is rupture of the proximal hamstring tendon. On rare occasion, concomitant LBP, radiculopathy, and hamstring injuries can occur;. This diagnostic challenge is described in the following case.

KEYWORDS: Proximal hamstring rupture; low back pain; radiculopathy

CASE REPORT

A 46-year-old woman was seen for an initial rehabilitation medicine evaluation four years after slipping on a wet floor, catching herself, and not falling. She acutely developed sharp pain in her right hip, posterior thigh, and buttock. Her non-radiating pain was rated as 6/10 and worsened with movement and walking. Her relevant past medical and surgical history included back pain, hyperlipidemia, anxiety, depression, diverticulosis, and left shoulder rotator cuff surgery. She drank alcohol rarely and smoked one pack of cigarettes per day. Examination by an Emergency Department physician revealed pain with palpation at the buttock and posterior thigh. She was diagnosed with a muscle strain and myofascial pain and treated with ibuprofen, diazepam, and intramuscular ketorolac.

A week after the injury, she had persistent burning, stabbing pain in her right buttock, a positive straight leg raise at 10-20 degrees, and a mild limp. Her primary care physician prescribed oral methylprednisolone and acetaminophen/propoxyphene. A magnetic resonance imaging (MRI) scan of her lumbar spine revealed mild degenerative changes of the disc spaces, but no significant narrowing of the spinal canal or neural foramina. There was hypertrophy of the facet joints at L4-L5, and a broad-based disc bulge at L4-L5 with mild narrowing of the neural foramen.

A month after her injury, she needed acetaminophen/propoxyphene three times a day. Her physician felt that her near-fall had worsened an asymptomatic spinal condition. Her physical therapy included trunk flexion and extension, spinal massage, stretching, ultrasound to the piriformis muscle, moist hot packs, and iontophoresis to the right hip. The pain initially decreased but persisted.

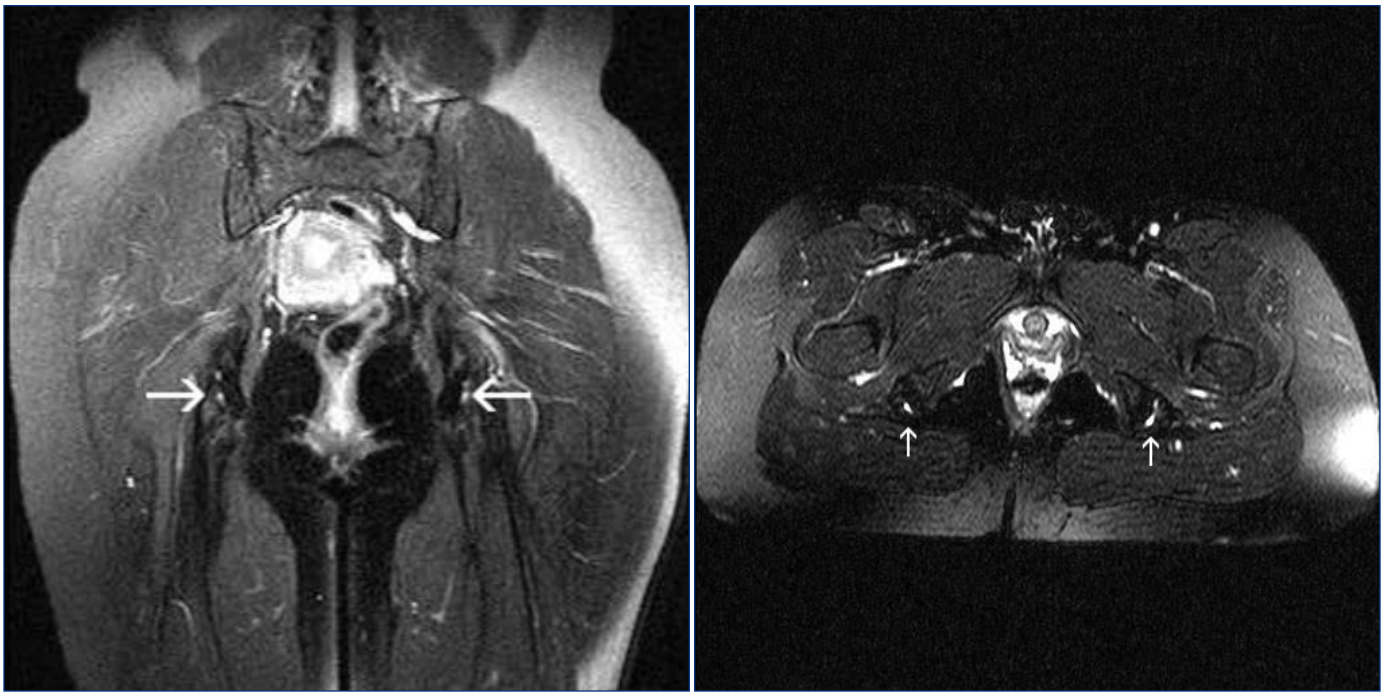
An orthopedic surgeon noted a short stride length on the right, tenderness at the posterior right greater trochanter and the sciatic nerve, and right hip pain with flexion of the lumbar spine. The surgeon felt that the disc bulge at the L4-L5 level and trochanteric bursitis were the likely cause of her radiculopathic symptoms; he injected the trochanteric bursa with methylprednisolone and bupivacaine, with some improvement in pain.

At follow-up with the surgeon six months after the near-fall, she still had tenderness in the ischial tuberosity and greater trochanter. Her symptoms worsened with adduction across the midline and hip flexion. An MRI of the pelvis revealed tendon ruptures: small fluid collections underlying the origin of the conjoined tendon of the hamstring tendon bilaterally, left greater than right (**Figure 1**). An EMG/NCV study revealed radiculopathies at the L4 and L5 nerve roots, with fibrillations at the L4 and L5 paraspinals, the right anterior tibialis, and the left peroneus longus muscle.

DISCUSSION

Acute hamstring injuries are commonly experienced by athletes.[4] The semitendinosis, semimembranosis, and biceps femoris tendons originate on the ischial tuberosity and are at risk of injury with eccentric contractions during hip flexion and knee extension.[5] Proximal hamstring ruptures represent 9% of all hamstring injuries.[6] Ruptures occur in adults at the myotendinous junction; however, patients aged 16-25 years may sustain an avulsion fracture of the ischial apophysis.[7] Hamstring ruptures may occur in elite or middle-aged recreational athletes.[7] Injuries have been reported

Figure 1. MRI images showing bilateral proximal hamstring ruptures from the ischial tuberosity (arrowheads). The tears are the white signals noted by the arrows; a normal tendon would be gray/black.



during water-skiing, running, soccer, American football, ice hockey, dancing, tennis, wrestling, and bull-riding as well as during slip and falls.[8,9] Timely evaluation of possible proximal hamstring injuries within 48 hours may avoid a delay in diagnosis.[10]

Patients with hamstring injuries complain of acute shooting pain in the posterior thigh. They may have a stiff-legged gait pattern in order to limit painful hip and knee flexion during ambulation.[5] Physical examination often reveals tenderness over the ischial tuberosity as well as ecchymosis due to hematoma formation. Depending on body habitus, a palpable step-off may be present at the location of the tear; however, this is not a reliable sign of injury. The bowstring sign may be the best way to distinguish between complete and partial tears and was present in 23/23 patients with complete tears.[9] It is present if there is no palpable tension in the distal hamstrings with the patient prone and the knee flexed to 90 degrees.

Neurological testing of the lower extremity is important, as chronic hamstring ruptures can present with sciatic neuralgia.[8] Chronic injuries may also present with "hamstring syndrome," or local posterior buttock pain over the ischial tuberosity. In one series of chronic hamstring injuries, 52/59 patients experienced relief of their symptoms following surgical release and nerve decompression.[11] Peroneal nerve function must also be assessed; injury to this nerve can result in foot-drop or weak ankle eversion.[7]

Radiographs will often be negative, although a small avulsion of the ischial tuberosity is possible. MRI is the gold standard and can distinguish complete versus partial rupture, allowing for grading of the injury. Grade 1 injuries show only muscle edema on MRI with no architectural disruption of the muscle while Grade 2 and 3 represent partial and complete tears, respectively.[5] Modifications to this grading system include sciatic nerve tethering and the degree of muscle retraction, with > 2 cm being a relative indication for surgery.[12] Ultrasound may be useful as a diagnostic tool but is operator-dependent. In one study, MRI diagnosed hamstring strain in 70% of patients while ultrasound correctly identified 75%.[13] At six weeks, MRI identified 35.7% of patients with abnormalities compared to 22.2% for ultrasound. MRI may be superior to ultrasound for follow-up imaging but either appears acceptable for initial diagnosis.[13]

The treatment of proximal hamstring ruptures depends on the patient and expectations for future activities. Cohen *et al.* suggested a treatment algorithm based on MRI findings.[5] Acute single tendon tears with retraction 1-2 cm tend to scar and adhere to the intact tendons; they are managed conservatively with relative rest for 6 weeks, with likely return to full strength.[5] Tears of all three proximal hamstring tendons often result in significant retraction of ≥ 5cm, and these injuries should be managed operatively, especially in high-level athletes.[5] There is currently no consensus on the management of two-tendon proximal hamstring tears. Some recommend surgical treatment of two-tendon proximal hamstring ruptures with ≥ 2 cm of retraction in patients younger than 50 who are recreational athletes; these patients may have an injury to the third hamstring muscle at the musculotendinous junction that is not apparent on MRI.[5] Failure to repair may result in chronic pain, weakness, and dysfunction.

Systematic reviews of outcomes after surgical repair of proximal hamstring rupture favored surgical repair in retracted, complete proximal hamstring tears but noted the paucity of higher level studies.[14,15]

Conservative management of proximal hamstring ruptures consists of relative rest with modalities including ice, ultrasound, electrical stimulation, non-steroidal anti-inflammatory medications, and gentle stretching with progression to therapeutic exercise and gradual return to sports.[5]

Most cases of LBP will resolve with conservative therapy. LBP has been attributed to injury, disc herniation, stress, weather, and aging but may have a psychosomatic component.[16] Nerve entrapment is over-diagnosed and leads to an overuse of surgical intervention.[17] Neurological abnormalities in strength, sensation, and reflexes, especially with bowel or bladder dysfunction, require prompt surgical evaluation and treatment in order to avoid complications of cauda equina syndrome. In our patient, neurological and radiological abnormalities were accompanied by EMG findings of radiculopathy but she was safely treated in a conservative manner.

SUMMARY

Proximal hamstring ruptures can be a source of low back pain and disability for both young, athletic patients who sustain an injury during sports as well as older patients who sustain a fall. Treatment options range from conservative measures with gradual resumption of activity to surgical repair of the ruptured tendons. In our patient, the diagnosis of hamstring tendon injuries was complicated by low back pain and radiculopathy. Co-existent neurological and musculoskeletal conditions can create a diagnostic challenge, but vigilance for these rare situations leads to better diagnosis and treatment.

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Orthopaedic Management of Spasticity

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ABSTRACT

Spasticity is a common manifestation of many neurological conditions including multiple sclerosis, stroke, cerebral palsy, traumatic brain injury, and spinal cord injuries. Management of spasticity seeks to reduce its burden on patients and to limit secondary complications. Non-operative interventions including stretching/splinting, postural management, physical therapy/strengthening, anti-spasticity medications, and botulinum toxin injections may help patients with spasticity. Surgical management of these conditions, however, is often necessary to improve quality of life and prevent complications. Orthopaedic surgeons manage numerous sequelae of spasticity, including joint contractures, hip dislocations, scoliosis, and deformed extremities. When combined with the efforts of rehabilitation specialists, neurologists, and physical/occupational therapists, the orthopaedic management of spasticity can help patients maintain and regain function and independence as well as reduce the risk of long-tem complications.

KEYWORDS: Spasticity, Orthopaedics, Multiple sclerosis, Stroke, Cerebral palsy, Traumatic brain injury, Spinal cord injuries (SCI)

INTRODUCTION

Spasticity is a common manifestation of many neurological conditions including multiple sclerosis (MS), stroke, cerebral palsy (CP), traumatic brain injury (TBI), and spinal cord injury (SCI).[1–4] Spasticity can lead to severe physical, psychological, and social impairments.[4–6] While numerous non-operative treatments are available, surgical management is often necessary to improve quality of life and prevent complications.

EPIDEMIOLOGY

Spasticity affects up to one-third of all stroke survivors. Six months after stroke, as many as 50% of patients have developed contractures.[5,7,8] Up to 90% of patients with MS experience spasticity and as many as one-third modify their activity as a result.[5,6] Spasticity has been reported in 25% to 89% of patients with TBI and is a common feature in SCI (65% to 78% of patients) and CP (72% to 91%).[9–14]

DIAGNOSIS

"Spasticity" refers to "disordered sensorimotor control resulting from an upper motor neuron (UMN) lesion, presenting as intermittent or sustained involuntary activation of muscles."[1,2,4,6,15] Patients commonly exhibit increased tone, hyperreflexia, clonus, a Babinski sign, reduced velocity of movement, reduced motor control, weakness, and loss of dexterity.[1,2,4,16] Increased tone manifests as a resistance to passive motion that is mediated by exaggerated spinal motor neuron responses to muscle stretch.[2–4] Over time, sarcomeres in underutilized muscles are replaced by fat and connective tissue, resulting in contractures.[2] Upper extremity spasticity often presents with hypertonia in the shoulder adductors; elbow, wrist, and finger flexors; and forearm pronators.[1,2] Lower extremity spasticity usually presents with high tone in the hip adductors, knee flexors, ankle plantarflexors and invertors, and great toe extensors.[1,2,4]

NON-OPERATIVE MANAGEMENT

Stretching/Exercise/Posture

Passive stretching is a mainstay of spasticity treatment, as it decreases the excitability of motor neurons and maintains flexibility.[2] Exercise improves motor control, strength, and overall function in addition to helping trunk, pelvic, and shoulder girdle muscles to control distal movements.[2,3] Exercise may not directly reduce spasticity, but it does not worsen hypertonia, as was previously thought.[2,3,17] Additionally, weight bearing reduces spasticity, improves bone mineral density, enhances psychological health, and aids lung, bowel, and bladder function; all of these benefits are especially important for people with disabilities.[2,3]

Medications

Table 1 summarizes the oral and injectable medications commonly used in the management of spasticity. Oral agents may unmask weakness and should be started at low doses and titrated up as needed.[2,3] Targeted Botulinum toxin (Botox) injections cause selective weakening of spastic muscles, obviating the generalized weakness associated with oral agents.[2] Similarly, neurolysis with phenol injections can achieve targeted muscle weakening, but should be performed only with pure motor nerves to avoid the risk of chronic neuropathic pain.[2–4]

Table 1. Medications for the Treatment of Spasticity[2]

Table 1 illustrates many of the commonly used oral medications for the treatment of spasticity.

GABA: "Gamma-Aminobutyric acid." QHS: "At bedtime;" 1XD: "One time daily;" 2XD: "Two times daily;" 3XD: "Three times daily."

Drug Name	Administration	Mechanism	Dosage	Side Effects
Baclofen	Oral, Intrathecal	GABA agonist	Starting dose: 5mg 3XD. Increase 5-10mg weekly until desired effect. Max dose: 90-120mg/day	Weakness, drowsiness, dizziness, sexual dysfunction, urinary incontinence, reduction of seizure threshold, withdrawal
Benzodiazepines	Oral, Intravenous	Potentiates GABA system	Starting dose (clonazepam): 500µg QHS. Max dose: 1mg QHS	Drowsiness, dizziness, fatigue, respiratory depression, dependency, withdrawal, seizures, hypotension, tachycardia
Gabapentin	Oral	Stimulates GABA biosynthesis	Starting dose: 300mg 1XD day 1; 300mg 2XD day 2; 300mg 3XD day 3. Increase by 300mg every 2-3 days until desired effect. Max dose: 3600mg daily	Weight gain, gastro-intestinal disturbances, confusion, depression, hostility, sleep disturbance
Pregabalin	Oral	GABA agonist	Starting dose: 75mg 2XD. Max dose: 300mg 2XD	Weight gain, gastrointestinal disturbances, confusion, depression, hostility, sleep disturbance
Tizanidine	Oral	Central α-2 adrenergic system agonist	Starting dose: 2mg QHS. Increase by 2mg weekly as needed. Max dose: 36mg (divided into 3-4 daily doses)	Dry mouth, gastrointestinal disturbance, hypotension, acute hepatitis, withdrawal: hyperadrenergic syndrome
Dantrolene	Oral, Intravenous	Blocks calcium release from sarcoplasmic reticulum, blocking contraction of muscle cells	Starting dose: 25mg 1XD. Increase by 25mg per week as needed. Max dose: 100mg 3-4 times daily	Hepatotoxicity and rare fatalities (need regular liver function tests)

OPERATIVE MANAGEMENT

Intrathecal Baclofen

Baclofen inhibits the spinal cord's reflex arc, which reduces resting muscle tone. It can be delivered via intrathecal pumps in small doses of high concentrations that can be titrated to a desirable level of inhibition.[2–4,16,18–21] Patients who rely on some tone to maintain posture will benefit from such a reduction without elimination of their spasticity.[2,3,16] As with any implantable device, infection is a concern.[16,22–24] Furthermore, errors in surgical implantation or catheter-related problems can cause baclofen overdose or withdrawal.[4,16,25–27]

Selective Doral Rhizotomy

Selective dorsal rhizotomy (SDR) reduces afferent input to the spinal reflex arc, dampening the heightened response to muscle elongation seen in spasticity.[2,16] SDR is a relatively permanent and cost-effective solution when compared to baclofen pumps, which require regular maintenance and refills.[16,28] SDR in children reduces the need for future orthopaedic procedures.[16,29] The procedure has also been shown to improve motion throughout the gait cycle.[30,31] Because SDR affects all afferent signals at the dorsal root, decreased proprioception and sensory function may impair walking and standing.[16,32]

ORTHOPAEDIC MANAGEMENT

Upper Extremity Management

Reconstructive surgery of the upper extremity in patients with spasticity can improve range of motion (ROM), strength, functional grasp, dexterity, two-point discrimination, stereognosis, and limb positioning.[33–37] Surgical options include tendon transfers, muscle/tendon lengthening, and joint stabilization.[35,37,38] **Table 2** summarizes numerous reconstructive options for the management of common spastic problems of the upper extremity.

Forearm pronation deformity can be addressed by rerouting or releasing the pronator teres (PT) muscle.[38] Tenotomy is preferred in patients who are able to supinate and have

Table 2. Common Soft Tissue Reconstructive Procedures for Treatment of Spasticity of the Upper Extremitya

Location	Deformity	Procedures
Elbow	Flexion	• Lengthening: Biceps, brachialis
Forearm	Pronation	• Releases: Pronator teres, pronator quadratus • Rerouting: Pronator teres
Wrist	Flexion +/- ulnar deviation	• Lenthening: FCR/FCU • Flexor pronator slides • Tendon Transfers: PT, BR, FCU, ECU, FCR to ECRB/ECRL
Fingers	Flexion	• Lengthening: FDS • Tendon Transfers: FCU/BR to EDC, FDS tenodesis, lateral band rerouting
Thumb	Thumb-in-palm	• Releases: Adductor pollicis, 1st DI • 1st web space Z-plasty • Lengthening: FPL • Tendon Transfers: FCR/PL/BR to APL, FCR/PL/BR to EPB, PL/BR to EPL • Rerouting: EPL

a: Adapted from Upper extremity Surgical Treatment of Cerebral Palsy. Van Heest et al., 1999

continuous PT spasticity.[38] Tendon transfer is favored for phasic PT contractions during supination.

A spastic flexor carpi ulnaris (FCU) can lead to wrist flexion and ulnar deviation, which impairs grasp and release. Patients with voluntary control of the FCU may benefit from transfer to the extensor carpi radilias brevis (ECRB), as described by Green.[39] Patients lacking finger extension may be best served with transfer to the finger extensors or combining the Green procedure with lengthening of the finger flexors.[37] Transfer of the FCU to the extensor carpi radialis longus (ECRL) can correct ulnar deviation. Additionally, transfers of the pronator teres, brachioradialis, or extensor carpi ulnaris (ECU); flexor carpi radialis (FCR) transfer to the ECRB; lengthening of the wrist flexors; or wrist fusion can be used to address the flexion deformity.[37]

Adduction of the thumb due to a spastic adductor pollicis (AP) muscle characterizes thumb-in-palm deformities.[38] Spasticity of the flexor pollicis muscles, metacarpophalangeal joint instability, and interphalangeal joint flexion or hyperextension can also contribute to the deformity.[38] In patients with voluntary control of the extensor pollicis longus (EPL), a radial transfer of the tendon from the third to first dorsal compartment on the radial side of the thumb can help restore thumb extension when combined with a release of the AP.[40,41] Associated first web space contractures can be addressed via z-plasty.[38] The deformity can also be addressed by tendon transfer to the thumb abductors and extensors and/or lengthening of thumb flexors.[38]

Hip Abnormalities

Hip deformities such as coxa valga, femoral anteversion, and acetabular dysplasia are common in patients with spasticity.[42] Up to 75% of patients with CP may experience hip subluxation, with more severely affected patients experiencing higher rates of subluxation and dislocation.[42–45] Hip abnormalities should be identified early in at-risk patients to prevent long-term complications.[42]

Radiographically, hip subluxation can be quantified by the Reimer migration index (RMI) and acetabular dysplasia can be evaluated by the acetabular index (AI), as illustrated in **Table 3**.[42] Independent ambulators should obtain a baseline AP pelvis film between age two and four, and should be followed clinically unless the exam suggests that further imaging is needed.[42] Patients who ambulate with assistive devices or not at all and who have an RMI of less than 30% should obtain yearly radiographs until age eight, and then biannual films until skeletal maturity.[42] Patients with an RMI of more than 30% require serial radiographs every six months.[42]

Numerous soft tissue operations for spastic hips in skeletally immature patients can prevent or address deformity and/or dislocation.[42] Adductor and iliopsoas lengthening or tenotomy have been shown to improve ROM, prevent dislocation, and reduce the need for bony reconstruction in children with hip muscle spasticity.[42,46,47]

Bony procedures about the hip may address acetabular and femoral deformities in skeletally immature patients with promising results.[48,49] Patients without substantial acetabular dysplasia benefit from proximal femoral osteotomy alone or combined with adductor/iliopsoas soft tissue procedures (**Figure 1**).[42] Such osteotomies often produce varus angulation to address coxa valga and rotation to address femoral anteversion. Patients with an abnormal AI may also require pelvic osteotomy.[42] Children under eight years of age with an RMI of 30%-60% may be treated operatively with adductor and iliopsoas lengthening/release; however, children over eight with an RMI greater than 40% and all children with an RMI greater than 60% should undergo a pelvic osteotomy combined with proximal femoral shortening/varus osteotomy and soft tissue releases.[42]

Skeletally mature patients with spastic hip deformities are considerably more challenging to treat. Nevertheless, periacetabular osteotomies combined with varus and de-rotational proximal femoral osteotomies can be successful.[50,51] In addition, proximal femoral resection procedures have been used to reduce pain and improve sitting in non-ambulatory adult patients with spastic hip deformities.[52,53] Using the resected femoral head to cap the resection arthroplasty reduces the risk of postoperative heterotopic ossification[54] Alternatively, a valgus-producing proximal femoral osteotomy pointing the femoral head away from the acetabulum allows indirect load transferring, which prevents proximal migration of the femur seen with resection arthroplasty.[55–57] Finally, some authors have demonstrated success with total joint arthroplasty in skeletally mature patients with spastic hip deformities.[42,58,59]

Table 3. Radiographic Measurement of Hip Dysplasia[42]

Table III illustrates two techniques for the radiographic evaluation of hip dysplasia. The Reimer migration index (RMI) is designed to evaluate subluxation of the femoral head while the acetabular index (AI) calculates dysplasia of the acetabulum. Increased AI suggests that a pelvic osteotomy may be necessary. AP: Anterior-Posterior.

Classification	Measurement	Normal Values	Abnormal Values
Reimer Migration Index	Calculates width of uncovered femoral head compared to whole head	< 30%	> 40%: Hip at risk > 60%: Dislocated hip
Acetabular Index	Measured on AP pelvis by calculating angle between acetabular roof and Hilgenreiner's line	> 5 yo: 20o < 5 yo: 25o	> 5 yo: > 20o < 5 yo: > 25o

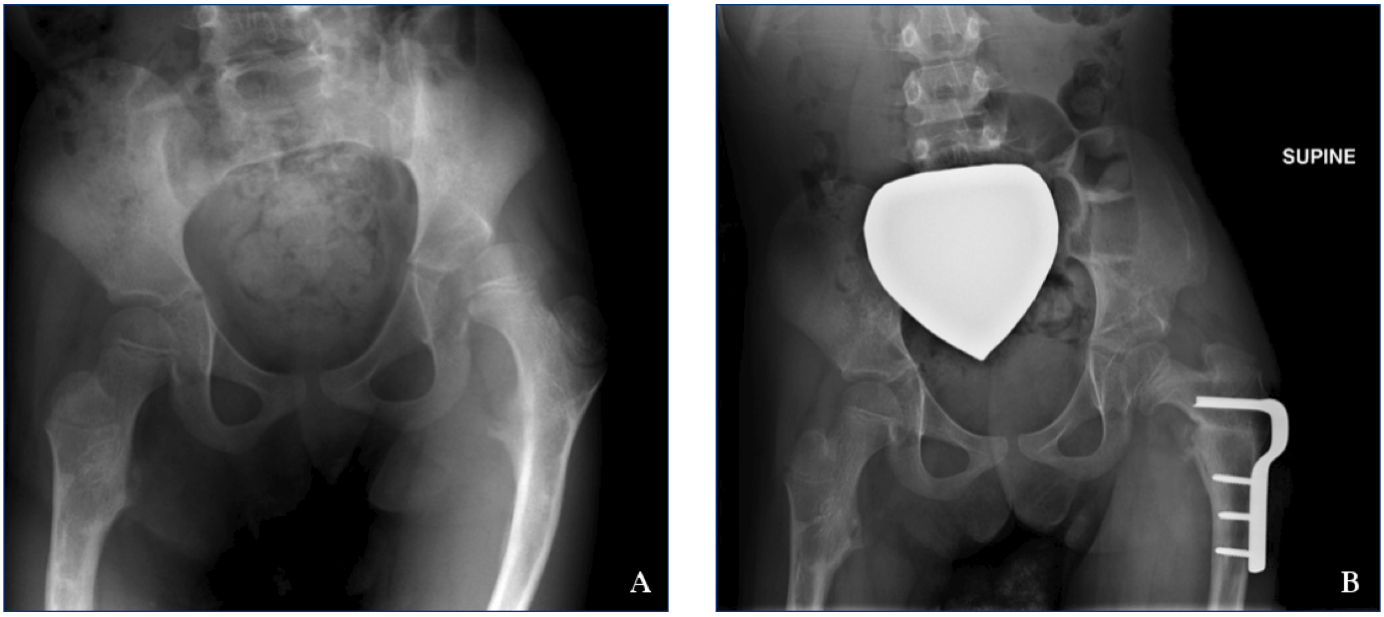
Foot Abnormalities

Foot abnormalities are common in patients with spastic conditions and can lead to pain and difficulty with ambulation, shoe wear, and bracing.[42] In patients with CP, planovalgus and equinovarus deformities are most common.[42] Surgical correction of such deformities is reserved for patients aged ten or older, while younger children can often be managed with orthotics.

The flexible planovalgus foot is first addressed

Figure 1. Spastic Hip

Figure 1A illustrates a child with cerebral palsy suffering from a hip dislocation on the left side secondary to spasticity. This child was successfully treated with a proximal femoral osteotomy. The post-operative radiograph is displayed in Figure 1B. *Radiographs courtesy of Dr. Jonathan Schiller.*



with lateral column lengthening through the calcaneus (in patients who ambulate without assistive devices) or via reduction of the talus and calcaneus and a subtalar fusion (in patients with more severe gait problems).[42,60–62] The medial column can then be assessed; if there is residual forefoot supination a tibialis posterior advancement (in mild cases) or plantarflexion osteotomy of the first ray is performed.[42] Particularly severe cases may require a talonavicular arthrodesis.[42,63] Rigid planovalgus foot is treated with lateral column lengthening and triple arthrodesis.[64]

The equinovarus foot is common in hemiplegic patients and may be treated with split tendon transfers in mild, flexible cases.[42,65,66] Patients with forefoot/midfoot inversion may benefit from split anterior tibial tendon transfers while patients with hindfoot varus are treated with split posterior tibial tendon transfers (but some patients require both procedures).[65] In more severe but flexible cases, an additional wedge or sliding calcaneal osteotomy is used to address residual hindfoot varus.[42] In cases of rigid equinovarus foot, triple arthrodesis is often required.[67]

Both planovalgus and equinovarus deformities can be associated with and exacerbated by Achilles contractures related to gastrocnemius tone.[42] Lengthening of the gastrocsoleus complex may be necessary to achieve appropriate correction of these deformities; however, great caution must be observed in diplegic patients with a crouching gait, which may be worsened by plantarflexion weakness.[42,68]

Spine Abnormalities

Spine deformity is common in patients with spasticity (**Figure 2**). Scoliosis has been reported in up to 77% of children with CP and is common in more severely affected patients.[42,69–73]

Figure 2. Neuromuscular Scoliosis

Figure 2 illustrates a patient with cerebral palsy with severe neuromuscular scoliosis. *Radiograph courtesy of Dr. Jonathan Schiller.*

Ambulatory patients develop curves similar to that of idiopathic scoliosis patients; those with severe disease and/or tetraplegia develop a long C-shaped curve that involves the pelvis.[42] Progression is more common in younger, skeletally-immature children; however, patients with large curves (>50°) may progress after skeletal maturity.[42,71,72] Furthermore, ambulatory patients exhibit less curve progression compared to non-ambulatory patients.[42,72] SDR, laminectomy, laminoplasty, and baclofen pump placement (controversial) have been linked to scoliosis development in patients with spasticity.[42,74–79]

Progression of disease can lead to cosmetic deformity as well as functional, physiologic (respiratory and alimentary), and postural impairment.[42] Ambulatory patients may be treated like patients with idiopathic curves.[42] If patients have severe neuromuscular curves, the treatment focuses on improving spinal balance, posture, and sitting ability.[42,80] Non-operative intervention, such as seating modification, bracing, and serial casting may delay future surgical intervention such as fusion.[42,80] Caution must be observed in patients with chest wall deformities who may succumb to respiratory compromise with rigid bracing.[42]

Insertion of growing rods in anticipation of definitive fusion is an option in children with significant growth potential[42,81,82] Non-ambulatory children may be best served with a primary T2 to pelvis fusion, which minimizes the incidence of junctional kyphosis and addresses pelvic obliquity, respectively. [42,83] While most fusions are performed posteriorly, the presence of a rigid pelvis may justify additional anterior surgery or hip reconstruction.[84] Furthermore, anterior fusion may be indicated to avoid the crankshaft phenomenon in growing children.[42] Lastly, while some ambulatory patients may avoid fusion to the pelvis, ambulation can be maintained after such a procedure.[42,85]

CONCLUSION

Spasticity is a devastating manifestation of numerous common neurologic conditions. A multi-disciplinary approach, with non-operative and surgical options, is required to adequately treat patients suffering from this condition. Orthopaedic surgeons can play an important role in alleviating symptoms, preventing complications, and improving function in patients with spasticity.

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Heterotopic Ossification in Neurorehabilitation

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ABSTRACT

Neurogenic heterotopic ossification (NHO) involves deposition of bone in extraskeletal tissue in the setting of a neurological disorder, and its pathophysiology is incompletely understood. NHO can lead to significant disability and functional impairment. NHO initially manifests as pain and joint stiffness. Early diagnosis requires appropriate suspicion and imaging studies to detect the uncalcified collagen matrix that forms in the early stages of NHO. If diagnosis is made in the early phase of NHO, progression may be halted with bisphosphonates, indomethacin or radiation therapy. If NHO progresses to its final stages without intervention, it may restrict joints and render them dysfunctional. Surgical treatment of NHO may restore function, but complications may occur, and prophylaxis and aggressive rehabilitation are essential.

KEYWORDS: Heterotopic ossification, bisphosphonates, indomethacin, radiation therapy, rehabilitation

INTRODUCTION

Neurogenic heterotopic ossification (NHO) refers to the aberrant formation of bone in extraskeletal tissue in the context of a neurological condition.[1–4] NHO is one of the most common complications associated with traumatic spinal cord (SCI) and brain injuries (TBI), with an incidence of over 50% in SCI and 20% in TBI patients. NHO may also develop with other neurologic conditions including stroke, cerebral anoxia, Guillain-Barre syndrome, tumors and infections. [5]

Various risk factors have been associated with the development of NHO, including prolonged immobilization, muscle spasticity, and a long hospital length of stay.[1] NHO has a tendency to develop around larger joints, particularly the hip and knee; however, it may develop near any joint, including the shoulders, elbows, and spine.[2] The exact pathophysiology that causes NHO formation is not completely understood.[6]

Pathophysiology

NHO is thought to be caused by the induction of pluripotent mesenchymal stem cells by signaling factors that are present in patients with neurologic conditions or trauma. Recent evidence suggests that these mesenchymal cells originate from muscles and their differentiation is dependent on soft tissue macrophages.[7] The resulting osteogenic cells lead to aberrant bone formation in extraskeletal tissue.[5] Many humoral factors have been implicated, particularly BMP-4 and substance P; however, none have been definitively proven to be the primary culprit in NHO.[7–9]

Several studies have investigated the role of peripheral nerves in NHO. Campos da Paz et al. suggested that altered proprioception could lead to tissue irregularities that predispose patients to NHO.[10] Salisbury et al. demonstrated that sensory nerves are stimulated by BMP-2, an osteogenic factor that induces a neuroinflammatory response and leads to the proliferation and release of osteogenic cells. NHO can be a painful condition, but the etiology of the pain is unclear. Local factors such as substance P and neuropeptides released in local soft tissues are thought to stimulate peripheral nerves, leading to the perception of pain.[11]

NHO formation occurs in three phases.[12,13] First, immature NHO is deposited in extraskeletal tissue. This is primarily comprised of well-organized collagen fibers with minimal calcification. Second, an inflammatory process leads to the vascularization of this tissue, which allows osteogenic cells to further induce immature bone formation. During the final phase, remodeling and maturation occurs. This last phase is associated with mature bone and minimal activity on 99m-technetium bone scanning.

Diagnosis

Early NHO manifests as joint stiffness, skin erythema, swelling and pain. Without appropriate suspicion, the diagnosis of early NHO is elusive because the condition is not evident on radiographs or computed tomography scans.[14] Patients with neurological disabilities are at high risk of deep venous thromboses (DVTs), and this condition should be excluded. Once critical diagnoses like septic joint, tumor, and deep venous thromboses are ruled out, a patient at high risk of developing NHO must have further studies to support the diagnosis.[15]

Early diagnosis of NHO is important because it allows for interventions that may stop its progression. Early diagnosis can be accomplished with 3-phase 99m-technetium bone scanning, MRI or ultrasonography. Bone scans may detect lesions suspicious for NHO in a high-risk patient; however, the specificity for making the diagnosis is low and further testing is required to prove its efficacy. Similar to bone scans, MRI is able to reliably detect NHO but the specificity is low.

Recently, it has been shown that ultrasound has proven to be a reliable method of diagnosing NHO in its early phases.[14]

Laboratory studies are not diagnostic for NHO; however, they may help identify the presence of NHO in its early inflammatory phase. Simultaneous elevations of phosphorus and alkaline phosphatase have been associated with NHO.[16] Erythrocyte sedimentation rate (ESR) and C-reactive protein (CRP) are typically elevated in the acute inflammatory phase of NHO and normalize once this phase is over.[17]

Treatment

Research studies of prophylaxis with bisphosphonates and indomethacin to prevent heterotopic ossification have shown similar efficacy.[18–20] These drugs target the early inflammatory phase of NHO. Generally, indomethacin is not tolerated as well as bisphosphonates, with adverse effects being reported in up to 31% of patients.[20] Although bisphosphonates are effective in NHO prophylaxis, they are up to six times more costly.[20]

In the early stages of NHO, radiation therapy has also been effective in halting the progression of NHO.[12] Unlike bisphosphonates and NSAIDS, which target the inflammatory cascade that activates osteogenic cells, radiation therapy inactivates the pluripotent osteoprogenitor cells that have been mobilized by the inflammatory cascade.[21] In patients diagnosed with early NHO as well as those who had NHO resection and radiation therapy, progression or recurrence was prevented in over 70%.[22]

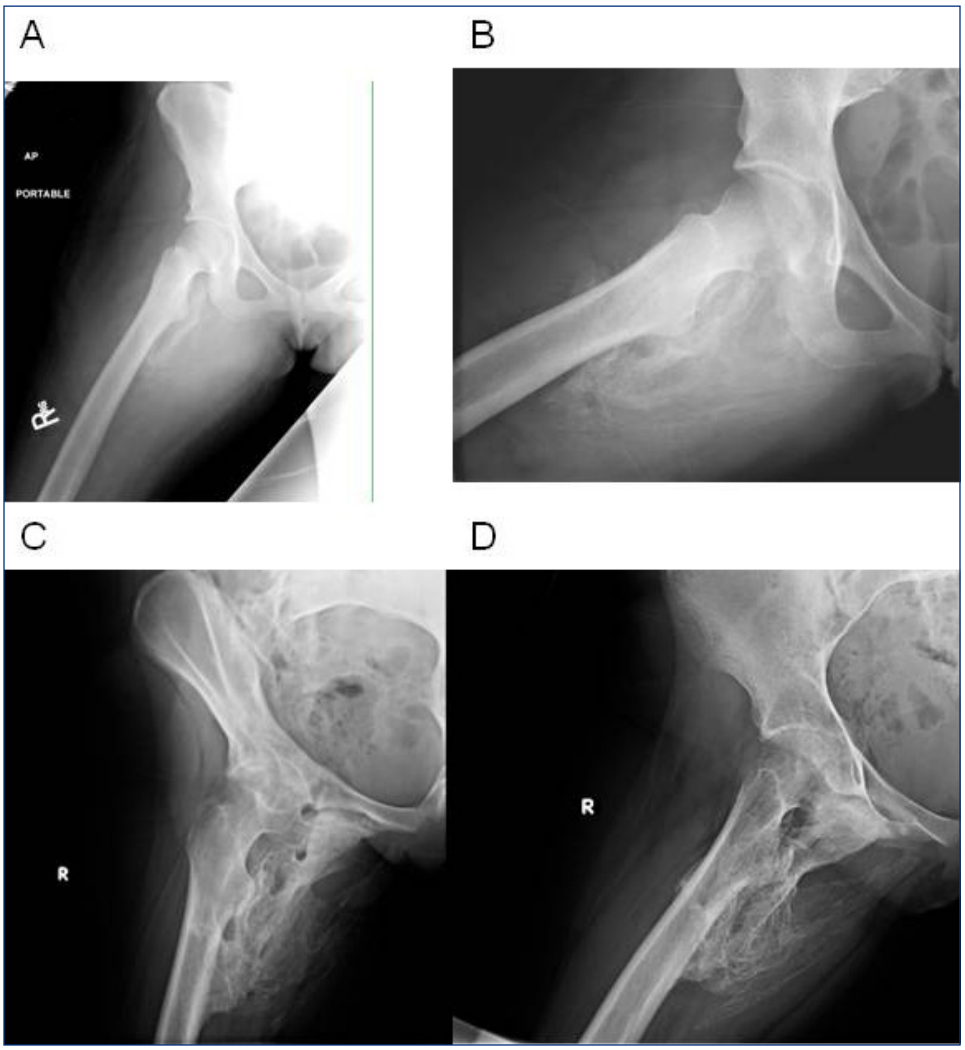
In the late stages of NHO, associated with functional impairment and pain, excess bone must be excised surgically (**figure 1**).[23] It has been reported that excision should not be performed until the growth and maturation phases have ended, which has been estimated to be over one year for NHO related to SCI and over 1.5 years for TBI.[12,24]

However, despite confirmation of the end of the growth or maturation phases of NHO, recurrence rates of NHO have been reported in over one-third of patients who undergo excision.[12,25]

Fortunately, surgical resection that is combined with prophylactic bisphosphonates and radiation therapy has significantly reduced the recurrence of NHO. [26] This suggests that the risks and benefits of waiting to excise NHO until the maturation phase must be weighed with the risk and benefits of earlier excision. Earlier excision may require less surgery if appropriate prophylaxis is used to prevent recurrence, as it may avoid the soft tissue contractures that often develop with NHO and the resulting immobilization.

Regardless of the phase of NHO or intervention utilized for prophylaxis or treatment, physical and occupational therapy have a significant role in the management of NHO. Physical therapy has not been proven to independently prevent the formation of NHO.[12] However, range-of-motion exercises are important in preserving joint function by preventing soft tissue contractures.[12] In the late stages of NHO, where function is impaired by a restricted joint, excision is generally combined with postoperative prophylaxis and a rehabilitation program to optimize function and prevent recurrence.[27]

Figure 1. 19-year-old female with heterotopic ossification of the right femur following a brain aneurysm rupture. She had an angiogram with resultant hematoma formation. Images A and B were taken 1 month after the hematoma formation and images C and D were taken at 9 months.



CONCLUSION

NHO deposition of bone in extraskeletal tissue is a disabling condition that is common following SCI, TBI, and other neurological conditions. Early diagnosis requires appropriate suspicion and imaging studies. If the diagnosis of NHO is made in the early phase, progression can sometimes be halted with bisphosphonates, indomethacin or radiation therapy. If NHO progresses to its final stages without intervention, it could restrict joints and render them dysfunctional, ankylosed, and painful. In cases where excision is performed to restore function, prophylaxis and regimented rehabilitation are required to maintain function and improve outcomes.

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Barriers to Health Insurance Pre- and Post-Affordable Care Act Implementation in Providence, RI

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ABSTRACT

The impact of healthcare reform under the Affordable Care Act (ACA) on individuals living in cities has not yet been quantified by local Departments of Health. This makes it difficult for safety net sources of healthcare, such as free clinics, to plan for the future. Therefore, members of Clinica Esperanza/Hope Clinic conducted a survey in predominantly Latino communities of South and West Providence, RI, using a convenience sample method (N = 206). Survey results were compared to a prior survey conducted in the same communities prior to ACA implementation. Despite gains due to Obamacare, a much higher level of uninsurance was reported in this survey than has been reported statewide. In 2014, as compared to 2010, 48% vs. 95% of respondents reported being uninsured, and more held private (20% vs. 5%) or government-subsidized health insurance (32% vs. 1%). Undocumented immigration status and cost were the two most commonly reported reasons for remaining uninsured under the ACA. First-generation immigrants living in urban centers are still reporting significantly higher rates of uninsurance (48%) than the general population in RI (7.4%).

KEYWORDS: Affordable Care Act, health disparities, uninsured, immigrant, free clinic

INTRODUCTION

The 2010 Patient Protection and Affordable Care Act (ACA) improved health insurance coverage for some previously uninsured populations, such as young adults.[1-4] The impact of the ACA on millions of immigrants, both legal and undocumented, and low-income populations in the "coverage gap" deserves additional scrutiny.[4-6] Lack of health insurance is prevalent in Rhode Island (RI) due to the confluence of two major factors: unemployment and increasing numbers of foreign-born residents. At the height of the economic recession in 2008, RI had the second-highest unemployment rate of any state at 7.7%.[7] Largely due to the subsequent loss of employer-based coverage, 1 in 5 RI residents under 65 were uninsured in 2010.[8] The foreign-born population also increased 5% by more than 40,000 people in the last two decades. These official census figures omit an equally large number of undocumented immigrants.

Low-income populations such as recent immigrants benefit most from insurance expansion, as demonstrated by results from nearby Massachusetts, which has provided universal coverage to all state residents since 2006.[9] Low levels of uninsurance were maintained, in Massachusetts, even in the face of nationwide economic recession.[10,11] Improvements in the health status of low-income populations after statewide reform in Massachusetts suggests that similar changes may occur after ACA implementation in neighboring RI.

"Safety net" healthcare, which is provided by community health centers, emergency departments, and free clinics, makes healthcare accessible to patients regardless of ability to pay,[12] and continues to be a critically important source of care in the post-ACA era.[13] Free clinics help expand options available to patients for primary care services and can reduce out-of-pocket costs for non-urgent visits that may have otherwise been handled in costly emergency rooms.[14-16] The present investigation evaluated the extent to which the ACA has had an impact on healthcare access and insurance enrollment in a low-income, predominantly Spanish-speaking, largely foreign-born urban community within proximity to a free clinic serving the same population (Clinica Esperanza/Hope Clinic, CEHC). In this study, we used street-level surveying by community health workers (CHW) to assess the population's barriers to insurance coverage and continued need, if any, for safety net healthcare services. The study expands on a 2011 RI Department of Health report[17] and is compared to a 2010 survey performed using the same method, in the same neighborhoods.[18]

METHODS

Convenience sample surveys similar to a previous assessment were conducted in public areas of West and South Providence in July-September 2014.[18] CEHC's bilingual (Spanish/English) CHW facilitated survey completion with participants in their preferred language. The communities are 36–56% Hispanic/Latino, approximately 17% Non-Hispanic Black, with a median age of approximately 29 years. One-quarter of families in the survey neighborhoods live below the federal poverty line (FPL). The area is a designated Primary Care Health Professional Shortage Area.[19]

Participants were over age 18, spoke Spanish and/or English, and were not compensated for their participation. Oral consent was obtained at the time of the interview and

documented on the paper survey form. No personal identifiers were collected. Survey data related to immigration status, income, and insurance status were collected. If uninsured, participants were asked to provide at least one reason for not having coverage under the ACA. Questions assessing basic past medical history and health services utilization of the sample were also asked. Responses were assessed for quality, and entered and analyzed using Microsoft Excel and SPSS.

Based on responses to certain questions, participants were offered informational pamphlets with clinic offerings and other local assistance programs. Individuals who appeared to be eligible for insurance under the ACA were given information on how to arrange follow-up with a trained ACA navigator at CEHC.

RESULTS

Demographics

A total of 206 participants were surveyed; data was compared to a survey conducted in the same community in 2010. The majority of respondents identified as Hispanic/Latino in both surveys and reported Spanish as their primary language. Mean age of respondents was 40.2 years (SD = 15.2 years), a slightly wider age range than the 2010 study (37.9 ± 11.7 years). Compared to the 2010 study, more women and more US citizens were surveyed. There was a decrease in the proportion of foreign-born respondents and an increase in the number of white respondents, which may have increased the number of participants reporting having insurance. After adjusting for household size, 55% of respondents had an annual income less than the 2014 FPL. Ninety percent of respondents had an annual income less than 250% FPL, the cut-off for ACA Cost Sharing Reduction eligibility. See **Table 1** for full demographic details.

Insurance and Healthcare Utilization

The overall number of participants reporting having health insurance (52%) was significantly higher in 2014, post-ACA, than in 2010 (5%, $p < 0.001$) (**Table 2**). In 2014, a significantly larger proportion of survey participants utilized a subsidized healthcare program such as Medicaid, Medicare, or RIteCare ($p < 0.01$). 38 participants reported having access to insurance under an ACA/marketplace/Obamacare health plan, an option that did not exist in 2010. **Figure 2** depicts the distribution of healthcare coverage during both years. The proportion of patients receiving healthcare at a community health center increased nearly ten-fold in the four years between surveys, from 5% to 49%. The use of emergency rooms was reported to be lower, as compared to 2014, the use of free clinics remained the same, and the use of all other sources of healthcare increased. Additionally, the percentage of respondents receiving primary care in the past year increased from 29% in 2010 to 69% in 2014.

Table 1. Participant Demographics

	2010 (N = 138)		2014 (N = 206)	
Sex	n	%	n	%
Male	74	56%	93	45%
Female	57	44%	113	55%
Race/Ethnicity and Nativity Status				
Hispanic/Latino	119	86%	159	78%
Non-Hispanic/Latino	19	14%	45	22%
White	5	4%	23	11%
Black	10	7%	12	6%
Mixed/Other	2	1%	7	3%
Nativity Status				
US-Born	19	15%	44	22%
RI-Born	12	9%	31	15%
Foreign-Born	97	76%	128	63%
Primary Language				
English	19	14%	62	31%
Spanish	92	67%	130	65%
English and Spanish	21	15%	3	2%
Other	5	4%	5	3%
Immigration Status				
US Citizen	59	44%	99	50%
Documented Immigrant ≥5 Years	27	20%	49	25%
Immigrant <5 Years	7	5%	17	9%
Undocumented Immigrant	42	31%	32	16%

Table 2. Healthcare-Related Variables

	2010 (N = 138)		2014 (N = 206)	
Insurance Status	n	%	n	%
Uninsured	122	95%	75	48%
Insured	7	5%	81	52%
Subsidized Program (Medicaid, Medicare, VA, etc.)	1	1%	50	32%
Private or Employer-Based	6	5%	31	20%
Marketplace Plan/ACA/"ObamaCare"	NA	NA	38	24%
Healthcare Utilization				
Emergency Department	74	57%	15	8%
Health Center	6	5%	93	49%
Free Clinic	12	9%	16	9%
Hospital Clinic	7	5%	25	13%
Private Physician	13	10%	31	16%
Other	18	14%	8	4%
Most Recent Physical Exam				
<1 Year Ago	40	29%	139	69%
1-5 Years Ago	39	28%	35	17%
>5 Years Ago	58	42%	27	13%

Characteristics of the Uninsured

In the 2014 survey, more males than females ($p = 0.025$) reported being uninsured, compared to those with all other sources of health insurance. Uninsured individuals were also more likely than insured participants to use the emergency room when they need healthcare compared to all other locations ($p = 0.019$). Uninsured participants were equally likely to be Hispanic versus all other races ($p = 0.080$), and approximately the same age ($p = 0.181$) as compared to insured patients, for this survey conducted in predominantly Latino neighborhoods.

The 2014 survey asked for explanations as to why participants lacked insurance coverage in the advent of the ACA. Lack of citizenship documentation was identified as the greatest barrier, with 43% of uninsured respondents citing this as rationale for their uninsurance (**Figure 1**). The next greatest barriers to healthcare access were cost (26%) and

Figure 1. Primary barriers to ACA coverage among a sample of the uninsured in Providence, RI (N = 74). A majority reported undocumented immigrant status as their primary barrier, followed by high cost of ACA plans.

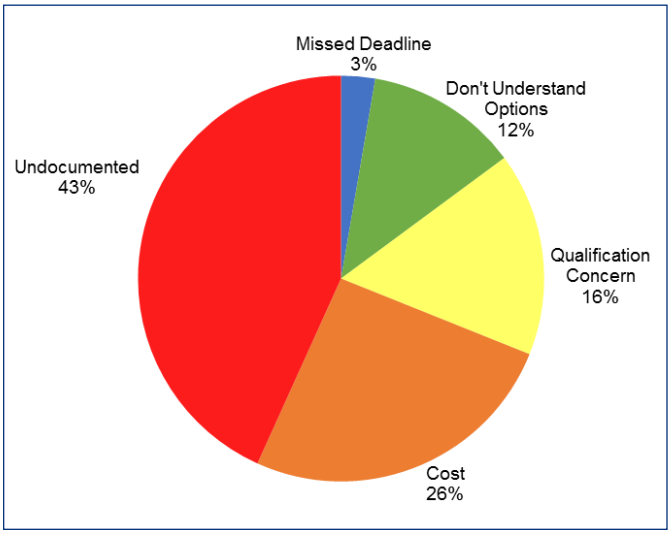
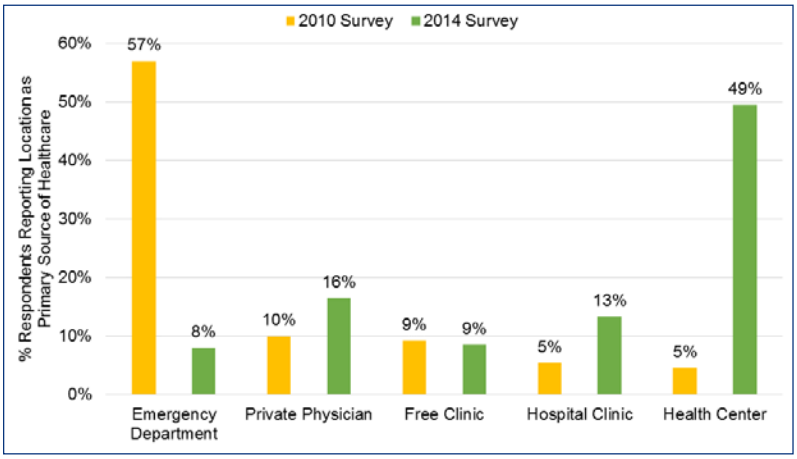


Figure 2. Primary sources of healthcare received, pre- and post-ACA implementation. Most notably, use of emergency rooms greatly decreased, while use of health centers greatly increased.



concerns about qualifications (16%). Missing the deadlines for online application was of little concern, with only 3% claiming this issue. Additionally, 32% of patients lacked computer/internet access and 27% lacked the skills to utilize the technology. Significant financial and technical barriers to accessing insured care following the implementation of the ACA remain, for members of this predominantly Spanish-speaking, low-income population, in 2014.

DISCUSSION

Since the expansion of Medicaid under the ACA, RI and many other states in the nation remain in a period of transition. Evaluating the impact of ACA reform on populations affected by health disparities enables safety net providers, such as free clinics, to determine how to address the gap in coverage. This survey uncovered legal, technical and financial impediments to enrollment that could reduce the number of individuals who are able to access subsidized healthcare under the ACA for low-income, Spanish speaking residents of RI.

As expected, more survey participants reported having insurance in 2014 than in 2010, predominantly through government-subsidized programs such as Medicaid and Medicare. In RI, 65% of those eligible had obtained health insurance through the marketplace in 2014[20] and more recently, the uninsurance rate was reported to drop to 5% (50,000 individuals remained uninsured according to figures released on September 10, 2015[21]). Nationally, more than 10 million previously uninsured individuals gained coverage. By the second quarter of 2014, the likelihood of having a personal doctor increased by 2.2 percentage points ($p < 0.001$) and the proportion of adults unable to afford medical care at the national level decreased by 2.7 percentage points ($p < 0.001$).[4] Unfortunately, as documented by this street-level survey, there is a gap in coverage for populations that may have been overlooked in statewide surveys. 48% of individuals who were approached by CHW in West and South Providence reported being uninsured.

Still, there has been progress. The rate of insurance coverage through government-subsidized programs increased in our sample population, as compared to the results of our previous survey from 2010. This can be attributed to Medicaid expansion following implementation of the ACA. Members of the still-uninsured sample population in this survey stated that their lack of insurance could be attributed to a lack of legal documentation, although a significant proportion stated that subsidies were not sufficient to cover the cost of insurance, and they had therefore declined to be enrolled (despite the penalties that would be applied).

Participants in this survey were predominantly Spanish-speaking, a population that has reported higher uninsurance rates. Nationally, Hispanic uninsurance rates remain high, although they dropped from 36% to 23% post ACA. States without expanded Medicaid did not see this change, with the uninsurance rate among Hispanics remaining at 33% in those areas.[22]

Decreased uninsurance rates were also accompanied by a major shift in the location of care, indicating potential savings for low-income families in Providence. In 2010, a majority of our survey respondents identified the emergency room as their main source of (fairly expensive) healthcare. Based on participant reports for the 2014 survey, reported emergency room usage appears to have decreased, whilst community health clinic (less expensive) usage increased.

In addition, access to primary care appears to have

increased by more than two-fold compared to 2010, post-ACA. Increased access to primary care and reduced emergency room usage is likely to translate into health-related and economic gains for the low-income population represented by our survey participants. Detailed evaluation of the economic and health benefits of becoming insured under the ACA, for members of low-income populations would be worth further evaluation.

Prior to ACA implementation, almost two-thirds of the uninsured were members of working families.[23] This street-level survey provides additional evidence that uninsured residents of RI are working, low-income immigrants. Despite the fact that these individuals make important contributions to their local and national economies,[24] they continue to experience significant barriers to improved health and increased rates of chronic disease,[25] a situation referred to as a "health disparity." Free clinics and safety net primary care at community clinics provide a low barrier of entry to chronic disease diagnosis for the uninsured and a point of referral into the system for those who are eligible. Based on a recent report that 50,000 individuals remain uninsured in RI,[21] "safety net" clinics that link uninsured populations to primary care deserve continued support.

Many survey respondents who were eligible for insurance under the ACA stated that they remained uninsured due to confusion about their options, concern about qualifications, and cost. Of the 48% reporting that they remained uninsured, nearly half (33 of the 75 uninsured participants) were found to be eligible to apply for insurance, underscoring the need for outreach to members of this low-income, limited English proficiency population. A street-level approach similar to the effort described here might be effective at reaching these individuals. Assistance with applications to insurance under the ACA was offered to every individual who was found to be eligible, and expert assistance was provided at no cost, at CEHC. More than 100 individuals were successfully enrolled in insurance by CHW at CEHC during the survey period.

Limitations

Survey limitations include the small sample size and use of convenience sampling by healthcare outreach workers, both of which may contribute to the noted variance in some key demographic variables between 2010 and 2014. For example, differences in the gender and ethnicity of the participants may have been due to parallel changes in the ethnicity and gender of the surveyors. This limitation does not appear to have diminished the key finding in this survey; many more low-income individuals are able to access healthcare than before.

Future Directions

Although the number of persons who have access to health insurance has increased under the ACA in RI largely due to Medicaid expansion, significant gaps remain that put low-income RI residents at risk for economic instability in the case of health-related events. For example, legally resident Rhode Islanders have to wait as long as five years before becoming eligible for health insurance. Free clinics provide a point of access to healthcare and provide important linkages to insured care for individuals who may be eligible for insurance under the ACA, but unaware of their eligibility status. Results of this survey clearly demonstrate that extended community outreach and safety net entry points are needed for individuals belonging to these difficult-to-reach populations who remain outside the usual sources of healthcare.

Lastly, it is worth noting that the number of uninsured individuals living in low-income neighborhoods in RI still vastly exceeds the number that can be accommodated during available patient visit hours in local free clinics (the two clinics serve approximately 5,000 patients; while more than 50,000 legally present Rhode Islanders remain uninsured in 2015). Rather than close safety net clinics in the post-ACA era, the role of free and safety net clinics as providers of healthcare to those who are not yet eligible for insurance under the ACA, and as critically important portals of entry into the healthcare system, should be recognized and reinforced.

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Hypertriglyceridemia-Induced Pancreatitis: A Decade of Experience in a Community-Based Teaching Hospital

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ABSTRACT

INTRODUCTION: Hypertriglyceridemia is the third most common cause of acute pancreatitis. The current evidence on the management of hypertriglyceridemia-induced pancreatitis (HTGP) is mainly derived from case series. It has been suggested that insulin, and plasmapheresis have a role in the management of acute HTGP. We present a retrospective review of patients seen at a community-teaching hospital between 2005 and 2015. Results: Out of the 549 admissions for acute pancreatitis, fourteen patients met our inclusion criteria. The mean age of presentation was 39± 8 years and there was a predominance of men (57%). More than two-thirds of the patients were admitted to the intensive care unit. The majority of the patients were treated with insulin drip (n=8), and the rest by subcutaneous insulin (n=3) and insulin drip + plasmapheresis (n=3). In the insulin drip group we noted a gradual decrease of the admission serum triglycerides by 50.6 ±16.0 % at 24 hours, 65.9±16.9% at 48 hours, and then 85.2± 7.1% at discharge. Serum triglycerides decreased by 79.8% and 92.6%, at discharge in the subcutaneous insulin and insulin + plasmapheresis cohorts, respectively. The insulin + plasmapheresis cohort stayed in the hospital longer (20.7±3.1 days) compared to the insulin drip (10.3±5.4 days) and subcutaneous insulin (5.7 ± 1.2 days) cohorts.

CONCLUSION: Our study strengthens the evidence for using insulin (infusion or subcutaneous) with or without plasmapheresis in the treatment of hypertriglycerimia-induced pancreatitis.

KEYWORDS: Hypertriglyceridemia, Acute pancreatitis, Plasmapheresis, insulin therapy

INTRODUCTION

Acute pancreatitis is the leading cause of hospitalization for gastrointestinal diseases in the United States of America.[1] While gallstones and alcohol abuse account for two-thirds of the cases of acute pancreatitis, hypertriglyceridemia is the third most common cause, with an estimated prevalence around (1-4%).[2] There are no definitive guidelines on the treatment of hypertriglyceridemia-induced pancreatitis (HTGP). Case series have suggested a role for insulin, heparin and plasmapheresis as adjunctive to conventional therapies such as statins and fibrates when treating HTGP.[3, 4]

METHODS

We reviewed records on all patients older than or equal to 18 years of age admitted with the primary diagnosis of acute pancreatitis between 2005 and 2015. This data was obtained from our hospital's electronic and paper-based medical records using the relevant ICD 9 codes. We screened patient with the secondary diagnosis of "Hypertriglyceridemia." Data was collected regarding demographics, clinical presentation, diagnostic method, treatment modalities, length of hospital stay, complications and in-hospital mortality. We compared the rapidity of correction of serum triglyceride levels with the various treatment modalities. For patients with multiple admissions, each was treated as a separate data entry. This study was given an exempt status by the local Institutional Review Board.

Only patients with admission serum triglyceride of >1000mg/dL were included. Based on the Atlanta classification for acute pancreatitis , the diagnosis of pancreatitis required fulfillment of two out of three criteria (abdominal pain, radiographic evidence or serum lipase at two-thirds the upper limit of normal.[5] Descriptive statistics were generated for all variables (means and standard deviations for continuous variables; counts and percentages for categorical variables). Due to the small sample size, exact chi-square p-values were calculated when examining differences in categorical variables by treatment group. A number of the continuous variables exhibited non-normal, highly skewed distributions. For this reason, the non-parametric Kruskal-Wallis test was used to examine differences in the continuous variables by treatment group. IBM SPSS version 21 (Armonk, NY) was used to conduct all analyses. A p-value ≤ 0.05 was used to designate a statistically significant result for all analyses.

RESULTS

A total of 549 cases of acute pancreatitis were identified. Three percent (n=18) of these admissions had a secondary admission diagnosis of hypertriglyceridemia. Four of these cases were excluded due to unavailability of serum triglyceride levels at discharge. In the 14 encounters involving a total of 10 patients, all patients received subcutaneous heparin and oral anti lipid agents (fibrate, niacin or statin) during the admission. The majority were treated with an insulin drip (n=8) and the rest by subcutaneous insulin (n=3) or insulin

drip+plasmapheresis (n=3) as shown in **Figure 1**.

The mean age of presentation was 39±8 years (insulin drip: 40±6, subcutaneous insulin: 35±16 and insulin±plasmapheresis:41±1). Fifty seven percent were men while seventy one percent were admitted to the intensive care unit. Every patient presented with abdominal pain while computed tomography confirmed pancreatitis in 71% of the encounters (n=10). The lipase level was three times above the upper limit of normal in 86 %(n=12) of the overall cohort. The most common presenting comorbidity was diabetes mellitus (50%). The mean lipase levels on admission was 452±348, p=0.46 [552.5 ±373.5mg/dL (insulin drip), 261.7±245.9mg/dL (subcutaneous insulin) and 375.3±369.1 mg/dL (insulin+ plasmapheresis)].The overall mean admisison triglyceride was 5753± 4056 mg/dL, p=0.90 (insulin drip: 5307 ±4932.3 mg/dL, subcutaneous insulin: 6123±1431 mg/dL and insulin+plasmapheresis: 6575±4214 mg/dL).

The serum triglycerides decreased by 50.6 ±16.0 % within 24 hours (from 5307±4932.3 mg/dL to 2139.9± 1702.5 mg/dL) for the patients admitted on insulin drip. **Figure 2** depicts this trend where the triglyceride decreased through 48 hours (65.9±16.9%) and at the time of discharge (85.2± 7.1%). Interestingly, at the time of discharge the triglyceride had decreased by 79.8% (p=0.02) for subcutaneous insulin and by 92.6±5.6% for insulin+ plasmapheresis. **Figure 3** shows a comparison of the percentage decreases of all three treatment modalities.

There was no death associated with any of the treatment cohorts. The patients treated with insulin+plasmapheresis stayed longer in the hospital (20.7±3.1 days) compared to those on insulin drip (10.3±5.4 days) and subcutaneous insulin (5.7± 1.2 days). None of the patients on subcutaneous insulin had any complication. Half (n=4) of the patients treated with insulin drip had complications, which included small bowel obstruction, spontaneous bacterial peritonitis, and respiratory failure requiring intubation. Two out of the three patients treated with insulin+plasmapheresis had complications. One had respiratory failure requiring intubation and also developed acute tubular nephritis requiring dialysis. The other developed acute respiratory distress syndrome, acute kidney disease and while the intubated patient developed ventilator acquired pneumonia.

Figure 1. Schematic diagram of study design showing the inclusion and exclusion criteria.

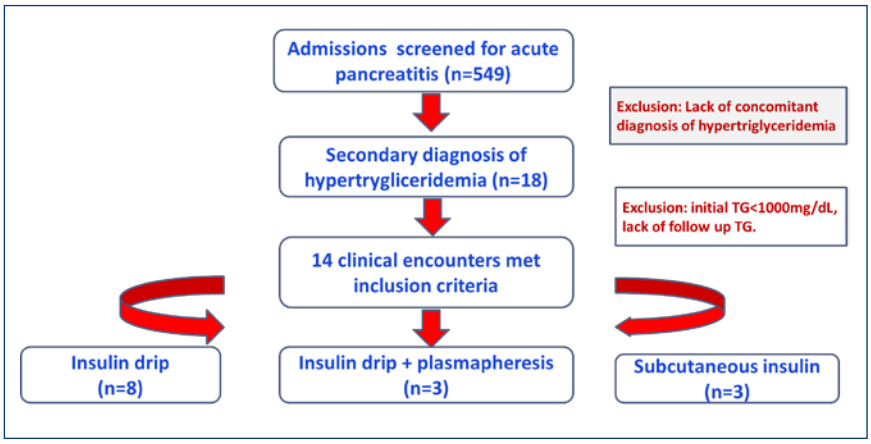


Figure 2. Graph shows the trend of serum triglyceride with intravenous insulin infusion over three days and at time of discharge.

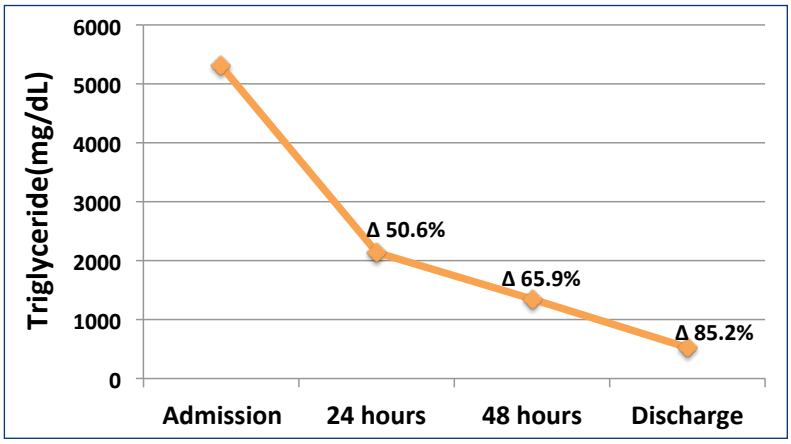
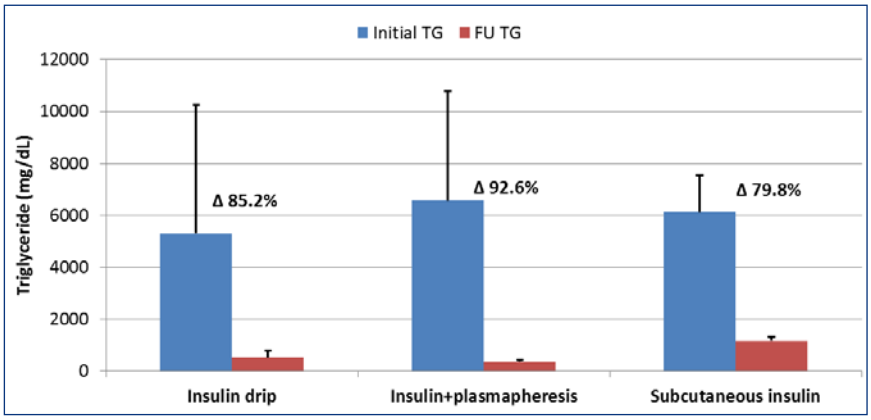


Figure 3. Graph compares admission and discharge serum triglycerides for all three treatment modalities (, intravenous insulin infusion, subcutaneous insulin, and insulin +plasmapheresis). The difference is presented as a percentage decrease.



DISCUSSION

HTGP is not an uncommon presentation. Unfortunately there are no guidelines that address its management. The conventional treatment of acute pancreatitis includes restricted oral intake, aggressive intravenous fluid resuscitation, and adequate pain control which were offered to our patients. The primary goal in HTGP is to lower the triglycerides level since this is proven to expedite clinical improvement.

The risk of pancreatitis increases with triglycerides greater than 1000 mg/dL.[6] Several mechanisms have been postulated for HTGP, all leading down the common pathway of ischemic injury to acinar cells. Excess triglycerides are hydrolyzed by pancreatic lipase resulting in the formation of excess free fatty acids, which cause acinar cell injury and capillary leakage in pancreatic vascular beds.[7, 8] The resultant ischemia produces an acidic environment which perpetuates a vicious cycle of subsequent ischemia and necrosis. Likewise, excess chylomicrons cause ischemic injury because the resulting hyperviscous plasma causes sluggish flow through the pancreatic beds.[9]

Anti-lipidemic agents are co-adjuvant therapy in HTGP. Fibrates can lower triglycerides by 40-60% and are frequently used for primary hypertriglyceridemia. Fibrates activate lipoprotein lipase which causes triglyceride-rich lipoprotein lipolysis. They also decrease hepatic fatty acid through hepatic β-oxidation, thus reducing triglyceride production.[10] Insulin has been suggested as a therapy for HTGP even in patients without diabetes. Insulin promotes storage of fatty acids, and acts as a potent activator of lipoprotein lipase, which hydrolyzes the circulating triglycerides and aids in their removal from plasma.[11]

Thuzar et al compared the treatment of HTGP using insulin drip with fasting, insulin drip alone and subcutaneous insulin.[12] At 24 hours, insulin drip and fasting reduced the triglycerides by 87%, while insulin drip alone reduced triglycerides by 40%. In our study a higher reduction (50%) was seen within 24 hours after initiation of the insulin drip. In their review only one patient had been treated with subcutaneous insulin and this had resulted in a 23% reduction of triglycerides while we showed that a 79% reduction could be achieved during the course of hospital stay. No trial has compared insulin drip and subcutaneous drip; however it is suspected that intravenous insulin has a better pharmacokinetics and absorption profile in acutely sick patients.

Plasmapheresis actively removes triglycerides and also supplements the patient with lipoprotein lipase and apolipoprotein which activate three-acyl-glycerols cleavage and clearance. Ramirez-Bueno et al demonstrated 81% reduction in serum triglyceride with plasmapheresis.[13] We achieved a higher reduction in triglycerides (92%) likely due to the fact that our patients received plasmapheresis in addition to intravenous insulin. Due to limited evidence and conflicting reports, plasmapheresisfor as treatment for HTGP is classified as Grade 2C (absence of morbidity and mortality benefit) by the American Society for Apheresis.[14] Our findings reinforce the role of plasmapheresis in hypertriglyceridemia-induced pancreatitis.

The observed complications in those who received insulin and or plasmapheresis may have reflected the severity of disease on presentation, as opposed to a causal relationship, which likely influenced the choice of more aggressive treatment modalities. This also highlights the fact that acute pancreatitis is not a benign condition as there is a risk of systemic inflammatory response, and also the breakdown of triglycerides into toxic free fatty acids could cause lipotoxicity.

The small sample size and the retrospective design of this study make it difficult to translate the results to a large population size however these findings indicate the need for controlled trials to further understand this clinical entity. Another limitation is the fact that a fasting triglyceride was not measured. In the setting of acute pancreatitis, triglycerides could be falsely elevated.

CONCLUSION

Severe hypertriglyceridemia is associated with acute pancreatitis. Our study strengthens the evidence for using insulin (infusion or subcutaneous) with or without plasmapheresis in the treatment of hypertriglycerimia-induced pancreatitis. Prospective randomized control trials need to be done to validate these promising therapies.

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Placing Bundled Payments in Perspective: A Survey of the New England Ophthalmological Society

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ABSTRACT

OBJECTIVE: To determine ophthalmologists' views on the Medicare bundled payment model for specialty physicians in the outpatient setting.

DESIGN AND METHODS: The New England Ophthalmology Society (NEOS) was emailed an anonymous survey. Views of bundled payments and demographic characteristics were analyzed.

RESULTS: Of responding members, 72% (115/160) strongly opposed bundled payments; 68% (108/160) believed bundled payments will lead to financial losses, and the majority did not support including costs of prescription drugs (69%, 109/159) or preoperative (77%, 123/159) or postoperative complications (59%, 94/159) in the bundle. Respondents who held office in a medical society, were in private practice, solely billed for income, and had mostly conservative political views were significantly more likely to oppose bundling.

CONCLUSION: The majority of NEOS ophthalmologists were opposed to bundled payments. Personal beliefs and practice type may influence the level of ophthalmologist support of bundled payments.

KEYWORDS: ophthalmology, bundled payments, Medicare

INTRODUCTION

Ophthalmology procedures account for a large portion of healthcare costs for Medicare beneficiaries.[1] To curb the expected rise in Medicare expenditure,[2] the Center of Medicare and Medicaid Services (CMS) has been piloting episode-based bundled payment models in a variety of specialties.[3] In this model, a pre-determined single payment is given for a set of services over a specified period of time. This cost-sharing method may lead to cost savings or financial losses for health care providers depending on the difference between the bundled payment and the actual costs of care.

In 2014, the CMS Innovation Center announced that it was interested in testing a new bundled payment model for specialists in outpatient settings such as ophthalmologists.[4] This Specialty Practitioner Payment Model (SPPM) may bundle services such as physician's fees, facility payments, diagnostic testing and prescription drug costs for ophthalmology procedures such as cataract surgery and glaucoma care.[4,5] As part of the development of the SPPM, CMS has sought to understand factors that may influence physician interest in participating in this payment model as well as the types of services that are recommended for bundling.[6]

Our purpose was to determine ophthalmologists' views on bundled payments by surveying members of the New England Ophthalmological Society (NEOS). We also aimed to understand factors that may be associated with ophthalmologists' interests in participating in such a model and their views on services that should be included in the bundled payment.

METHODS

After obtaining institutional review board approval, we administered a survey designed to assess ophthalmologists' views on bundled payments. The survey was modeled from previously published physician surveys,[7,8] and was tested on a small group of ophthalmologists and revised based on their input. The final survey asked respondents for their consent to participate in the survey and questions regarding 1) level of opposition or support to bundled payments 2) belief of what the overall financial outcome of bundled payments will be 3) opinion on which services should be included in the bundle and 4) demographic information. All answers related to their views on bundled payments were based on a five-point scale. An invitation to participate in the study was e-mailed to all NEOS members along with a link to the survey in March 2015. Email was the contact method approved by the NEOS board. Two additional weekly email reminders were sent. The survey was administered using the web-based software Research Electronic Data Capture (REDCap).[9] Responses were automatically stored in the REDCap system and recorded anonymously with no identifiable information.

In order to identify the extent of non-response bias that may have occurred in our survey, demographic information that was collected for respondents was compared to the general NEOS membership. The NEOS directory was searched for all members who had listed the name and address of their practice. Using this information, we determined if their primary practice was private, academic, governmental, or a health maintenance organization (HMO). The location of their practice was identified as urban (city/town), suburban,

or rural based on the National Center for Education Statistics classification of the majority of the schools located in each city.[10] Each ophthalmologist's date of certification by the American Board of Ophthalmology was identified in order to approximate time in practice. The proportions in each demographic category were then compared between our respondents and general NEOS members.

The proportion of members who selected each answer was tabulated. Answers to the question "How much do you oppose or support a bundled payment model for ophthalmology procedures?" were re-categorized from the five-point scale into three categories: "mostly or strongly oppose", "neutral" and "mostly or strongly support". Fisher's exact tests were computed to determine whether there were significant associations between other answers and the level of support for the model. P-values of <0.05 were considered statistically significant.

RESULTS

We administered the survey to 684 NEOS members with valid email addresses; 160 (23%) responded. Demographics are shown in **Table 1**. The majority of respondents had over 20 years of experience (68%; 108/160) and worked in private practice (84%; 133/159) in suburban locations (85%; 87/159). Almost all accepted Medicare (98%; 156/160) and private insurance (95%; 152/160). The most common source of income was billing only (65%; 104/160), followed by salary only (30%; 48/160). Most respondents performed surgery (85%; 135/159); of those, 76% (98/129) performed cataract surgery. The respondents were most commonly independent/moderate (32%; 51/160) in their political beliefs and 75% (120/160) were involved in their local, regional, or national medical societies. About a quarter of those in societies held office in the society (24%; 29/119).

Table 1. Demographics of survey respondents

Number	Question and Responses	Responses	n (%)
1	**How many years have you been in practice?**	160	
	< 10 years in practice		16 (10%)
	10- 20 years in practice		36 (23%)
	> 20 years in practice		108 (68%)
2	**What is your primary practice setting?**	159	
	HMO		2 (1%)
	Private practice		133 (84%)
	Academic practice		19 (12%)
	Government affiliated practice		0 (0%)
	Other		5 (3%)
3	**What is your primary practice location?**	159	
	Urban		48 (30%)
	Suburban		87 (55%)
	Rural		24 (15%)
4a	**What insurance/payment does your primary practice accept (select all that apply)**	160	
	Medicare		156 (98%)
	Medicaid		142 (89%)
	Private insurance		152 (95%)
	Cash		139 (87%)
	Other		11 (7%)
4b	**About what percentage of your patients receive Medicare?**	151	
	< 25%		8 (5%)
	25-50%		56 (37%)
	51-75%		73 (48%)
	> 75%		14 (9%)
5	**What is your source of income from your primary practice?**	160	
	Salary (+/- bonus) only		48 (30%)
	Billing only		104 (65%)
	Other		8 (5%)
6a	**About how many surgeries do you perform per week (if any?)**	159	
	I do not perform surgery		24 (15%)
	< 10 surgeries per week		88 (55%)
	10- 20 surgeries per week		38 (24%)
	>20 surgeries per week		9 (6%)
6b	**Do you perform cataract surgery? (Of those who perform surgery)**	129	
	Yes		98 (76%)
	No		31 (24%)
7	**What is your political self-characterization?**	160	
	Very Conservative		11 (7%)
	Somewhat Conservative		50 (31%)
	Independent/moderate		51 (32%)
	Somewhat liberal/progressive		35 (22%)
	Very liberal/progressive		13 (8%)
8a	**Are you involved in your local, regional, or national medical (specialty or general) societies?**	160	
	Yes		120 (75%)
	No		40 (25%)
8b	**Do you hold office in one of your local, regional, or national medical societies? (Of those involved in societies only)**	119	
	Yes		29 (24%)
	No		90 (76%)

HMO=health maintenance organization

As shown in **Table 2**, the majority (72%; 115/160) of respondents mostly or strongly opposed a bundled payment model, with 58% (93/160) strongly opposing the model. The majority of respondents (68%; 108/160) believed that a pre-determined, episode-based bundled payment model would result in financial losses, and that the costs of care would likely be higher than the payment; only 3% (5/160) believed the financial outcome would be cost savings and that payments will likely be higher than the costs of care. Most respondents believed that the costs of preoperative complications (77%; 123/159), postoperative complications (59%; 94/159), and prescription drugs (69%; 109/159) should not be included in the bundle.

Table 3 shows the factors that were significantly associated with ophthalmologists' support or opposition to the payment model. Ophthalmologists' views on whether preoperative and postoperative complications and prescription drugs should be included in the bundle were significantly associated with their overall support or opposition to the model. Significantly more ophthalmologists who thought bundling would lead to financial losses opposed the model (89%) compared to those who were unsure of the outcome (45%), thought there would be neither losses nor savings (29%), or thought the outcome would be cost savings (0%). The majority of ophthalmologists in each political category were opposed to bundled payments. Those who were very conservative were significantly more opposed to bundled payments (100%) than those that were somewhat conservative (78%), independent (71%), somewhat liberal (63%), and very liberal/progressive (54%). Significantly more physicians in private practice opposed bundling (75%) than those in academic practice (63%) or HMOs (0%). Almost all (90%) ophthalmologists that held office in a medical society opposed bundling compared to only 66% who were members but did not hold office in their medical society. Significantly more ophthalmologists who only billed as an income source were opposed to bundling (74%) compared to those who only received salary (67%).

The respondents in this survey were similar to the 352 NEOS members with available information when comparing time in practice and primary practice type (**Appendix**). For location of practice, the majority of our respondents were located in suburbs (55%) compared to NEOS members, who were mostly located in an urban location (65%).

Table 2. Ophthalmologists' views of bundled payments

Number	Question and Responses	Responses	n (%)
1	**How much do you oppose or support a bundled payment model for ophthalmology procedures? Please rate your level of support from a scale of 1 (strongly oppose) to 5 (strongly support).**	160	
	1 Strongly oppose		93 (58%)
	2		22 (14%)
	3		31 (19%)
	4		7 (4%)
	5 Strongly support		7 (4%)
2	**What do you think the likely overall outcome would be of a pre-determined, episode-based bundled payment model?**	160	
	Financial losses; the costs of care will likely be higher than the payment		108 (68%)
	Cost savings; the payment will likely be higher than the costs of care		5 (3%)
	Neither losses nor savings; the costs of care will likely be similar to the payment		14 (9%)
	I am unsure		33 (21%)
Please rate whether the following services should be included in a bundled payment from a scale of 1 (should NOT be included) to 5 (should absolutely be included).			
3	**The costs of preoperative complications:**	159	
	1 Should not be included		123 (77%)
	2		4 (3%)
	3		10 (6%)
	4		6 (4%)
	5 Should absolutely be included		16 (10%)
4	**The costs of postoperative complications:**	159	
	1 Should not be included		94 (59%)
	2		9 (6%)
	3		16 (10%)
	4		23 (14%)
	5 Should absolutely be included		17 (11%)
5	**The costs of prescription drugs:**	159	
	1 Should not be included		109 (69%)
	2		11 (7%)
	3		14 (9%)
	4		6 (4%)
	5 Should absolutely be included		19 (12%)

Table 3. Significant factors associated with ophthalmologists' views of bundled payments

	Mostly or Strongly Oppose Bundling	Neutral	Mostly or Strongly Support Bundling	Fisher's exact
Believe costs of prescription drugs:				**p <0.001**
1. Should not be included	89 (82%)	15 (14%)	5 (5%)	
2.	5 (45%)	5 (45%)	1 (9%)	
3.	7 (50%)	7 (50%)	0 (0%)	
4.	3 (50%)	1 (17%)	2 (33%)	
5. Should absolutely be included	10 (53%)	3 (16%)	6 (32%)	
Believe costs of preoperative complications:				**p <0.001**
1. Should not be included	94 (76%)	25 (20%)	4 (3%)	
2.	2 (50%)	0 (0%)	2 (50%)	
3.	6 (60%)	4 (40%)	0 (0%)	
4.	2 (33%)	1 (17%)	3 (50%)	
5. Should absolutely be included	11 (69%)	1 (6%)	4 (25%)	
Believe costs of postoperative complications:				**p <0.001**
1. Should not be included	81 (86%)	10 (11%)	3 (3%)	
2.	6 (67%)	3 (33%)	0 (0%)	
3.	9 (56%)	6 (38%)	1 (6%)	
4.	7 (30%)	11 (48%)	5 (22%)	
5. Should absolutely be included	12 (71%)	1 (6%)	4 (24%)	
View of financial implications of bundled payments				
Financial losses	96 (89%)	9 (8%)	3 (3%)	p<0.001
Cost savings	0 (0%)	2 (40%)	3 (60%)	
Neither losses nor savings	4 (29%)	6 (43%)	4 (29%)	
I am unsure	15 (45%)	14 (42%)	4 (12%)	
Political Belief				
Very Conservative	11 (100%)	0 (0%)	0 (0%)	p=0.038
Somewhat Conservative	39 (78%)	10 (20%)	1 (2%)	
Independent/moderate	36 (71%)	9 (18%)	6 (12%)	
Somewhat liberal/progressive	22 (63%)	10 (29%)	3 (9%)	
Very liberal/progressive	7 (54%)	2 (15%)	4 (31%)	
Practice Setting				
HMO	0 (0%)	2 (100%)	0 (0%)	p=0.002
Private Practice	100 (75%)	27 (20%)	6 (5%)	
Academic Practice	12 (63%)	2 (11%)	5 (26%)	
Office in Medical Society				
Hold office	26 (90%)	2 (7%)	1 (3%)	p=0.039
Don't hold office	59 (66%)	21 (23%)	10 (11%)	
Income Source				
Salary (+/-bonus)	32 (67%)	7 (15%)	9 (19%)	p=0.011
Billing only	77 (74%)	23 (22%)	4 (4%)	

HMO = health maintenance organization

DISCUSSION

To our knowledge, this is the first survey to assess ophthalmologists' views on bundled payments. Our study showed that the majority of the NEOS members opposed a bundled payment model like the SPPM for outpatient procedures. Those ophthalmologists who held office in a medical society, were in private practice, solely billed for income, and had mostly conservative political views were significantly more likely to oppose bundling.

Other physician surveys have reported similar rates of opposition to bundled payments.[7, 8] Physician opposition is problematic as it can impede the successful implementation of a new payment model into the healthcare system. The Medicare Cataract Surgery Alternate Payment Demonstration in 1993 piloted bundled payments for a select group of cataracts surgeons and was met with overwhelming organized opposition by the ophthalmology community.[11] Ultimately, only 3.7% of invited facilities applied to participate. Investigators concluded factors that may have influenced ophthalmologists' opposition to bundling included recent reductions in reimbursement in the field, the fact that Medicare beneficiaries made up a large portion of ophthalmology patients, and a lack of evidence that higher volume would improve clinical outcomes for ophthalmology procedures.[11]

Bundled payment models have emerged in response to rising health care costs that are often attributed to the current fee-for-service model, which has been criticized for promoting disintegrated and unrestricted spending.[12, 13] Fee-for-service payments for ophthalmology services in particular are very high,[14, 15] a large portion of which is due to prescription drug costs.[16,17] The wide variation in ophthalmic drug costs allows for the potential for cost savings,[18, 19] especially in a bundled payment model that may encourage ophthalmologists to use alternative, cost-effective drugs. Despite this fact, we found that the majority of NEOS ophthalmologists did not believe that prescription drugs should be bundled in an episode-based payment, including more than a third of those who said they supported a bundled payment model.

Although bundled payments may present an opportunity for physicians to achieve cost savings,[2] we found that most NEOS ophthalmologists are concerned that a bundled payment model may lead them to financial losses. In order to mitigate this risk, physicians may change management of care in a way that reduces quality of care. Bajric et al. surveyed oculoplastic surgeons following the bundling of blepharoplasty and blepharoptosis repair to determine how delivery of care might have changed; instead of improving the quality of care, the authors reported that oculoplastic surgeons were more likely to bill patients for cosmetic blepharoplasty and delay blepharoptosis repair past the 90-day episode following the implementation of the bundled payment model.[20]

Limitations

Our study has several limitations. First, the views of NEOS members may not be generalizable to ophthalmologists in other regions of the country. Second, our 24% response rate suggests the possibility of non-response bias. However, non-response bias may be lower among physicians than the general public.[21] Additionally, our response rate is similar to many other surveys of ophthalmologists[22-27] and is a typical of electronic surveys to physicians.[28] Since we were unable to compare political views between our respondents and the general NEOS membership, it is possible that members with more extreme political views and stronger opposition to bundling were more likely to complete our survey. However, this is not likely since almost one-third (32%) of respondents identified as independent/moderate on the political spectrum.

With the emergence of the SPPM and other bundled payment models across medicine, there is a good possibility that ophthalmologists will be facing bundled payments in the near future. Further studies are needed to determine what factors would increase ophthalmologists' support for new payment models. Knowledge of these factors will help ensure that a cost-effective, outcomes-driven and physician-supported model can be successfully integrated into our healthcare system.

Appendix. Comparison of practice-related factors between NEOS survey respondents and NEOS general membership[a]

	NEOS Survey respondents (n=160)	NEOS general membership (n=352)
Time in practice		
<10 years	16 (10%)	51 (15%)
10-20	36 (23%)	91 (26%)
>20	108 (68%)	204 (58%)
Location		
suburb	87 (55%)	107 (30%)
urban	48 (30%)	233 (66%)
rural	24 (15%)	12 (3%)
Primary practice type		
private	133 (83%)	259 (74%)
academic	19 (12%)	92 (26%)
government	0 (0%)	1 (0.3%)
HMO	2 (1%)	0 (0%)

NEOS = New England Ophthalmological Society
[a]Includes only those members that identified their practice name and address on the New England Ophthalmological Society membership directory

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Pott's Puffy Tumor in a 12-year-old boy

TIANJIANG YE, MD; STUART SPITALNIC, MD; WILLIAM BINDER, MD

Case Records of the Brown University Residency in Emergency Medicine

DR. TIANJIANG YE: A 12-year-old boy with a history of attention deficit hyperactivity disorder and asthma was referred from an outside facility for evaluation of a headache and an abnormal head CT scan. The patient was playing soccer 3 days prior to presentation when he was elbowed by an opposing player in the forehead, just above his left eyebrow. The patient denied any loss of consciousness but subsequently developed intermittent headaches, nausea, and malaise, which became progressively worse over the next few days. A review of systems was negative for visual changes, weakness, numbness, tingling, nuchal rigidity, or vomiting. His mother reported he had an upper respiratory infection approximately 2 weeks prior to presentation, and he continued to have some congestion. The mother also noted swelling above the left supraorbital ridge where he was elbowed, and the patient was brought to an urgent care clinic three days later for evaluation of ongoing headaches and inability to concentrate at school. A CT scan of his brain was obtained at the outside facility and he was noted to have a focal lucency in the left frontal region of his brain concerning for a subdural hematoma. He was transferred to the Hasbro Children's Hospital ED for further evaluation and management.

At triage, the patient 's blood pressure was 116/71 mm Hg, pulse 106 beats per minute, respiratory rate of 22, temperature of 100.4 F, and pulse oximetry of 100% on room air. The patient appeared well and was cooperative and able to answer questions appropriately. He had a moderate area of focal swelling over his left supraorbital ridge with mild tenderness to palpation. His extraocular movements were intact and painless. Pupils were equal and reactive. His neurological exam, including cranial nerve, sensory, motor, reflex, cerebellar, and gait was normal. His nasal mucosa was moist and he had mild turbinate hypertrophy and tenderness to palpation over his frontal sinus. He did not have any nuchal rigidity or lymphadenopathy. His heart, lung and abdominal exam were unremarkable and his extremities were warm and well perfused. The remainder of the exam was unremarkable.

DR. SARAH GAINES: It is interesting to me that this patient had a CT after such a minor trauma. What are the indications for a head CT after minor head injury or persistent headaches?

DR. STUART SPITALNIC: Headaches in children are not uncommon. The prevalence of at least one major episode of headache increases from 30 to 50% in elementary school-age children to 50 to 82% in adolescents. Migraine is the most common chronic headache in children, while tension headaches tend to predominate in adolescents (1). CT scan is generally not indicated in the initial work up for these benign causes for headache. However, changes in the quality of headache or additional symptoms such as seizure, can lead to an expansion of the differential diagnosis and neuroimaging.

There are certain clinical findings – prolonged loss of consciousness, persistent vomiting, and an abnormal neurologic exam – which, when present after head injury, require brain imaging. Similarly, the normal child with no risk factors nor exam findings, who was subject to minimal trauma, requires no imaging. While there is no difficulty identifying the seriously injured on initial evaluation, it can be challenging to identify which patients who have experienced non-trivial head trauma can forgo radiologic evaluation. Although clinical judgment does very well predicting which patients require imaging, several clinical guidelines have been developed regarding who does not require a CT scan.

The Pediatric Emergency Care Applied Research Network (PECARN) guidelines have been validated and are often applied to the pediatric population to determine the necessity of imaging. The PECARN guidelines suggest that in children under 2 years, a CT is not required if the Glasgow coma score is 15, there has not been a prolonged (>5 seconds) loss of consciousness (LOC), no palpable skull fracture, and there are no signs of altered mental status including agitation, somnolence or a change in response to verbal communication. In patients 2 years and older, CT may safely be avoided in patients with a GCS of 15 without other signs of altered mental status, no signs of a basilar skull fracture, no vomiting, no loss of consciousness, and no severe headache. (2,3,4,5,6,7,8)

Of note, and to reiterate, the guidelines were designed to assist in determining in which patients CT can be avoided, not those in whom it is required. A significant amount of leeway is given to clinical judgment. Additionally, the guidelines were developed in children presenting within 24 hours of injury. As such, they can only have a limited application to the patient at hand.

DR. DALE STEELE: The patient had a low-grade fever, and swelling over his forehead, but an otherwise normal exam.

Did you review the abnormality on the CT scan with radiology? What were your next steps?

DR. YE: On review of the outside CT, it appeared that there was a fluid collection in the left frontal epidural space concerning for either blood or an infection. (**Figure 1**) We obtained a complete blood count, coagulation studies, basic chemistries, blood cultures, c-reactive protein (CRP), and an erythrocyte sedimentation rate (ESR). Notably, the patient had a white count of 12.3 with left shift, the CRP was 143, and ESR was 36. He underwent an MRI of the brain which showed an erosion of the posterior table of the left frontal bone with associated air and a 2.1 x 0.7 x 2.7 cm fluid collection. (**Figure 2**) The findings were strongly suggestive of frontal sinusitis complicated by an adjacent subperiosteal abscess of the posterior table of the frontal bone and epidural abscess overlying the left frontal lobe. This finding was consistent with a Pott's puffy tumor complicated by an epidural abscess.

DR. THOMAS GERMANO: Can you discuss the cause of Pott's Puffy Tumor?

DR. YE: Pott's puffy tumor is a rare clinical entity characterized by a subperiosteal abscess and associated frontal bone osteomyelitis. It was first described in 1768 as a complication of head injury by Sir Percival Pott. (9) Seven years later Pott reported it as a complication of sinusitis and it is now known to be much more commonly associated with untreated frontal sinusitis in pediatric patients. (10) There have been other case reports of this clinical entity as a complication of insect bites, malignancy, and even mastoiditis. (11, 12) Pott's puffy tumor is most commonly described in the adolescent and preadolescent age group and is extremely rare in children under the age of six. It is also uncommon in adults.

The pathophysiology of this condition relates in part to the anatomy of the frontal sinus. The frontal sinus develops as an extension of the ethmoidal air cells after the sixth year of life and do not fully develop until late adolescence. As sinusitis is the most common precursor to the development of Pott's puffy tumor, the condition is thought to arise through several mechanisms including retrograde spread of the sinusitis from the diploic veins that drain the sinus as well as direct extension through various anatomical pathways. (12) Bacteria erode through the posterior table of the frontal bone, resulting in intracranial extension and subsequent complications including meningitis, epidural, and subdural abscess. (13) The subperiosteal abscess that is universally present in this condition results in swelling of the forehead giving the condition its "puffy" nature. The low oxygen environment of the sinus predispose to anaerobic organisms, such as *fusobacterium* and *bacteroides* species, but infections involving *streptococci, hemophilus influenza*, *staphylococcus*, and *pseudomonas* have also been reported. (10)

DR. WILLIAM BINDER: What are the clinical symptoms associated with this disorder and how is it usually diagnosed?

Figure 1. CT of the brain without contrast demonstrates air and fluid collection in the left frontal epidural space

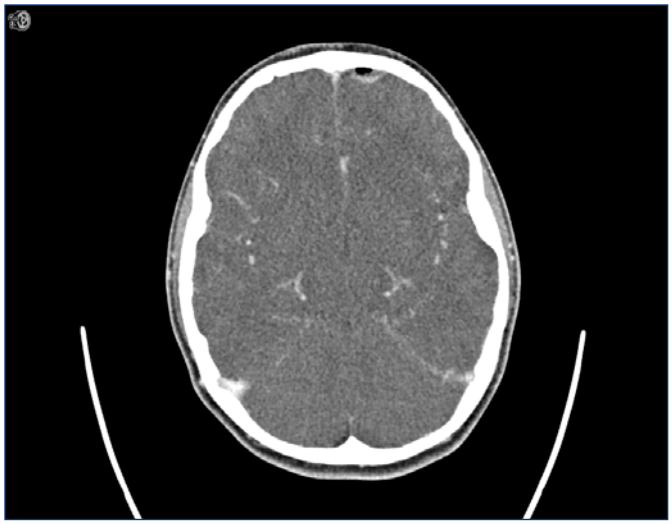
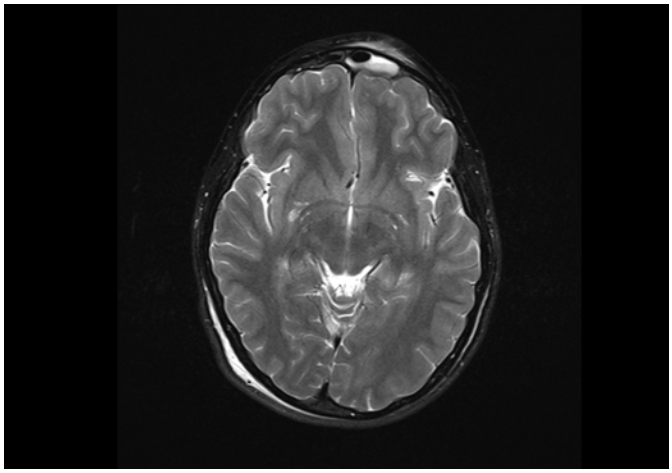


Figure 2. T2 axial image with a 2.1 x 0.7 x 2.7 cm fluid collection in the left frontal sinus, which demonstrates contrast enhancement and restricted diffusion.



DR. YE: The diagnosis of this condition requires a high degree of clinical suspicion. The classic presentation is a child who presents to the ED with a soft, fluctuant swelling of the forehead of several days duration associated with nasal congestion, low-grade fever, and rhinorrhea. They may have had some minor trauma to the head or URI symptoms of subacute duration prior to the onset of presentation. The presence of headache, vomiting, seizure, or focal neurological deficits suggests intracranial complications. Physical exam will often show periorbital swelling or localized swelling and fluctuance of the forehead with a well-delineated mass and tenderness of the frontal sinus. Nasal speculum exam may reveal rhinorrhea with inflamed turbinates. Laboratory testing will generally result in elevated white count and inflammatory markers. Blood cultures should be drawn. A CT scan of the brain should be ordered to visualize opacification of the frontal sinus and defects in the frontal bone.

It is often possible to see intracranial expansion. A MRI of the brain with contrast will help to further characterize the lesion and allows for preoperative planning.

The treatment of this condition involves broad-spectrum IV antibiotics in addition to surgical management for evacuation of associated abscess and possible removal of the osteomyelitic bone. (14) This condition is a surgical emergency and to this end, neurosurgery and ENT should be consulted for further surgical management. Often, the procedures can be done via a minimally invasive endoscopic sinus approach. (14) Antibiotics should be continued postoperatively for 6-8 weeks. Complications are treated on an individualized basis. Such complications include meningitis, epidural/subdural abscess, cavernous sinus thrombosis, and orbital cellulitis. (10) The morbidity and mortality is high if it is untreated with but prompt recognition and management, the outcome is usually favorable and sequelae is minimal.

DR. OTIS WARREN: What was the clinical course of this patient?

DR. YE: Neurosurgery and ENT were subsequently consulted. The patient was given ceftriaxone, vancomycin, and metronidazole. He was taken to the OR the same day for endoscopic left frontal sinus exploration, ethmoidectomy, and left maxillary antrostomy. He underwent burr hole drainage with irrigation of suction of the epidural space. He was found to have purulent secretions in the ethmoid air cells and associated inflammation with granulation tissues, some of which was removed.

Postoperatively, the patient was admitted to the PICU. The purulent sample grew *streptococcus intermedius* sensitive to ceftriaxone, and a PICC line was placed for long-term antibiotics, which were continued for an additional 4 weeks. He recovered uneventfully and has had no residual neurological deficits.

FINAL DIAGNOSIS: Pott's puffy tumor complicated by subperiosteal abscess and an epidural abscess due to *streptococcus intermedius.*

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Perinatal Mental Distress in Rhode Island: Data to Guide Decision-Making

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Rhode Island stakeholders in maternal health consistently identify mental health as a priority area. It is probable that the hormonal and biochemical changes associated with pregnancy and delivery contribute to perinatal mental and emotional difficulties. However, modifiable social factors are also strongly associated with perinatal mental distress.[1] We analyzed data on stressors and adverse circumstances from the Centers for Disease Control and Prevention (CDC)'s Pregnancy Risk Assessment and Monitoring System (PRAMS) to help stakeholders identify opportunities for interventions to reduce the scale of perinatal mental distress in the state.

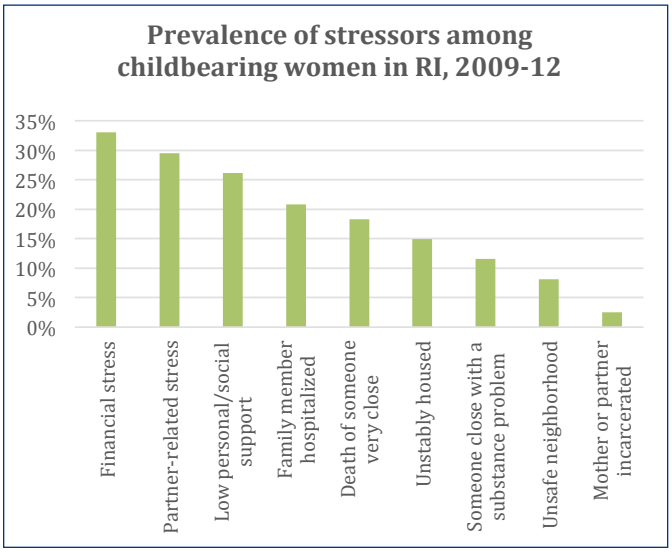
Most discussion of perinatal mental health focuses on postpartum depression, but this captures only part of the range of perinatal mental distress,[2] missing other conditions like anxiety and stress.[3] Likewise, estimates based solely on clinical diagnoses rather than symptomology more broadly may underestimate the scale of the problem.[3,4] Previous studies have provided inconsistent results about the demographic distribution of mental distress, and there have been varied approaches to analyzing the role of stressors or adverse circumstances, e.g. clustering into categories or providing counts.[2,4-9] However, simply counting stressors provides little guidance to stakeholders trying to understand what exactly should be addressed for maximal public health impact. We analyzed the potential population impact of targeting specific stressors, with the goal of providing calculations to stakeholders trying to select among multiple social factors to address. Since women generally have more provider contact during the perinatal period than any other time in their lives,[10] these contacts are also an important opportunity to address mental distress well beyond the perinatal period, especially in light of the ACA's expansion of the range of care for both childbearing women and mental health in general.

METHODS

To increase the sample of RI's small annual population of childbearing women, we aggregated 2009–2012 RI PRAMS data (n=5039). The PRAMS survey is sent to a random sample of women who have delivered live infants in the past 2-6 months; the full methodology is available at http://www.cdc.gov/prams. We created several outcome variables to evaluate mental distress. Distress during the pregnancy was identified if a respondent said the pregnancy was "A moderately hard time/a very hard time/one of the worst times of my life" (vs. "A happy time with few problems/one of the happiest times"). Postpartum depressive symptomology was determined by responses of "Often" or "Always" to either of the following questions: "Since your new baby was born, how often have you felt down, depressed, or helpless?" and "Since your new baby was born, how often have you had little interest or little pleasure in doing things?" (prior to 2012, the questions were "…felt down, depressed, or sad" and "…felt hopeless"). An overall variable captured any mental distress if women had either of the above or a diagnosis of depression during the pregnancy.

Although several of the stressors and adversities identified in PRAMS (**Figure 1a**) were prevalent among child-bearing women, we removed most of them from the final analysis on the basis of preliminary results indicating minimal potential population impact, leaving three in the final analysis (partner-related stress, financial stress, and close relationship with someone with a substance problem; analysis results for the full set of stressors are available from the authors). We used Alhuwalia et al.'s category of partner-related stresses (argued with partner more than usual, partner did not want pregnancy, or divorced or separated in the year before birth)[9] and added to it physical violence by partner

Figure 1a. Prevalence of stressors among childbearing women in RI (Source: 2009-12 PRAMS)



before or during the pregnancy. We included financial stress as defined by Alhuwalia et al. as mother or partner losing a job, or having trouble paying bills. Alhuwalia et al. include two additional categories of trauma and emotional stressors, but given the diversity, low prevalence or weak associations with the outcomes of interest among the stressors in these two categories, we included only relationship with someone with a substance problem ("someone very close to me had a problem with drinking or drugs") as this was identified as an area of interest to stakeholders.

Covariates included maternal age (categorized as <20; 20-29; and >=30); education (classified as less than a high school degree; graduated high school; and any education beyond high school); and race/ethnicity (grouped as Hispanic/Latina; non-Hispanic black; non-Hispanic white; and, due to small numbers of all other responses, "all others"). Social support, which has been previously identified as a possible mediator between stressors and mental distress, was defined as low if respondents could not count on any one of 5 types of informal help (**Figure 1b**). Bivariate and multivariate analyses for prevalence, crude and adjusted risk difference, population attributable risk, and adjusted odds ratios were conducted in SAS 9.4 using survey weights and strata information provided by the CDC to account for complex sampling methodology. Population attributable risk is a means of identifying potential impact rather than the strength of an association alone, as is typically displayed in adjusted odds ratios.

Figure 1b. Components of social support among childbearing women in RI (Source: 2009–12 PRAMS)

Since you delivered your new baby, would you have the kinds of help listed below if you needed them?

a. Someone to loan me $50

b. Someone to help me if I were sick and needed to be in bed

c. Someone to talk with about my problems

d. Someone to help me if I were tired and feeling frustrated with my new baby

e. Someone to take me and my baby to the doctor's office if I had no other way of getting there

RESULTS

Among women who had recently delivered an infant, 21.1% had a troubled pregnancy and 13% showed symptoms of postpartum depression (**Table 1**). The demographic distributions were roughly similar across categories, though we note that 29.8% of women who exhibited postpartum depressive symptomology were Hispanic/Latina, compared to 20.7% of women with no mental distress and 18.9% of women with troubled pregnancies. Women with each type of mental distress were significantly more likely to report each of the stressors we examined: nearly half (47.1%) of women with any form of mental distress reported partner-related stress compared with 20.9% of women exhibiting no distress; similarly, 46.5% of women with mental distress reported financial stress, versus 26.2% of women without distress.

Table 2 provides crude and adjusted risk differences (RD) and population attributable risk (PAR). Mental distress by all measures was highly prevalent (46.6-52.4%) among women with each of the stressors investigated, though prevalence fell to 21.0-24.4% for postpartum depressive symptomology. The RD shows how much higher this prevalence was than among women without the stressor. When we adjusted for all the other stressors in turn, partner-related stress had the highest ARD (27.8%, compared to the next

Table 1. Demographics of perinatal mental distress in RI, 2009–2012

	No mental distress	Poor mental state during pregnancy	Postpartum symptoms	Any form of mental distress
	67.1% (n=3109)	21.1% (n=1111)	13.0% (n=704)	32.9% (n=1698)
Mother's age	**Weighted % (95% CI)**			
<20	7.4 (6.3-8.6)	8.4 (6.2-10.6)	10.6 (7.6-13.7)	9.1 (7.3-10.9)
20-29	47.2 (45.2-49.3)	47.4 (43.8-51.1)	53.2 (48.5-57.8)	49.2 (46.3-52.2)
30+	45.3 (43.3-47.3)	44.1 (40.6-47.7)	36.2 (31.8-40.6)	41.7 (38.9-44.6)
Mother's race/ethnicity				
Hispanic/Latina	20.7 (19.1-22.3)	18.9 (16.0-21.7)	29.8 (25.5-34.2)	23.3 (20.8-25.8)
Black, non-Hispanic	5.6 (4.7-6.6)	7.3 (5.3-9.2)	8.8 (6.1-11.4)	7.7 (6.1-9.3)
White, non-Hispanic	64.8 (62.9-66.6)	65.2 (61.7-68.6)	53.1 (48.4-57.8)	60.1 (57.2-62.9)
All others	9.0 (7.8-10.1)	8.7 (6.7-10.8)	8.3 (5.8-10.8)	8.9 (7.2-10.6)
Mother's education				
<12 years	11.9 (10.5-13.4)	12.3 (9.7-14.9)	16.1 (12.5-19.8)	15.1 (12.9-17.4)
12 years	24.7 (22.8-26.6)	29.0 (25.4-32.5)	34.3 (29.6-39.1)	31.1 (28.2-34.0)
>12 years	63.4 (61.3-65.4)	58.7 (55.0-62.5)	49.5 (44.7-54.4)	53.7 (50.7-56.8)
Partner-related stress	20.9 (19.2-22.6)	51.2 (47.6-54.9)	51.1 (46.5-55.8)	47.1 (44.2-50.1)
Financial stress	26.2 (24.3-28.0)	48.0 (44.4-51.7)	53.3 (48.6-58.0)	46.5 (43.5-49.4)
Someone close with a substance problem	8.5 (7.4-9.7)	18.3 (15.5-21.2)	22.1 (18.2-26.1)	18.4 (16.1-20.7)
Low personal/social support	22.4 (20.7-24.2)	32.1 (28.7-35.5)	40.6 (36.1-45.2)	33.6 (30.8-36.4)

Source: 2009–12 RI PRAMS.

highest ARD of 21.0% for a close relationship with someone with a substance problem). That is, once we accounted for coexisting stressors, 27.8% of perinatal mental distress is independently associated with partner-related stress. Maternal demographics and the availability of a medical provider 24/7 were tested and did not significantly alter these results. The PAR was also highest for partner-related stress at 25.0%, versus 20.3% for financial stress and 7.5% for substance problem in someone close. Without being able to attribute causality, if the outcomes were the same for women experiencing partner-related stress as women without that exposure, rates of perinatal mental distress in RI would be 25.9% lower. The comparable reduction would be 7.5% in the case of proximity to a substance problem.

Finally, **Table 3** shows the unequal distribution of stressors. Black and Hispanic/Latina women had higher adjusted odds of partner-related stress, financial stress, and low social support compared to white women, but considerably lower odds of close relationships with someone with a substance problem (0.40 and 0.36 respectively) compared to white women. Contrary to our expectations, level of social support did not significantly mediate the association between stressors and outcomes, and had a relatively low PAR (19.9% for postpartum depressive symptomology and 10.2% for overall mental distress).

Table 2. Prevalence, risk difference, adjusted risk difference, and population attributable fractions

		Partner-related stress	Economic stress	Someone close with substance problem	Low social support
Hard time during pregnancy	Prevalence of outcome	36.6%	30.7%	32.9%	25.4%
	Risk difference	22.1%	14.4%	13.6%	6.0%
	Adjusted risk difference	18.9%	8.5%	5.5%	1.7%
	Population attributable risk	**30.9%**	**22.5%**	**7.6%**	**7.6%**
Postpartum depressive symptoms	Prevalence of outcome	22.5%	21.0%	24.1%	20.4%
	Risk difference	13.6%	12.0%	12.7%	10.0%
	Adjusted risk difference	9.2%	7.3%	7.8%	6.9%
	Population attributable risk	**30.9%**	**30.5%**	**11.7%**	**19.9%**
Any mental distress	Prevalence of outcome	52.4%	46.6%	51.3%	42.4%
	Risk difference	27.8%	20.3%	21.0%	12.8%
	Adjusted risk difference	21.9%	11.8%	11.0%	6.9%
	Population attributable risk	**25.0%**	**20.3%**	**7.5%**	**10.2%**

Source: 2009-12 RI PRAMS.

Table 3. Adjusted odds ratios of stressors/adverse circumstances

	Partner-related stress	Economic stress	Someone close with substance problem	Low social support
Age				
<20	**2.08 (1.49-2.91)**	**0.60 (0.42-0.86)**	1.08 (0.65-1.81)	1.30 (0.91-1.86)
20-29	**1.21 (1.02-1.43)**	**1.37 (1.17-1.62)**	**1.49 (1.17-1.90)**	1.19 (0.99-1.43)
30+	1	1	1	1
Education				
< high school	1.13 (0.84-1.51)	**1.93 (1.47-2.54)**	**1.65 (1.09-2.52)**	**2.05 (1.55-2.71)**
High school graduate	**1.44 (1.18-1.75)**	**2.08 (1.72-2.51)**	**1.70 (1.29-2.23)**	**1.65 (1.34-2.04)**
Beyond high school	1	1	1	1
Race/ethnicity				
Hispanic/Latina	**1.25 (1.01-1.56)**	**1.30 (1.06-1.61)**	**0.36 (0.25-0.51)**	**3.23 (2.61-4.00)**
Black	**2.61 (1.92-3.57)**	**1.40 (1.01-1.94)**	**0.40 (0.23-0.70)**	**3.61 (2.63-5.00)**
White	1	1	1	1

Source: 2009–12 RI PRAMS. Boldface indicates statistical significance

DISCUSSION

Unsurprisingly, stressors before the birth of a child are strongly associated with perinatal maternal mental distress. Additionally, the demographic patterns of stressors themselves suggest they play a role in perinatal mental health disparities.

While adverse circumstances like partner-related stress are traditionally considered personal problems, they can and should also be viewed as modifiable social determinants of health: an epidemic of substance abuse that crosses demographic boundaries, a sociocultural environment that may conduce to partner conflict, and a lack of economic policies to help young parents who are struggling financially. Our analysis suggests a first course of action addressing partner-related stress to reduce the burden of perinatal mental health in RI. Even after accounting for other stressors that might be assumed to underlie it, especially financial stress and relationships involving substance problems, multiple data points consistently show that reducing the risk associated with partner-related stress could have a substantial impact on perinatal mental health. Addressing partner-related stress at first appears beyond the capacity of medical and public health stakeholders, but they can look to other models of interventions addressing both social determinants and interpersonal behavioral change. Potential actions include:

1) Building on existing Department of Education and Department of Health programs that focus on young men and address not only sexual health but interpersonal relations; such programs may help young fathers-to-be and new fathers

work with their partners to decrease partner-related stress.

2) Increasing systems that link healthcare providers who screen patients for adverse conditions to public health or legal advocates (e.g. the Medical-Legal Partnership) that can provide patients with needed non-clinical resources. Stone's analysis of PRAMS data for Massachusetts – which has demographics roughly similar to RI's – found that fewer than half of women with postpartum depressive symptoms who experienced adversity sought help for their depression[4] suggesting that providers may have an important role in destigmatizing and enabling help-seeking behaviors. We caution against attempting to rely on pharmacological solutions rather than addressing the root issues at work, especially in light of mixed evidence regarding antidepressants and adverse birth outcomes.

3) Facilitating collaboration between medical and public health stakeholders to take advantage of increased mandates under the ACA. For instance, section 2952 is specific to postpartum depression – only one component of perinatal mental distress – but its allowed activities, such as delivery of in-home support services, are broad enough to establish the groundwork for broader interventions.

4) Advocating that the state create an entity with responsibility and oversight for the large number of Rhode Islanders with mental health needs currently not under the umbrella of the Department of Health or the Department of Behavioral Healthcare, Developmental Disabilities and Hospitals (BHDDH).

The fact that level of social support did not significantly mediate the association between stressors and outcomes reinforces the argument that public policy and services are necessary to reduce the burden of perinatal mental distress, rather than expecting personal resources to meet the needs of new mothers.

Maternal mental distress is in itself a serious public health concern, even aside from a large body of literature showing the association between poor maternal mental health and adverse outcomes for infants and young children. Rhode Island can become a leader in the field by establishing systems to address the social determinants contributing to the scale of the problem, rather than treating them as individual-level problems alone.

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A Logic Model for Understanding and Reducing Preventable Hospitalizations

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ABSTRACT

Identifying and understanding the root causes of preventable hospitalization (PH) is important for improving health outcomes and reducing unnecessary healthcare costs. Thus far, however, the desire to address this issue has been impeded by a general lack of research on factors associated with PH. To begin to address this gap, we propose an evidence-based logic model of individual, environmental, and systemic factors related to PH. We aim to use this logic model to design public health interventions to reduce PH in the State of Rhode Island and to stimulate an industry-wide discussion of the problem and its possible solutions.

INTRODUCTION

Preventable hospitalization (PH) burdens the healthcare system. In 2008, nearly ten percent of all U.S. hospitalizations (over four million in total) were deemed to have been preventable, or to have been replaceable with lower cost preventative health management options such as primary care services (1). PH costs in the U.S. exceed $31 billion (2) annually. PH may be indicative of inadequate preventative care infrastructure, and may also be a forerunner of poor population health outcomes (3-8).

PH may have many determinants, including the root causes of disparities in patients' societal, behavioral, mental, and cultural wellbeing (9). These root causes are not only complex in themselves, but also interact in complex ways. For example, social discrimination and environmental inequality may contribute *directly* to poor health, but they also may contribute *indirectly* to poor health by undermining community infrastructure (10). Evidence suggests that a focus on social determinants is needed in order to improve population health (11). Rhode Island is a case in point. According to the 2013 annual report of *America's Health Rankings*, Rhode Island has a high rate of PH among 65-99 year-old Medicare enrollees without HMO coverage, and therefore, might be expected to have a correspondingly low primary care supply (12). However, estimates show that Rhode Island has a *high* primary care supply, defined as the number of general practitioners, family practitioners, and OB-GYN, pediatrics, and internal medicine physicians per 100,000 population (12). This discrepancy illustrates the need to assess and to address *multiple* factors in hopes of reducing PH.

We assert that PH is the result of many (and inter-related) demographic, social, and behavioral factors, which together influence public health outcomes in complex ways. We recognize this complexity by proposing a "logic model" for PH which incorporates factors well beyond physical illness and its management in the healthcare system.

Logic Models

"A logic model describes the sequence of events for bringing about change by synthesizing the main program elements into a picture of how the program is supposed to work. Often, this model is displayed in a flow chart, map, or table to portray the sequence of steps leading to program results. One of the virtues of a logic model is its ability to summarize the program's overall mechanism of change by linking processes (e.g., laboratory diagnosis of disease) to eventual effects (e.g., reduced tuberculosis incidence). The logic model can also display the infrastructure needed to support program operations. […] Creating a logic model allows stakeholders to clarify the program's strategies; therefore, the logic model improves and focuses program direction. It also reveals assumptions concerning conditions for program effectiveness and provides a frame of reference for one or more evaluations of the program." (25)

THE LOGIC MODEL

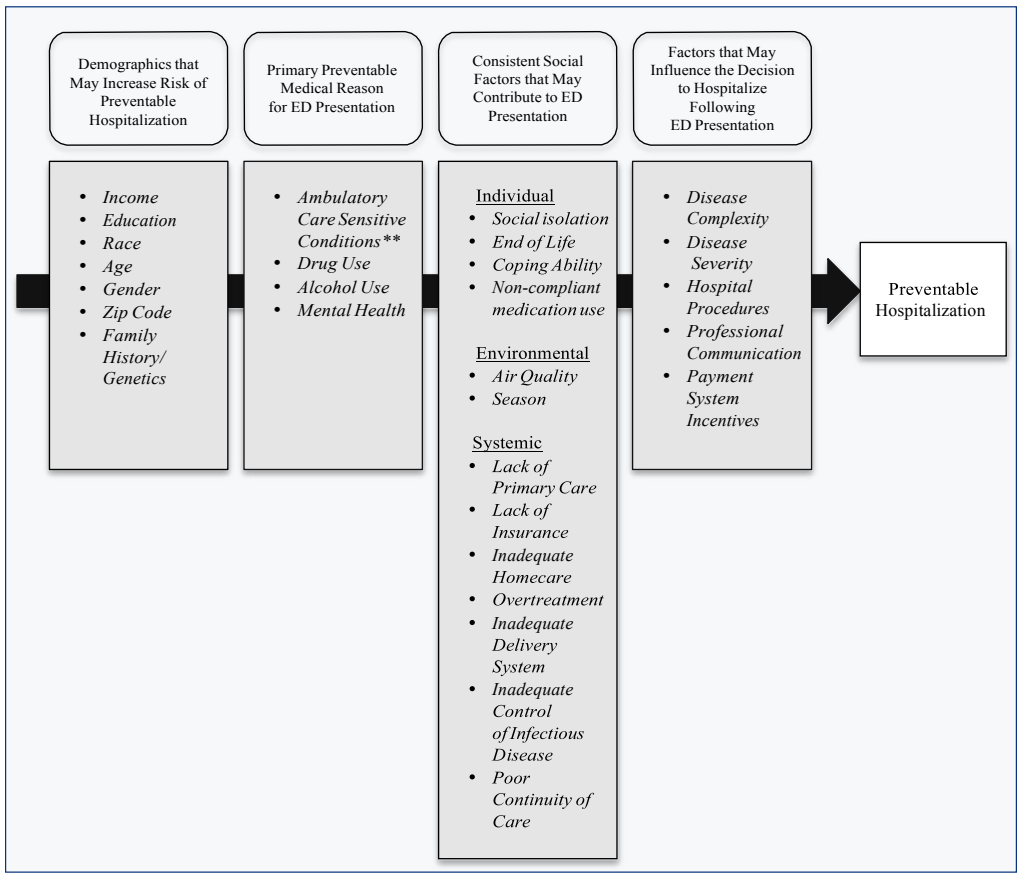
In response to the high rate of PH in Rhode Island, a committee at the Rhode Island Department of Health brainstormed to build a list of factors putatively associated with PH (along with ways to address them). Factors thus identified included medical diagnosis, mental illness, end of life complications, healthcare payment models, admission/discharge policies, individual propensity for behavioral change, and training models for emergency responders.

Upon searching the literature, we found many studies that explored the relation between PH and *demographic factors*, and a few that explored the relation between PH and more difficult-to-measure variables, such as *individual, environmental, and systemic factors* (3, 13-17). To develop a useful logic model, the various factors were articulated, differentiated, and organized (in part, to reflect their progressive nature). The model shown in **Figure 1** resulted, incorporating four groupings of PH determinants in relation to one another.

The first grouping includes the demographic, socioeconomic, and genetic elements that predispose individuals or specific populations to developing ambulatory care-sensitive conditions. Evidence of health disparities in communities of low socioeconomic status (S.E.S.) is well documented (4, 18). Likewise, wealth, race, age, gender, and S.E.S. have been shown to affect rates of PH (2, 3, 16, 19-21). For example, higher rates of PH occur in communities of lower average income (3, 4, 19, 21), and it has been suggested that persistently high rates of PH in these areas may be the product of underlying access barriers and environmental concerns (16), in conformity with our logic model.

The second grouping lists those clinical conditions which are frequently associated with PH. These include "ambulatory sensitive conditions," such as angina, asthma, chronic obstructive pulmonary disease, diabetes, grand mal status and other epileptic convulsions, heart failure and pulmonary edema, and hypertension, as well as certain mental health conditions and problems such as drug and alcohol abuse.

Figure 1. Preventable Hospitalization Logic Model



** Ambulatory Care Sensitive Conditions include: angina, asthma, chronic obstructive pulmonary disease [COPD], diabetes, grand mal status and other epileptic convulsions, heart failure and pulmonary edema, and hypertension (1)

The third grouping lists the individual, behavioral, environmental, and systemic factors that have a tendency to channel patients to hospitals rather than primary care, or to other non-hospital alternatives such as home-based hospice care. One of these factors, unsurprisingly, is "lack of [health] insurance." By lack, we mean "no health insurance," certainly, but also "inadequate" health insurance. For example, consider Medicaid recipients, who are hospitalized more often for preventable conditions than those who are privately insured (16, 22). Because Medicaid reimbursement rates tend to be less than the reimbursement rates of many private health insurers, Medicaid patients, compared to privately insured patients, may find it more difficult to secure high-quality primary care (23). Nonetheless, the logic model we propose would also suggest that Medicaid status, a "third-tier" indicator in the logic model, may be closely associated with first-tier and second-tier indicators, and thus may be associated with higher rates of PH because of related socio-demographic and clinical factors.

The fourth grouping includes those hospital-level factors which influence the decision to admit, following a visit to an Emergency Department (ED). The latter, of course, may also be a preventable event, and should be (and frequently is, in the literature) considered an independent-but-related event, *vis-à-vis* PH. In short, a preventable ED visit does not necessarily translate into a PH. One study, for example, revealed a high rate of variability in admission from the ED for illnesses which do not require hospitalization, especially for those illnesses with unclear clinical guidelines, such as mood disorders and non-specific chest pain (24). Thus, our logic model suggests four distinct levels at which we might intervene to reduce the rate of PH.

In sum, we propose a logic model that utilizes evidence-based correlations to guide public health-focused thinking on how to reduce rates of PH. The model provides a basis for the strategic deployment of public health interventions at multiple points, based on the literature. As well, because that literature is strong at some "levels" of the logic model and not others, the model itself provides a basis for the strategic deployment of future research efforts.

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Rhode Island Monthly Vital Statistics Report
Provisional Occurrence Data from the Division of Vital Records

VITAL EVENTS	REPORTING PERIOD		
	JUNE 2015	12 MONTHS ENDING WITH JUNE 2015	
	Number	Number	Rates
Live Births	1016	11,431	10.8*
Deaths	794	10,276	9.7*
Infant Deaths	9	67	5.9#
Neonatal Deaths	8	55	4.8#
Marriages	816	6,704	6.4*
Divorces	243	2,966	2.8*
Induced Terminations	242	2,773	242.6#
Spontaneous Fetal Deaths	52	633	55.4#
Under 20 weeks gestation	46	579	56.3#
20+ weeks gestation	6	54	4.7#

* Rates per 1,000 estimated population
# Rates per 1,000 live births

Underlying Cause of Death Category	REPORTING PERIOD			
	DECEMBER 2014	12 MONTHS ENDING WITH DECEMBER 2014		
	Number (a)	Number (a)	Rates (b)	YPLL (c)
Diseases of the Heart	237	2,356	223.7	3,474.5
Malignant Neoplasms	193	2,257	214.3	5,849.5
Cerebrovascular Disease	45	399	37.9	445.0
Injuries (Accident/Suicide/Homicide)	86	783	74.3	11,691.0
COPD	48	518	49.2	590.0

(a) Cause of death statistics were derived from the underlying cause of death reported by physicians on death certificates.
(b) Rates per 100,000 estimated population of 1,055,173 (www.census.gov)
(c) Years of Potential Life Lost (YPLL).

NOTE: Totals represent vital events, which occurred in Rhode Island for the reporting periods listed above.
Monthly provisional totals should be analyzed with caution because the numbers may be small and subject to seasonal variation.

RIMS and Coverys announce new partnership

In October 2014, the Medical Society entered into a new strategic partnership with Coverys, the 40 year-old medical liability insurance giant headquartered in Boston.

Coverys and RIMS have pledged to combine and coordinate their complementary strengths for the purpose of enhancing patient safety. The two organizations share the conviction that safety is fundamental to promoting and maintaining the kind of professional liability environment that everyone wants for Rhode Island: one that is stable and responsive to the needs of the medical profession and the public. RIMS and Coverys are uniquely positioned to support each other in this endeavor.

Key elements of the new collaboration will be peer review, risk management and continuing education. RIMS' peer review prowess is well established, particularly in the highly sensitive and all-important area of physician health. In addition, RIMS is recognized by the American Council for Continuing Medical Education (ACCME) as the agency responsible for accrediting the CME programs of all the hospitals within the state of Rhode Island. RIMS has been a consistent star nationally in earning an unbroken string of long-term recognitions from ACCME.

For its part, Coverys is one of a tiny number of medical professional insurers that have devoted the necessary and substantial resources to gaining and maintaining full accreditation by the ACCME as a source of Category 1 CME credits for physicians. RIMS regards this extraordinary commitment to CME as particularly meaningful and praiseworthy in an insurance company. Of course, medical peer review and continuing medical education, each in its own way, provide targeted risk management and serve to enhance quality and safety.

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for Better Outcomes℠

RIMS has also agreed to advise Coverys and to offer the company additional eyes and ears focused on the evolving insurance market, the medical practice environment and the medical liability climate, as each of these is affected by legislative, regulatory, judicial, economic, demographic and political developments in the Ocean State. In recognition of their strong relationship and mutual support, RIMS and Coverys will also engage in joint marketing.

Coverys is the sixth largest medical liability insurer in the nation. It protects more than 32,000 physicians, dentists and other health professionals nationally, as well as over 500 hospitals, health centers and clinics. It is rated A ("excellent") by A.M. Best. It writes over $400 million in premium, has net assets of $3.5 billion, and maintained a policyholder surplus of $1.5 billion as of the end of last year. Member companies include Medical Professional Mutual Insurance Company ("ProMutual") and the ProSelect Insurance Company.

Coverys is the dominant insurer of physicians and surgeons in Rhode Island. The Rhode Island Medical Society Insurance Brokerage Corporation (RIMS-IBC) is proud to have been appointed as an agent for Coverys three years ago. The RIMS-IBC is a full-service agency that specializes in medical professional liability.

RIMS-IBC

Robert A. Anderson, Jr, Director of the IBC, can be reached at 401-272-1050.

Working for You: RIMS advocacy activities

November 2, Monday

Meeting with Senior Medical Directors, Blue Cross Blue Shield of RI; Russell Settipane, MD; Sarah Fessler, MD; and Staff

Meeting with Director, Department of Health; Russell Settipane, MD; Sarah Fessler, MD; and Staff

November 3, Tuesday

RIMS Physician Health Committee; Herbert Rakatansky, MD, Chair

November 4, Wednesday

Governor's Overdose Prevention & Intervention Task Force: Josiah Rich, MD, Chair

Legislative Commission on Board of Medical Licensure and Discipline

Governor's Working Group for Healthcare Innovation

RIMS Membership Committee Meeting; Elaine Jones, MD; Diane Siedlecki, MD; Co-chairs

November 5, Thursday

Meeting with American Heart Association, RI Chapter

RI Foundation Community Conversation regarding health care

November 6, Friday

AMA Policy Finder Beta Test

November 10, Tuesday

Governor's Working Group for Healthcare Innovation Subcommittee on health care spending target

Department of Human Services Medicaid Waiver for STOP (Sobering Treatment Opportunities Program; Otis Warren, MD, testifying)

November 11, Wednesday

Veterans Day

November 12, Thursday

Providence Journal Bulletin event, "The Publick Occurrences," Pablo Rodriguez, MD, Panelist

November 13, Friday–November 17, Tuesday

AMA Interim Meeting, Atlanta, Georgia; Peter Hollmann, MD; Alyn Adrain, MD; Barry Wall, MD; and Staff attending

November 18, Wednesday

Primary Care Physician Advisory Committee-Department of Health

Board of Medical Licensure and Discipline

Health Care Planning and Affordability Advisory Committee

Meeting with Secretary Elizabeth Roberts, Executive Office of Health and Human Services

November 19, Thursday

Administrative Simplification Task Force

Senator Satchell Fundraiser

November 20, Friday

Alpert Medical School Students Seminar on Civic Involvement

November 23, Monday

State Innovation Model (SIM) Measurement Harmonization Subgroup; Peter Hollmann, MD

Recovery Works Committee Meeting

November 25, Wednesday

Administrative Simplification Task Force

RIMS gratefully acknowledges the practices who participate in our discounted Group Membership Program

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RI ENT

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UEMF
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A program of The Miriam Hospital
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For more information about group rates, please contact Megan Turcotte, RIMS Director of Member Services

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The Rhode Island Medical Society delivers valuable member benefits that help physicians, residents, medical students, physican-assistants, and retired practitioners every single day. As a member, you can take an active role in shaping a better health care future.

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RHODE ISLAND MEDICAL SOCIETY

Care New England, Southcoast Health agree to explore affiliation

Partnership would create one of New England's largest not-for-profit, community-based health care systems

PROVIDENCE – After conducting an extensive request for proposals process, the Providence Rhode Island-based Care New England Health System (CNE) has chosen Southcoast Health System, Inc. (SHS), a four-hospital health care system located in southeastern Massachusetts, as a potential strategic partner. The two organizations have signed a Letter of Intent (LOI) to engage in exclusive discussions and to work toward the goal of forming a new not-for-profit parent organization that would oversee both systems.

The announcement came November 16 from **DENNIS D. KEEFE**, president and CEO of Care New England, and **KEITH A. HOVAN**, president and CEO of Southcoast.

If the two health systems come together, the new organization would become one of New England's largest not-for-profit health care systems dedicated to the advancement of population health, the delivery of community-based care and a commitment to academic medicine. It would encompass eight hospitals, an expansive network of ambulatory sites, two established Accountable Care Organizations, more than 1,700 aligned physicians and providers, a continuation of the academic relationship Care New England currently enjoys and the educational relationship Southcoast currently enjoys with The Warren Alpert Medical School of Brown University, and the responsible stewardship of charitable assets.

The announcement follows a comprehensive and deliberative process undertaken by the Care New England Board of Directors to assess the need for a strategic partner and enlist proposals from a number of organizations. During that process, the Care New England Board and senior leaders evaluated potential partners against defined criteria and considerations which included clinical program quality, population health management, physician enterprise, academic focus, governance and corporate infrastructure, capital commitment, community benefit, and mission alignment. That confidential process concluded favorably after the Board voted unanimously to select Southcoast Health for exclusive negotiations.

"In most every respect," commented **GEORGE W. SHUSTER**, chairman of the CNE Board, "Southcoast represents the best possible choice in enabling us to move forward strengthening quality, transitioning to population health, improving the value proposition, finding the right structural and cultural fit for both organizations, and maintaining our valued relationships with key academic, provider and organizational partners. We believe this partnership will truly be a win for our community."

"We are pleased that Care New England has selected Southcoast Health as their preferred choice to enter into exclusive negotiations," said **JEAN MACCORMACK**, chair of the Southcoast Board. "This partnership will further enable our health systems to continue providing our patients with the high quality care they have come to expect and deserve. Care New England is a highly respected health system that shares our values, vision, and culture, and our dedication to patients, their families and care providers. It is a trusted organization with a wide array of advanced services and innovative programs. This partnership reaffirms Southcoast's commitment to our not-for-profit mission of promoting the optimal health and well-being of individuals in the communities we serve."

The execution of the LOI, which was also unanimously approved in separate action by the Southcoast Board, now paves the way for the two organizations to conduct due diligence and work toward the development of a definitive agreement. The hope is, following this phase, the organizations would agree to partnership terms and move forward with the needed approvals, including state and federal regulatory processes.

"We believe the complementary services of Southcoast and the geographic span of their service area will enable us to advance the high quality, high value continuum of care we have been building," said Keefe. "We already see the common ties to community and an unwavering commitment to mission and values both our organizations share, and we look forward to further study of the partnership potentials that could come to fruition in a new vision for health care delivery for our region."

"Southcoast has long been focused on providing the very best care within our region of Southeastern Massachusetts and Rhode Island, finding ways to remain highly competitive, cost effective, and at the forefront of technological and strategic change," said Hovan. "We believe that Southcoast can be a strong and complementary partner for Care New England, and that together our respective organizations could form the foundation of a highly competitive, community-based and value-driven integrated health care system throughout southern New England." ❖

Miriam NIH grant to study phone-based mindfulness for HIV patients

First facility in the nation to evaluate phone-delivered MT

PROVIDENCE – The Centers for Behavioral and Preventive Medicine at The Miriam Hospital has received a $146,000 research project grant from The National Center for Complementary and Integrative Health to explore whether telephone-delivered mindfulness training (MT) can help individuals living with HIV better cope with stress, anxiety and depression; increase their adherence to antiretroviral therapy (ART); and promote healthy behaviors. The Miriam Hospital is the first facility in the nation to evaluate phone-delivered MT for people living with HIV.

A form of meditation, mindfulness is an awareness of the present and moment-to-moment activities. It is a fundamental ability of the mind, but studies have shown that it is a teachable skill and mindfulness levels increase with training.

"Mindfulness has been proven effective in lessening anxiety, depression and physical symptoms associated with many medical conditions ranging from cancer to rheumatoid arthritis and fibromyalgia," said **MICHAEL CAREY, PhD**, lead researcher and director, The Centers for Behavioral and Preventive Medicine. "However, few studies have examined mindfulness training for those with HIV."

Consisting of several phases, this research project will determine the feasibility and acceptability of phone-based MT and explore its effectiveness for improving ART adherence and promoting healthy behaviors. First, a series of focus groups will be conducted with up to 30 individuals including those living with HIV, HIV care providers and HIV advocates. They'll share their perspectives about what is needed to expand the care provided at The Samuel and Esther Chester Immunology Center at The Miriam Hospital, and help inform new immunology center health programs that are in development. The information will be used to refine related programs and research materials.

Next, a clinical trial will assess 50 immunology center patients who will be provided with one of two health improvement programs. Both programs will be designed to address the health needs of people living with HIV. One will feature mindfulness meditation and the second program will feature broader health promotion programs with specific content determined following completion of the focus groups. The study phases will include an individual baseline assessment and individual intervention conducted via phone, as well as a three-month follow up. At the time of enrollment and again over the subsequent three months, all patients will complete surveys and provide specimens to measure the effectiveness of both programs.

"Preliminary research suggests that traditional mindfulness training can help people with HIV cope more effectively with stress, but it has limitations and there is little to no information available about the possible effect of MT on ART adherence and other health behaviors," said Dr. Carey.

Other researchers in the study include **ELENA SALMOIRAGO-BLOTCHER, MD, PhD**, a research scientist at The Miriam Hospital Centers for Behavioral and Preventive Medicine and an assistant professor of medicine and assistant professor of epidemiology at the Alpert Medical School of Brown University and Brown's School of Public Health; and **AADIA RANA, MD**, an internal medicine and infectious diseases physician at The Miriam Hospital and an assistant professor of medicine at the Alpert Medical School of Brown University. ❖

Miriam recruiting for clinical trial of Parachute device to treat heart failure

PROVIDENCE –The Miriam Hospital is actively recruiting participants for a U.S. clinical trial of the Parachute device for treating heart failure. The study is focused on determining if the new minimally invasive catheter-based device can slow the progression of heart failure, reduce repeat hospitalizations and death, and significantly improve quality of life for patients who experience enlargement of the left ventricle after a heart attack. The only site in Rhode Island to take part in the study, The Miriam has already completed the Parachute implant on two local patients. The Parachute device, an experimental treatment, is the first of its kind in the U.S.

"Presently, there are very few treatment options available for patients who experience enlargement of the left chamber of the heart, which makes this clinical trial crucial," said **PAUL GORDON, MD**, director of the cardiac catheterization laboratory at The Miriam Hospital and principal investigator of the trial there. "Heart attack survivors currently suffering from heart failure may be candidates for the Parachute device research study and should discuss their condition with their physician."

The Parachute device works by separating the damaged muscle from the healthy, functional segment to decrease the overall volume of the left ventricle and restore its function.

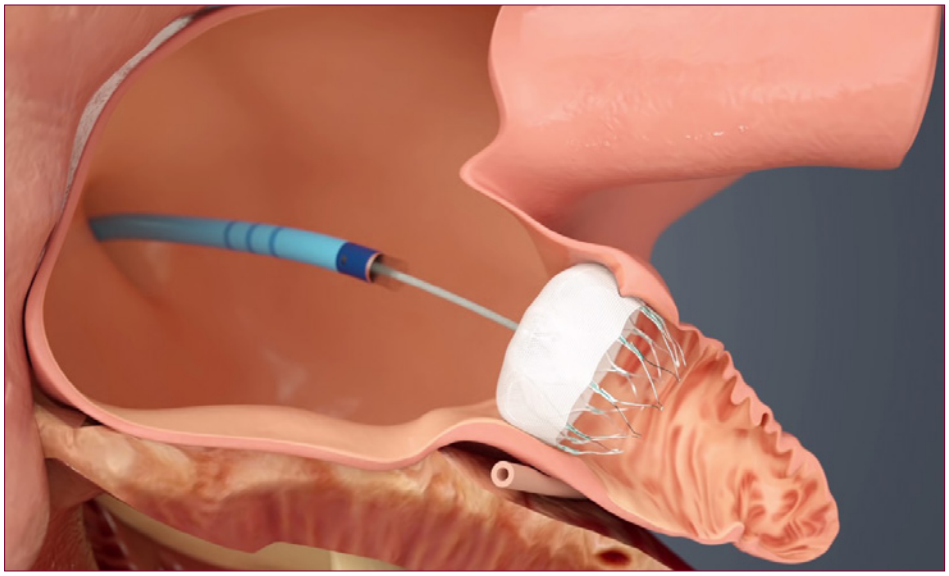
The PARACHUTE IV randomized clinical trial explores the effectiveness of the device by comparing it to medical therapy and placement of an internal cardiac defibrillator (ICD) in approximately 500 patients with ischemic heart failure at up to 65 centers. ❖

Southcoast offers implantable device as an alternative to long-term blood thinners

The Watchman Device is a new option for patients with non-valvular atrial fibrillation that has been shown to reduce patients' risk of stroke.

NEW BEDFORD, MASS. – Southcoast Health announced recently that it is just the third hospital in New England to offer a surgical implant that will allow certain atrial fibrillation patients to stop taking blood- thinning medications that are currently used to prevent stroke.

The newly approved Watchman Left Atrial Appendage Closure (LAAC) Device, from Boston Scientific, reduces the risk of stroke in atrial fibrillation (AFib) patients by preventing the heart from producing blood clots. A heart with AFib beats irregularly and as a result can produce clots, which is why doctors prescribe blood-thinning drugs such as Coumadin or Warfarin.



SOUTHCOAST HEALTH

The newly approved Watchman Left Atrial Appendage Closure (LAAC) Device, from Boston Scientific.

"Patients who undergo a procedure to implant Watchman have a much lower risk of major strokes related to bleeding and also had significantly lower mortality at long-term follow up when compared to Coumadin therapy for stroke reduction with atrial fibrillation," said Dr. Nitesh Sood, electrophysiologist at Southcoast Health.

The procedure will benefit patients with non-valvular AFib who prefer a non-drug alternative to blood thinners. They can include individuals who take part in sports or other activities that carry the risk of injury and thus excessive bleeding.

Lahey Hospital & Medical Center in Burlington, MA, and Catholic Medical Center in Manchester, NH, are the only other hospitals in New England to offer the treatment.

"The big advantage is if the procedure goes well, you have the ability of getting someone off blood thinners and reducing their risk of stroke," said **DR. ADAM SALTZMAN**, cardiologist at Southcoast Health.

Implanting the Watchman Device is a one-time, minimally-invasive procedure that usually lasts about an hour. Following the procedure, patients typically stay in the hospital for 24 hours.

The device was approved by the FDA in March, but has been available internationally since 2009. As of March, more than 10,000 patients worldwide had been implanted with the device. The approval was based on a clinical trial program that included more than 2,400 patients. The studies showed the device reduced the risk of stroke. A meta-analysis of the randomized studies found patients who received the device had reductions in hemorrhagic stroke, disabling stroke and cardiovascular death compared with the warfarin group. ❖

Aurora Pop-Vicas, MD: flu shots prevent hospitalizations in elderly

PAWTUCKET – New research authored by **AURORA POP-VICAS, MD**, an infectious disease physician at Memorial Hospital, in conjunction with a research team from Brown University's Health Policy Department, reinforces the importance of vaccinations in the elderly to prevent flu and related hospitalization.

The authors studied Medicare claims data from more than 1 million nursing home residents in the United States. Their retrospective cohort study "Estimating the Effect of Influenza Vaccination on Nursing Home Residents' Morbidity and Mortality," was published recently in the *Journal of the American Geriatrics Society*.

"Influenza causes almost 40,000 deaths each year, mostly among the elderly. Those who live in nursing homes are especially vulnerable because of the natural weakening of the immune system due to the aging process, other health issues, and living in close institutional quarters," explains Dr. Pop-Vicas.

"What we found was that even in years when the vaccine match was insufficient, influenza vaccination was an important primary prevention strategy for nursing home residents," Dr. Pop-Vicas says. "This is in contrast with recent literature suggesting that there are limited or no benefits to the elderly from influenza vaccination." ❖

New Gateway Healthcare residential program opens

Treats mental health and substance use issues in adolescents

PROVIDENCE – Gateway Healthcare launched on Wednesday, November 4, the state's only residential treatment program for adolescents struggling with both mental health and substance use issues. The new Caritas ARTS program provides cognitive behavior therapy designed to help youth learn skills to regulate and change behavior as well as prepare them to transition to the least restrictive level of care possible.

Located in Cranston, the residential program serves males and females ages 12 to 17. The average length of stay ranges from five to 15 days.

The program brings together two well-established Gateway programs. The Acute Residential Treatment Service (ARTS) has helped thousands of adolescents with mental health issues over the last 15 years, while the Caritas program has been a critical resource to patients with substance use problems for more than 40 years. The program – licensed for up to 16 patients – is staffed by a multidisciplinary team that includes a psychologist, a psychiatrist, nurses, master-level therapists and residential staff.

SELBY CONRAD, PhD, Gateway Healthcare's clinical director of adolescent co-occurring disorders treatment, said the co-occurring treatment structure makes sense because whether the adolescent enters a program for mental health issues, substance use or co-occurring disorder the care team will provide a common therapeutic approach.

"From a clinical perspective, these children and adolescents will have a very common set of needs in terms of skill development and benefit from cognitive behavioral therapy," said Conrad, a psychologist who specializes in co-occurring disorders. She added that the program includes individual, group and family therapy critical to reinforcing skill development and aiding in managing triggers for problem behaviors.

"Our ultimate goal is to build skills that help each patient transition to a lower level of care and reengage in their lives," Conrad said.

The residential program complements inpatient and partial hospitalization programs already provided by Gateway and Lifespan partner Bradley Hospital. Leclerc expects patients to be referred to Caritas ARTS from programs from across the state as well as nearby Connecticut and Massachusetts. ❖

Hasbro now offering minimally invasive pediatric urologic surgeries

PROVIDENCE – Hasbro Children's Hospital now offers the only pediatric urology program in Rhode Island performing laparoscopic and robotic surgery.

These minimally invasive services will be offered by pediatric urologist **LIZA AGUIAR, MD**, who recently joined the hospital's division of urology.

"Robotic surgery is a growing field in pediatric urology, and one that is incredibly valuable to our young patients," said Dr. Aguiar. "We are able to make precise surgical maneuvers by taking advantage of technology that increases surgical dexterity, improves magnification and utilizes three-dimensional imagery."

Hasbro Children's Hospital now offers laparoscopic and robotic surgery for several urological procedures, including:

- partial and total nephrectomy
- pyeloplasty for ureteropelvic junction obstruction (UPJ)
- vesicoureteral reflux
- duplicated systems ❖

Butler opens The Hall @ Center House to address health crisis for young adults

Day program offers variety of therapies focused on the mental illness of 18-26 year olds

Pictured left to right: Program Manager Erin Ursillo, LMHC; Medical Chief Michael Wolfe, MD; Senior Vice President Chief Medical Officer James Sullivan, MD; President and Chief Operating Officer Lawrence Price, MD; Foundation Board Member Allen H. Cicchitelli; Director of Operations Partial Hospital Sheila Russell, LICSW, and Medical Director Child and Adolescent Services Joel Solomon, MD.

PROVIDENCE – On Nov. 18, a ribbon-cutting for The Hall @ Center House celebrated the opening of the Hospital's Young Adult Partial Hospital Program. The program, located in newly renovated space, is designed specifically for people ages 18 to 26 years old.

LAWRENCE PRICE, MD, President and COO of Butler Hospital and Executive Chief of the CNE Brain and Behavioral Health Service Line, said, "We are extremely pleased to offer specialized care to a segment of the community that has unique experiences during this transitional period of life. With the support of our specially-selected multidisciplinary team, The Hall offers a place to come together for people addressing the complexities of life situations impacted by depression, anxiety, mood disorders or psychosis."

The program opened to a soft-launch in mid-October and is already seeing the benefits it's able to deliver. "Our goal is to create and provide a community of support and respect to help this group of young people better navigate this transitional time in their lives with mental illness. We are already seeing from the feedback to date that this program is filling the unmet need of creating a safe and accepting space for people in this age group," said Program Chief, **MICHAEL WOLFE, MD**.

The Hall @ Center House is designed to feel like a campus student union or dorm lounge. The space is a brightly painted hall that connects comfortably furnished shared and private rooms, including a group waiting area, a quiet room, two group therapy rooms and a series of private offices for the program manager, psychiatrists and team of therapists.

The program offers weekday, day-long treatment sessions that allow for individual, group and family therapy and medication management to support understanding and skill development to address emotional and behavioral health. People admitted to the program have problems that are hindering a healthy daily life at school, at work or with family and friends. The Hall accommodates up to 21 individuals at a time, with each person assigned a psychiatrist, an individual therapist, group therapists and occupational therapists. Open Monday through Friday from 9 a.m. to 3:30 p.m., patients are scheduled for five to eight treatment days, depending on health concerns and progress in the program. Each day consists of customized individual and group therapy sessions that draw on several types of evidence-based therapies, including Cognitive Behavioral Therapy (CBT), Dialectical Behavior Therapy (DBT), and Acceptance & Commitment Therapy (ACT). ❖

Public Health Accreditation Board accredits RI Department of Health

The Public Health Accreditation Board (PHAB) has awarded five-year national accreditation status to 17 governmental public health departments, including the Rhode Island Department of Health.

NICOLE ALEXANDER-SCOTT, MD, MPH, director of Rhode Island Department of Health, praised the rigorous assessment process required for PHAB accreditation, noting, "We have built on our strengths and put quality improvement projects in place that have made the Rhode Island Department of Health a more efficient, effective organization. The national standards of quality and performance to which we will now be held will be instrumental in our work to eliminate health disparities and promote health equity by improving health outcomes for all Rhode Islanders in every zip code throughout the state." ❖

Three orthopedic practices merge to form Ortho Rhode Island

PROVIDENCE – Three Rhode Island orthopedic practices have consolidated into a new larger orthopedic group. Blackstone Orthopedics & Sports Medicine, Foundry Orthopedics & Sports Medicine and South County Orthopedics, are now Ortho Rhode Island, which is the largest privately-run orthopedic provider in the state.

There are nearly 40 providers in the practice, led by an Executive Committee made up of six physicians. The group encompasses thirteen Rhode Island offices located in Bristol, East Greenwich, East Providence, Lincoln, Newport, North Smithfield, Pawtucket, Providence, Wakefield and Warwick, plus one Massachusetts location in Attleboro, MA. In addition, they provide immediate care for orthopedic injuries at OrthoNowRI, located in Pawtucket, RI.

Ortho Rhode Island offers a holistic approach to musculoskeletal care encompassing the entire continuum of care from diagnosis to treatment, and through rehabilitation.

"We have very similar values and are focused on our patients. We expect that our geographic coverage will create a tremendous opportunity to better serve the entire state of Rhode Island in the current healthcare environment," said **ERIC WALSH, MD**, Ortho Rhode Island Vice President and Medical Director.

Ortho Rhode Island President and CEO, **MICHAEL BRADLEY, MD**, said, "Our scale allows us to leverage clinical and business synergies to improve patient access to affordable orthopedic care, and to benefit from greater bargaining power with suppliers."

Ortho Rhode Island is not controlled by any hospital or institution; they remain a private orthopedic practice, affording them the agility to keep up with the rapidly changing healthcare environment. "Our size is our strength," said **ROBERT MARCHAND, MD**. "We are working with like-minded partners to drive innovation, improve quality and manage our costs." ❖

Bradley Center for Autism and Developmental Disabilities opens partial hospitalization program – the first of its kind in the nation

Specialized program teaches families to better manage care at home

EAST PROVIDENCE – The Center for Autism and Developmental Disabilities (CADD) at Bradley Hospital has opened a partial hospitalization program for children and adolescents ranging in age from five to 18 years who have autism or developmental disabilities with co-existing emotional or behavioral disorders. The new program, the nation's first, complements CADD's already successful inpatient services.

The primary goal of the CADD Partial Program is to help children and adolescents remain safely at home while they and their families work on clinical issues. There has been a demand for this type of program, one that bridges the gap between inpatient and outpatient or home-based care.

"The creation of this partial program completes a full continuum of care that is not matched anywhere. This new service further strengthens the CADD program – a long-standing destination treatment program and national model for the care of some of our most fragile and in-need children," said **J. ZEN MESERVY, MD**, CADD program director, who noted that CADD services also include inpatient, outpatient, in-home and residential services.

The program's interdisciplinary treatment team works to teach and support parents and primary caretakers to better understand the needs of children in the program and to better equip families to manage care at home. "We frequently see children in our CADD inpatient unit who are taken care of by this remarkable interdisciplinary team, but then parents ask us 'how do you incorporate that at home?'" explained Dr. Meservy. "This partial program takes those services and replicates and modifies them to help families with the transition period for a child between treatment levels."

The goal of the CADD Partial Prgram is to help find patients' strengths and help families maximize those strengths, as children transition from inpatient, outpatient or community-based care. Children and adolescents receive care in a safe, comfortable and nurturing environment five days a week, equivalent to a school day, and return home to their families at night.

As a family-based program, parents and primary caregivers are generally involved between four to 10 hours a week, which includes participation in family therapy and parent-child interaction sessions, staff-supported teaching sessions and daily check-ins. Parents and primary caregivers learn behavior management techniques, which they can utilize with their child upon discharge in an effort to promote and maintain an optimal level of functioning at home and school. ❖

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Recognition

Dr. Jonathan Kurtis honored by American Society of Tropical Medicine and Hygiene

Recognized for research that could aid in the development of a malaria vaccine

PROVIDENCE – **JONATHAN D. KURTIS, MD, PhD**, was awarded the Bailey K. Ashford Medal by the American Society of Tropical Medicine and Hygiene (ASTMH) for research that could aid in the development of a malaria vaccine. Dr. Kurtis, the founder and director of the Center for International Health Research at Rhode Island Hospital and a professor of pathology and laboratory medicine at the Alpert Medical School of Brown University, was presented the medal during ASTMH's annual meeting in Philadelphia.

"I congratulate Dr. Kurtis on the occasion of this tremendous honor, the awarding of the Bailey K. Ashford Medal for distinguished work in tropical medicine," said **DOUGLAS ANTHONY, MD, PhD**, pathologist-in-chief at Rhode Island Hospital. "Jake has spent his entire career working toward developing a vaccine that will protect millions of people from malaria and other tropical infections. His drive and dedication to improving global health is admirable, and we're thrilled that others in this field share our view of the impact of his work."

Most notable among Dr. Kurtis' recent work is the discovery of a protein that is essential for malaria-causing parasites to escape red blood cells. Antibodies to this protein trap the parasite in the red blood cells, rendering them incapable of causing further damage. It is hoped that this discovery could lead to the development of a vaccine that will prevent the progression of *Plasmodium falciparum* malaria, which kills one child every 15 second in sub-Saharan Africa and Southeast Asia.

The medal honors distinguished work in tropical medicine. It is named for Col. Bailey K. Ashford (1873–1934), a pioneering physician who, at age 26, recognized that hookworms caused the anemia prevalent among the rural populations of Puerto Rico. He was instrumental in founding the School of Tropical Medicine in Puerto Rico that later transformed into the school of medicine.

RHODE ISLAND HOSPITAL

(L to R) Chandy John, MD, last year's recipient of the Bailey K. Ashford Medal presenting the award to Jonathan Kurtis, MD, of Providence.

Dr. Kurtis is also an expert in schistosomiasis immunity, and he has led extensive population-based studies in the Philippines, China, Kenya, Tanzania and Brazil. His research is funded under a series of grants from the National Institutes of Health and the Gates Grand Challenges in Global Health. Chandy John, MD, director of the Ryan White Center for Pediatric Infectious Disease and Global Health at Indiana University School of Medicine, nominated Dr. Kurtis.

"Dr. Kurtis has made seminal contributions in understanding the modulation of protective immune responses by developmental and nutritional factors and the identification of vaccine candidates for *falciparum* malaria in the pediatric population," said John. "His work in these areas is recognized both nationally and internationally for its innovative approaches and overall excellence."

In addition to serving as principal investigator or co-investigator on six research projects, Dr. Kurtis is a prolific writer. His bibliography includes 75 published papers, and he has delivered more than 50 academic presentations. He serves on the editorial boards of *Infection and Immunity* and *Human Parasitic Diseases* as well as an *ad hoc* reviewer for a number of journals including *Nature Communications* and the *American Journal of Tropical Medicine and Hygiene*.

At the Alpert Medical School, Dr. Kurtis lectures on international health, parasitology, coagulation and pharmacology. The university has awarded him the Dean's Award for Excellence in Teaching 12 times.

Dr. Kurtis earned his bachelor's degree and medical degree as well as a PhD from Brown University. He is a National Research Council fellow and a recipient of a Becton-Dickinson tropical medicine research award. ❖

Recognition

Center for Bariatric Surgery at Miriam earns Optum Center of Excellence accreditation

PROVIDENCE – The Center for Bariatric Surgery has received the designation as a Center of Excellence (COE) from The Clinical Sciences Institute (CSI) of Optum, a leading information and technology-enabled health services business focused on providing health care systems resources to improve care.

"At The Center for Bariatric Surgery, we take a comprehensive approach to treating obesity," said **SIVA VITHIANANTHAN, MD**, chief of minimally invasive and bariatric surgery at The Center for Bariatric Surgery, a program of Rhode Island and The Miriam hospitals. "With our 40 years of cumulative experience, we provide care that is safe, coordinated and personalized. We are committed to working closely with each patient to achieve his or her goals."

Optum's Centers of Excellence networks are developed in conjunction with a national panel of industry experts and practitioners. Centers of Excellence evaluation criteria includes positive patient outcomes and cost effectiveness.

Bariatric surgery is a safe and effective option for treating obesity. The Center for Bariatric Surgery (http://www.miriamhospital.org/centers-and-services/center-for-bariatric-surgery.html) performed 1000 bariatric surgeries from June, 2012 through August, 2015, and provides a full range of multidisciplinary services, including:

- Coordinated preoperative and long-term nutritional and behavioral modification programs.
- A full complement of bariatric surgeries, including sleeve gatrectomy, Roux-en-Y gastric bypass, gastric band and revisional surgeries.
- Team of bariatric surgeons available 24/7 for care of all bariatric patients.
- State-of-the-art laparoscopic and minimally invasive technologies.
- Free, multi-disciplinary, professionally coordinated patient support groups.
- Highly trained operating room personnel and certified nursing staff. ❖

ADAM MASTOON

White Coat Ceremony 2015

Students in the Alpert Medical School Class of 2019 received their first white coats on Oct. 17 in the Ceremony of Commitment to Medicine, which marks a student's transition from classroom to clinical study. It was held at the First Unitarian Church, and was followed by a reception at the medical school. The event was sponsored by the Brown Medical Alumni Association.

Recognition

Ghada Bourjeily, MD, receives Selya biomedical research award

PROVIDENCE – Lifespan, Rhode Island's largest health system, honored pulmonary medicine expert **GHADA BOURJEILY, MD**, of Smithfield, with the 2015 Bruce M. Selya Award for Excellence in Research. Named for the Hon. Bruce M. Selya of the United States Court of Appeals for the First Circuit and a former Lifespan chairman, the annual award is presented to leading researchers across the Lifespan network for outstanding biomedical work.

Dr. Bourjeily is an attending physician in pulmonary services and obstetric medicine and director of research at the Women's Medicine Collaborative. She is board certified in internal medicine, pulmonary medicine and critical care medicine and is an associate professor of medicine at the Alpert Medical School.

Her research has focused on sleep-disordered breathing and its impact on cardiovascular and metabolic outcomes during pregnancy, with her most recent work looking at the placenta's role in sleep-disordered breathing. Her current work as principal investigator and co-investigator is funded by the National Institute for Child Health and Human Development and the National Center for Complementary and Integrative Health.

The Hon. Bruce M. Selya presents Ghada Bourjeily, MD, with the 2015 award for research excellence.

Her other honors include two American College of Chest Physicians awards for clinical research in women's health and the Young Investigator Award from the North American Society of Obstetric Medicine.

Bourjeily has authored numerous abstracts, articles and book chapters. She edited a textbook on pulmonary disorders in pregnancy and was guest editor of an issue in *Chest Medicine* on lung disease and pregnancy. She serves as a reviewer and editorial board member for numerous journals in her primary disciplines as well as for obstetric journals. She is the chairperson of the Women's Health NetWork (the College of Chest Physicians) and vice president of the North American Society of Obstetric Medicine.

Established in 1999, the award honors Lifespan's first board chairman. Judge Selya is devoted to the promotion of academic medicine. The prestigious award recognizes research excellence of Lifespan's independent investigators and enhances the visibility and critical role of research. All award recipients are named members of the Selya Research Award Committee for a three-year term. ❖

Southcoast Health named one of the nation's 50 Top Cardiovascular Hospitals by Truven Health Analytics

FALL RIVER, MASS. — Southcoast Health has been named one of the nation's 50 Top Cardiovascular Hospitals by Truven Health Analytics, an independent and objective research firm. The study, now in its 17th year, singled out 50 hospitals from across the country that achieved superior clinical outcomes in this critical area of care. Southcoast Health is the only community hospital in both Massachusetts and Rhode Island to be recognized.

"Time and time again Southcoast has distinguished itself as one of the country's elite providers of cardiac care," said **KEITH A. HOVAN**, President & CEO of Southcoast Health. "The part of this success that I am most proud about is that this top-notch care is being provided in a community hospital setting, and is available to every person in our region regardless of social or financial standing."

"These well-deserved recognitions and awards are the result of the tireless efforts of our doctors, nurses and ancillary staff," said **DR. MARGARET FERRELL**, Physician-in-Chief of Cardiovascular Services at Southcoast Health. "The skill and dedication of the individuals who make up our team are second to none, and I'm very proud to see our achievements recognized once again on a national level." ❖

Recognition

Melissa Nothnagle, MD, receives Family Medicine Education Consortium Leadership Award

PAWTUCKET – **MELISSA NOTHNAGLE, MD, MSc**, family medicine residency director, associate professor of Family Medicine, Memorial Hospital/The Warren Alpert Medical School of Brown University was awarded the Family Medicine Mid-Career Faculty Achievement Award. It is from the Family Medicine Education Consortium, a family medicine organization that serves the northeast region of the United States and supports collaborative educational and clinical initiatives in primary care, education, policy and advocacy. Dr. Nothnagle received the award at their annual conference recently.

JEFFREY BORKAN, MD, PhD, professor and chair of Family Medicine, Memorial Hospital / The Warren Alpert Medical School of Brown University, assistant dean for Primary Care – Population Health Program Planning stated in his nomination letter, "Dr. Nothnagle has made significant clinical, teaching, intellectual, and advocacy contributions to the field of Family Medicine, particularly in the areas of medical education scholarship and comprehensive reproductive health training."

Dr. Nothnagle has been on the family medicine faculty for 13 years, after completing her residency training at Memorial. ❖

Dr. Brenna L. Hughes invited to serve on immunization expert work group of ACOG

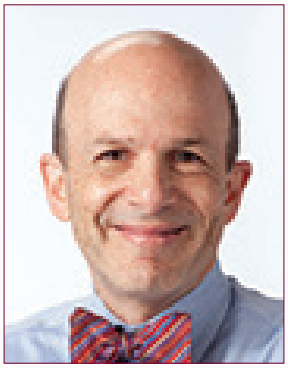
PROVIDENCE – **BRENNA L. HUGHES, MD**, of North Kingstown, chief of the Women's Infectious Diseases Consultative Service at Women & Infants Hospital and associate professor of obstetrics and gynecology at The Warren Alpert Medical School of Brown University, has accepted an invitation to become a member of the Immunization Expert Work Group of the American College of Obstetricians and Gynecologists (ACOG). The Group serves as an advisory group of ACOG's Committee on Obstetric Practice, Committee on Gynecologic Practice, and Committee on Adolescent Health Care.

The ACOG Immunization Expert Work Group was formed in 2010 following an ACOG immunization task force and the H1N1 pandemic to develop and deliver accurate immunization education and resources, and continues to demonstrate ACOG's commitment to increasing immunization rates. The Work Group is made up of immunization and infectious disease experts who regularly report on their activities and are able to relay ACOG guidelines and opinions.

Dr. Hughes and her Work Group members will be asked to develop and review documents such as committee opinions, patient and provider fact sheets, physician scripts, letters, and other patient and provider immunization materials. ❖

Dr. Gary Frishman elected to board of American Association of Gynecologic Laparoscopists

PROVIDENCE – **GARY N. FRISHMAN, MD**, associate director of the Division of Reproductive Endocrinology and Infertility and Residency Program Director at Women & Infants Hospital, and professor of obstetrics and gynecology at The Warren Alpert Medical School of Brown University, has been elected secretary/treasurer of the American Association of Gynecologic Laparoscopists (AAGL). With more than 7,700 members from 100 countries, the AAGL is the leading association in the world in promoting minimally invasive gynecologic surgery. Dr. Frishman will begin duties later this month for a one-year team. After his term as secretary/treasurer, Dr. Frishman will then ascend to vice president, and then president of the association the follow year.



Dr. Frishman currently sits on the Residency Review Committee for the Accreditation Council for Graduate Medical Education (ACGME) overseeing all obstetric and gynecologic residency training programs in the United States. He is also deputy editor for the *Journal of Minimally Invasive Gynecologic Surgery* and serves as an oral board examiner for the American Board of Obstetrics and Gynecology (ACOG). Dr. Frishman previously served on the board of directors for both the AAGL and its associated Fellowship in Minimally Invasive Gynecologic Surgery.

Dr. Frishman received his undergraduate degree from the University of Pennsylvania and attended medical school at Columbia University in New York City. Following this, he completed a residency in obstetrics and gynecology at Pennsylvania Hospital in Philadelphia and a fellowship in reproductive endocrinology and infertility at the University of Connecticut in Farmington. ❖

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Recognition

Michael J. Dacey, MD, MS, FACP, president and chief operating officer, Kent Hospital; Joseph W. Spinale, DO, FACC, FACP, sr. vice president and chief medical officer; Jim Burke, vice president, finance; Judith Laurence, manager, Hospitality Shop; and Mary Jane Sweetland, president of Kent Hospital Auxiliary.

Kent Hospital Auxiliary reaches $1M pledge

WARWICK – The Kent Hospital Auxiliary has reached its $1 million pledge made to the hospital to help support important clinical services and advancements. In January 2012 the Auxiliary pledged to raise $1 million for the Ambulatory Service Pavilion, Dialysis Unit and renovations to the 3 North patient floor. Through the Auxiliary's annual golf tournament, the Hospitality Shop revenue, and numerous fundraisers, this pledge was reached in about 3 ½ years, well under the five-year estimate. Auxiliary members presented the check during their annual luncheon.

"The hard work and dedication the Kent Hospital Auxiliary has demonstrated is truly commendable," said **MICHAEL J. DACEY, MD, MS, FACP**, president and chief operating officer, Kent Hospital. "They are tireless ambassadors for the hospital and our community. Their generosity and ongoing commitment is a testament to their hard work and leadership for the growth and betterment of Kent Hospital."

"It is an honor to give back to Kent Hospital for all that it does for the community," said Mary-Jane Sweetland, president of the Kent Hospital Auxiliary. "The Auxiliary is thrilled to be able to present this million dollar donation to ensure the constant improvement of programs and services that daily help meet needs of so many." ❖

Dr. Amy Salisbury published in *American Journal Of Psychiatry* for study findings in depression medication and pregnancy

PROVIDENCE – **AMY SALISBURY, PhD**, a research scientist at Women & Infants Hospital's Brown Center for the Study of Children at Risk and an associate professor of pediatrics and psychiatry at The Warren Alpert Medical School of Brown University, was published for her study "Effects of Maternal Depression on the Neurobehavior of Infants," in the *American Journal of Psychiatry*.

Women who were pregnant and diagnosed with depression were involved in the study. Researchers evaluated the effects of prenatal use of selective serotonin reuptake inhibitors (SSRIs) and benzodiazepines, as well as no drug treatment, on newborns. Dr. Salisbury and her team found adverse effects in infants of women taking SSRI antidepressants during pregnancy beyond the first seven to 10 days postpartum and that the use of benzodiazepines in conjunction with SSRIs was associated with more significant problems in infant neurological functioning than SSRI use alone.

"Infants in the SSRI and SSRI plus benzodiazepine groups had lower motor scores and more central nervous system stress signs across the first postnatal month as well as lower self-regulation. Infants in the depression group had low arousal through the newborn period," explained Dr. Salisbury.

"Women who need treatment should continue to receive it. The recommendations are actually to not stop taking the medications just to prevent neurobehavioral problems for the baby at birth as we did not find evidence that it prevents these signs. The one caution was in using a benzodiazepine to treat women as the effects were more pronounced and longer lasting."

However, Dr. Salisbury notes that women who need that medication combination may be at higher risk from their symptoms showing that the need for treatment may outweigh the potential problems for the baby.

Additional co-authors on the study from Women & Infants Hospital include **CYNTHIA BATTLE, PhD**, a research psychologist in the Center for Women's Behavioral Health and associate professor of psychiatry and human behavior (research) at the Alpert Medical School; **CYNTHIA LONCAR, PhD**, director of clinical services for the Women & Infants Center for Children and Families and assistant professor of pediatrics and psychiatry at the Alpert Medical School; and **BARRY LESTER, PhD**, founder and director of the Brown Center for the Study of Children at Risk. ❖

Recognition

Bradley Hospital named "Top Performer on Key Quality Measures" by Joint Commission

One of four facilities in New England to receive distinction for psychiatric services

EAST PROVIDENCE – Bradley Hospital, the nation's first psychiatric hospital focusing exclusively on children and adolescents, has earned the distinction of '*Top Performer on Key Quality Measures*' for 2014 by The Joint Commission, the leading accreditor of health organizations in the U.S.

Bradley Hospital was recognized as part of The Joint Commission's 2015 annual report *"America's Hospitals: Improving Quality and Safety,"* for attaining and sustaining excellence in accountability measure performance for inpatient psychiatric services.

Bradley Hospital, which is also a teaching hospital for the Warren Alpert Medical School of Brown University, is one of only 1,043 hospitals out of more than 3,300 eligible hospitals in the United States to achieve the 2014 *Top Performer* distinction.

"This is the third year Bradley Hospital has been recognized as a *Top Performer* in the five years since the creation of the program," said **DANIEL J. WALL**, Bradley Hospital president. "This recognition from The Joint Commission affirms our commitment to consistently provide the best quality care for each child and family we serve, and is a credit to the exemplary work of our patient care staff." Bradley Hospital was also recognized in 2012 and 2013 for its performance on accountability measure data for inpatient psychiatric services in 2011 and 2012.

The *Top Performer* program recognizes hospitals for improving performance on evidence-based interventions that increase the chances of healthy outcomes for patients with certain conditions. Along with inpatient psychiatric services, performance measures included in the recognition program include heart attack, heart failure, pneumonia, surgical care, children's asthma, stroke, venous thromboembolism, perinatal care, immunization, tobacco treatment and substance use.

To be a 2014 *Top Performer*, hospitals must meet three performance criteria based on 2014 accountability measure data, including:

- Achieve cumulative performance of 95 percent or above across all reported accountability measures
- Achieve performance of 95 percent or above on each and every reported accountability measure with at least 30 denominator cases
- Have at least one core measure set that had a composite rate of 95 percent or above, and within that measure set, achieve a performance rate of 95 percent or above on all applicable individual accountability measures. ❖

Women & Infants earns Top Performer On Key Quality Measures® from Joint Commission

PROVIDENCE – Women & Infants Hospital has been recognized as a 2014 *Top Performer on Key Quality Measures®* by The Joint Commission.

Women & Infants was recognized as part of The Joint Commission's 2015 annual report *"America's Hospitals: Improving Quality and Safety,"* for attaining and sustaining excellence in accountability measure performance for perinatal care. Women & Infants is one of only two hospitals in Rhode Island and 1,043 hospitals out of more than 3,300 eligible hospitals in the U.S. to achieve the 2014 *Top Performer* distinction.

"We are so proud of this honor and to be recognized among some of the best hospitals in our country," said **MARK R. MARCANTANO**, president and chief operating officer, Women & Infants Hospital. "This distinction as a *Top Performer* by The Joint Commission is recognition of our organization's continuous focus on improving the safety and the quality of the care that we provide to the women and newborns of our region."

The *Top Performer* program recognizes hospitals for improving performance on evidence-based interventions that increase the chances of healthy outcomes for patients with certain conditions. The performance measures included in the recognition program include heart attack, heart failure, pneumonia, surgical care, children's asthma, inpatient psychiatric services, stroke, venous thromboembolism, perinatal care, immunization, tobacco treatment, and substance abuse.

To be a 2014 *Top Performer,* hospitals had to meet three performance criteria based on 2014 accountability measure data, including:

- Achieve cumulative performance of 95 percent or above across all reported accountability measures;
- Achieve performance of 95 percent or above on each and every reported accountability measure with at least 30 denominator cases; and
- Have at least one core measure set that had a composite rate of 95 percent or above, and within that measure set, achieve a performance rate of 95 percent or above on all applicable individual accountability measures. ❖

Recognition

Newport Hospital's rehabilitation program receives 2015 Press Ganey Guardian of Excellence Award

NEWPORT – Newport Hospital has been named a 2015 Guardian of Excellence Award winner by Press Ganey Associates, Inc. for the hospital's inpatient rehabilitation patient experience. Press Ganey is a leading health care performance improvement and analytics organization. The distinction recognizes top-performing health care organizations that have consistently reached the 95th percentile or above in categories ranging from patient experience to physician engagement.

The Guardian of Excellence Award is a nationally recognized symbol of achievement in health care. The Press Ganey awards annually honor health care organizations that have consistently sustained performance in the top five percent for each reporting period for the year. This year's award is based on quarterly reports delivered between May 2014 and April 2015.

Newport Hospital recently expanded its rehabilitation services with the launch of a physiatry service line and the addition of two new physiatrists who work closely with the hospital's Vanderbilt Rehabilitation Center staff, providing medical support, enhancing services, and completing the continuum of care on both the inpatient and outpatient sides. "The nursing and therapy staff at Vanderbilt are so well trained and exude the kind of confidence that gives the necessary boost to patients who are recovering from significant impairments," said **MUSTAPHA KEMAL, MD**, medical director of Vanderbilt Rehab.

Quarterly rankings generated by Press Ganey are based on data in its Hospital Consumer Assessment of Healthcare Providers and Systems (HCAHPS) survey database and must be at the 95th percentile or above for every quarter in the time frame. ❖

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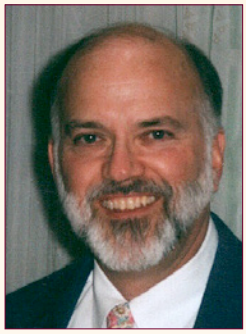
Obituaries

DAVID P. FLETCHER, MD, 64, formerly of East Greenwich, passed away November 5, at Briarcliffe Manor, eight years after being diagnosed with Alzheimer's disease. He was the devoted husband of Barbara A. Fletcher.



He was a graduate of Brown University Medical School and started his career at St. Louis Children's Hospital where he met his wife. Dr. Fletcher returned to RI and was a beloved pediatrician in Warwick for 25 years before retiring due to illness.

He was a kind and gentle soul. His patients of all ages loved him. He will be missed terribly by family and friends. Besides his wife, he is survived by his son, Joseph M. Fletcher of Nashville, TN; a brother, Harold G. Fletcher of Lebanon, IL; a sister, Barbara A. LaRose of Hope, RI.

Contributions in his memory may be made to the Alzheimer's Association, Rhode Island Chaper or Gentiva Hospice. ❖

DR. STEVEN A. PELIGIAN, 58, of North Kingstown, passed away November 16, 2015, as a result of injuries sustained in an automobile accident.

A Providence native and beloved friend to many, "Dr. Steve" was a physician in private practice and later became Medical Director of CODAC, a behavioral health care agency where he worked for 15 years. He was an Emeritus Member of the Board of Trustees for Blue Cross Blue Shield of Rhode Island.

In lieu of flowers, memorial contributions may be made to: Sts. Sahag & Mesrob Church, 70 Jefferson St., Providence, RI 02908 or Clinica Esperanza/Hope Clinic, 60 Valley St., Providence, RI 02909. ❖

JOSEPH P. PROCACCINI, MD, 67, of Johnston, passed away peacefully surrounded by family October 24, 2015 at the Philip Hulitar Hospice Inpatient Center in Providence. He was the cherished husband of Alberta F. (Ristigian) Procaccini.

Dr. Procaccini was a summa cum laude graduate of Manhattan College and a magna cum laude graduate of Creighton University School of Medicine, Omaha, NE. He completed a Family Practice residency at St. Joseph's Hospital and Medical Center in Phoenix, AZ. He started his career as a part-time emergency room physician in Washington DC, where he was also employed at the NIH.

Dr. Procaccini opened a private medical practice in Johnston RI from 1980-1993. He was a clinical instructor in Family Medicine at Brown University School of Medicine from 1984 to 1993. He then began his career at Reliant Medical Group in MA, where he worked in Adult Urgent care from 1993 to the present.

His colleagues often commented what a difference one person makes in the lives of others. They have described "Dr. Joe" as someone with a following of fans that included patients, colleagues and staff. His calm demeanor and soothing voice helped many through challenging times. His colleagues looked to him for his wisdom, intelligence and wonderful wit.

The family wishes to acknowledge their gratitude and deep appreciation to Dr. Joseph DiBenedetto, Jr. and his wife Pat. Dr. DiBenedetto was a friend for more than 30 years. As Joseph's physician, he gave him the greatest gift of many quality years beyond what was one would expect, given his rare diagnosis. Joseph was the most loving husband, father, son, brother, uncle, friend and colleague. He believed his purpose in life was to be of service to those who were ill and needed help. He will be missed by all.

Besides his wife, he is survived by his loving son Joseph M. Procaccini of Johnston. Joseph was the brother of Martha Nardacci (husband Nick) and Charles Procaccini (wife Robyn). He was brother-in-law to Albert Ristigian Jr., Renee Gasparri (husband Chris), Karen Laflamme (husband Claude) and Judith Ristigian. He also leaves behind many adored nieces and nephews.

If you wish to make a donation in memory of Joseph P. Procaccini, please make it to the Tomorrow Fund. ❖

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1996: RIMS adopts neutral stance on physician-assisted suicide

MARY KORR
RIMJ MANAGING EDITOR

In 1996, the Rhode Island Medical Society (RIMS) passed a resolution on physician-assisted suicide, which called for RIMS to:

a) adopt a neutral position with regard to physician-assisted suicide

b) and reaffirm its opposition to legislation that would attach criminal penalties to acts or omissions that occur in the exercise of medical judgment within the doctor-patients relationship, including such acts or omissions as may be associated with physician-assisted suicide, pain management or palliative care for the terminally ill.

A second resolution by **DR. DAVID P. CARTER** was passed, which called for the AMA and its Council on Ethical and Judicial Affairs to revisit the issue and report on its recommendations at their meeting in 1996.

The general press covered the June 24, 1996 AMA annual meeting in Chicago.

According to the Associated Press report of the meeting:

"Delegates from Rhode Island have submitted a resolution asking the House and the AMA's Council on Ethical and Judicial Affairs to revisit the [physician-assisted suicide] issue.

"The resolution alludes to two federal appeals court decisions that have favored allowing physician-assisted suicide.

"The resolution also cites 'strong evidence that a majority of physicians and a large majority of the general public support the freedom of competent, terminally ill adults to request and receive physician assistance in ending their lives.' "

RIMS

Dr. David P. Carter in 1994, when he served as president of RIMS.

Dr. Carter is quoted in the AP and other news reports of the day:

"What business is it of organized medicine to require the continuation of agony when the result is imminent and inevitable?" said Dr. David P. Carter, a family doctor from Pawtucket, R.I., during an hour-long debate on the first day of the AMA's annual meeting. "Is this care giving, when healing is impossible? Is there no room for patient choice if death is the only therapeutic alternative? Is this cruel and paternalistic?"

A second resolution was submitted by retired Illinois radiologist Ulrich F. Danckers, which asked the AMA to be neutral on the issue until public opinion, courts and state legislatures have decided which way to go.

The two doctors were in the minority.

According to a *Washington Post* report several days later, the AMA's 430-member House of Delegates, in a virtually unanimous vote rejected the two resolutions "which would have compromised the AMA's strong stance against physician-assisted suicide." ❖

Two doctors ask AMA to reconsider its opposition to physician-assisted suicide

Chicago (AP) Two doctors urged the American Medical Association on Sunday to reconsider its long-standing opposition to physician-assisted suicide as the practice gains favor and captures the attention of the courts.

"What business is it of organized medicine to require the continuation of agony when the result is imminent and inevitable?" said Dr. David P. Carter, a family doctor from Pawtucket, R.I., during an hourlong debate on the first day of the AMA's annual meeting.

"Is this care giving, when healing is impossible? Is there no room for patient choice if death is the only therapeutic alternative? Is this cruel and paternalistic?"

The meeting of the nation's largest organization of doctors brings together more than 400 delegates representing 296,000 physicians nationwide.

The policy decided here is not legally binding, but guides the AMA when it comes time to use its considerable lobbying power and financial resources.

The 430 doctors in the AMA House of Delegates will vote on the physician-assisted suicide issue Tuesday.

Delegates from Rhode Island have submitted a resolution asking the House and the AMA's Council on Ethical and Judicial Affairs to revisit the issue.

The resolution alludes to two federal appeals court decisions that have favored allowing physician-assisted suicide.

The resolution also cites "strong evidence that a majority of physicians and a large majority of the general public support the freedom of competent, terminally ill adults to request and receive physician assistance in ending their lives."

A second resolution, submitted by retired Illinois radiologist Ulrich F. Danckers, asks the AMA to be neutral on the issue until public opinion, courts and state legislatures have decided which way to go.

"I may have heard the question a hundred times: 'Why doctor, am I not allowed to die? Why will you not help me?'" Danckers said.

"Do I tell the patient, 'Please respect my pledge to be a healer, not a killer?' Do I say, 'My medical society does not want me to help you die?'"

Danckers said the patient's answer to that is, "'Damn your medical society with its doctor-knows-best attitudes and that tries to substitute its own moral judgment for that of my own. The physician is the expert on how to treat disease. He is not the expert on the meaning of death.'"

AP Report of AMA annual meeting in Chicago on June 24, 1996, which quotes Dr. Carter.