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UPDATE IN ORTHOPEDICS

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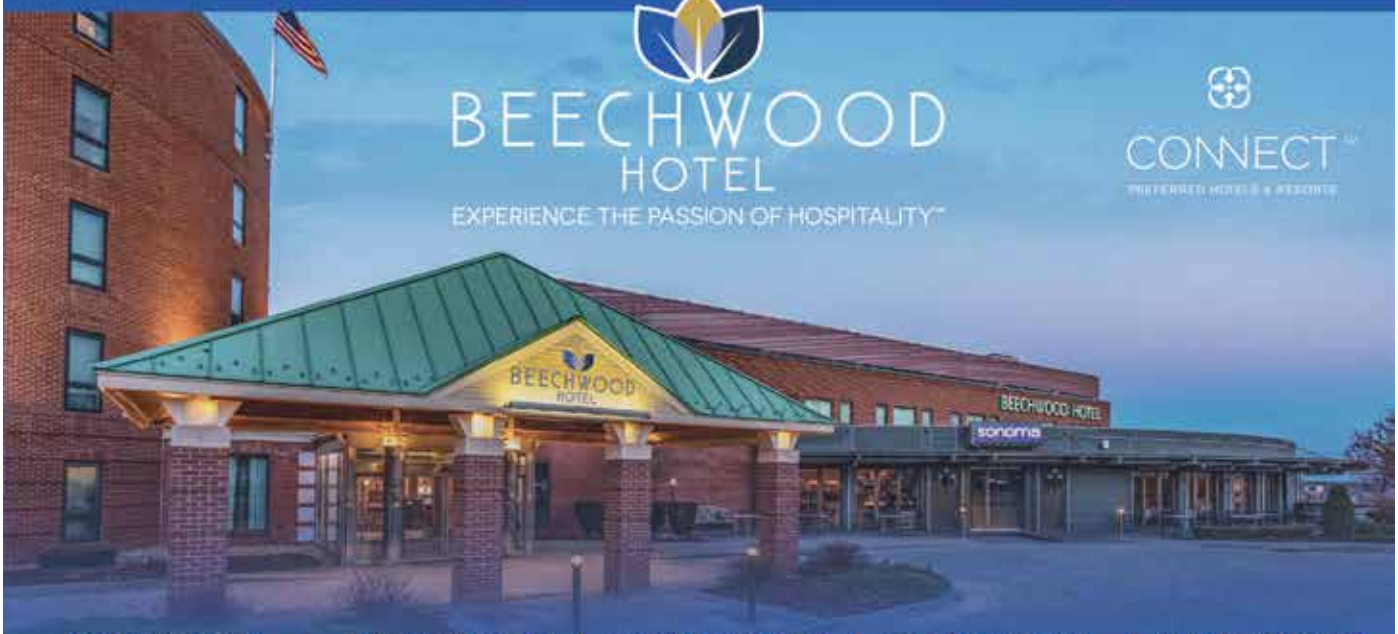

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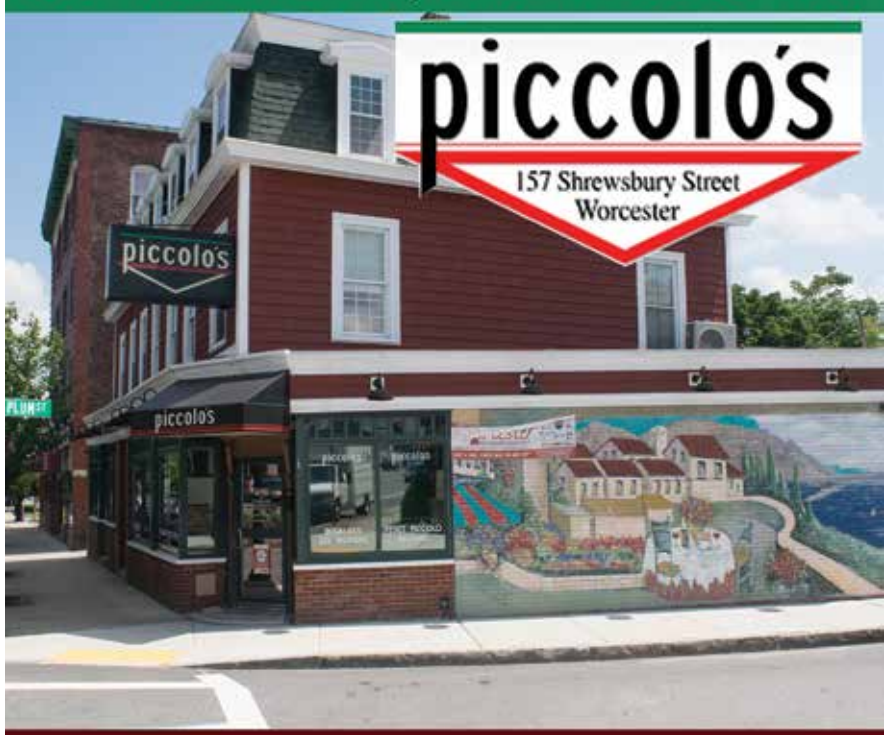

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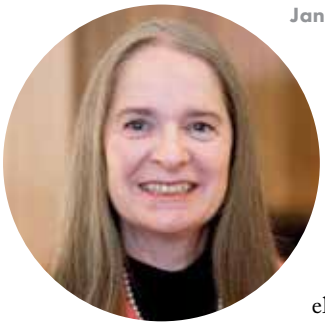

Jane Lochrie, MD

Orthopedic surgery, like most medical and surgical specialties, has undergone tremendous technological growth over the past few decades. Total joint replacement (TJR) is one of the most commonly performed, elective surgical procedures in the United States, and the volume of primary and revision TJR procedures has risen continuously in recent decades. Total hip (THR) and total knee replacement (TKR) are clinically and cost-effective procedures for end stage arthritis, which causes patients ongoing pain, limited function and diminished life quality. In 2014, there were 370,770 total hip replacements and 680,150 total knee replacements in the Unites States.

It wasn't that long ago that a total knee or hip replacement would require weeks in the hospital and a painful recovery, often with complications. Today, with evidence-based better surgical techniques, new anesthesia and pain management options, patients often return home on the same day.

In the first article, Dr. Balcom states that many orthopedic procedures performed today are done using a minimalist approach while the patient is awake. This decreases the rate of complications, supports a faster recovery and is a patient satisfier. In addition, he explains advances using more biologics and restorative techniques such as replacing lost cartilage with bone cartilages plugs. The third advancement that he discusses is the use of robotic surgery especially in spine surgery and joint replacement.

Drs. Kanzaria and Jubouri introduce us to new imaging modalities that have no radiation risk such as MRI and ultrasound. MRI remains the mainstay to evaluate soft tissue abnormalities and can accurately identify infiltrating bone disease. Ultrasound, is emerging as an alternative to image ligaments, tendons and cartilage at a lower cost and no radiation risk. With patients receiving surgery with metallic hardware, metallic artifact reduction applications have been developed that has greatly improved the quality of MRI and CT. Recently, both SPECT and PET scans have been combined with MRI and CT allowing for accurate localization of bone metabolism and assessment of bone morphology.

Dr. Busconi describes sports medicine as a subspecialty that provides evaluation and treatment of sports-related injuries for athletes of all ages and sports levels. This is a team approach involving specialty physicians, surgeons, athletic trainers, physical therapists, coaches, athletic directors, parents and athletes.

The importance of addressing childhood obesity is the focus of Dr. Kraus's article. He describes the negative effect that obesity has on the musculoskeletal system of children. He explains three specific pathologies: Blount disease, Slipped Capital Femoral Epiphysis and fracture care that are exacerbated by obesity.

The important role of nursing for successful total joint replacement surgery is discussed by Karen Wilk, ANP-BC, ACNP-BC. Their role starts with the decision to undergo surgery and continues until complete recovery. She reviews the nurse's role in the prevention of infection, post-operative hyperglycemia, thromboembolism and pain control. She emphasizes the importance of patient education and early mobilization.

Christopher Leahy, PA reviews the role of the physician assistant as an integral member of the orthopedic team. The scope of practice has grown over the years to the management of the orthopedic patients in the Emergency Department hospital, surgical and office settings; performing joint and tendon aspirations and injections, incision and drainage procedures, reductions of fracture and joint dislocations, applications of splints and cast and assisting in the operating room.

Kayla Daly, MA, MT-BC, LMHC, Ph.D., opines that music has been an integral part of healing throughout many world civilizations. Music therapy is implemented by a board-certified music therapist and may include active or passive interventions such as therapeutic song writing, clinical improvisation, music listening and recreation (use of precomposed songs within a clinical context). Studies have shown that music therapy improves pain, emotional status and nausea symptoms.

In this issue, we are introducing two new feature articles. One piece is from the medical students highlighting the Greater Worcester Free Medical Consortium, a newly formed entity that unites the five free medical programs in the Greater Worcester area and the second one is a restaurant review.

As always, don't close this issue of Worcester Medicine without reading, Legal Consult, As I See It and Society Snippets. Sadly, this issue also has four In Memoriams.

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Exciting Advances in Orthopedic Surgery

William Balcom, MD, MHA, CPE

With the passage of time, things certainly do change and in the world of orthopedic surgery this is especially true. Over the last decade, there has been significant emphasis on less invasive surgical techniques. Wide awake surgery, and the use of biologics have all served to expedite patient recovery and improve patient outcomes. There has also been an increased interest in using computers and robots to assist in surgery. Finally, the recent use of 3D modeling and additive manufacturing techniques have moved orthopedics into a more individualized or personalized approach to patient care.

The first area of advancement in orthopedics has been the explosion of less invasive techniques. Many orthopedic procedures performed today are done using minimalist approaches and often with patients remaining wide awake. These techniques reduce the rate of complications, support a quicker recovery, and have proven to be a real patient satisfier. In spinal surgery and joint replacement surgery these advances have been particularly remarkable. With newer anesthetic techniques, minimally invasive surgery, new pain control protocols and enhanced recovery pathways, spine fusions and joint replacements which have historically required several days in the hospital are now performed as same-day outpatient procedures. Patients are able to recover in the familiar surroundings of their home and in the company of their families. This has truly transformed the patient experience and has improved patient outcomes as well.

The second area of advancement within orthopedics has been the move toward more biologic and restorative techniques. This shift has taken us from an era of treating disease symptoms to a moment when we are attempting to instead alter the underlying disease process. In the area of cartilage repair for instance, there are several techniques that have proven highly successful by replacing areas of injured or lost joint cartilage. One technique involves replacing lost cartilage with bone cartilage plugs. A second technique involves taking a small piece of the patients' own cartilage, extracting and growing the cartilage cells in culture, and then implanting these cells within the defect. Although both of these techniques require surgery, the ability to restore cartilage in a patient is quite exciting. Even more exciting is the possibility that we may soon be able to restore some cartilage via an injection rather than through a surgical procedure. This would involve injecting stem cells into a joint. These cells can be enticed to localize toward the zone of injury and then can subsequently participate in cartilage restoration. Although this technique has promise, there remains some regulatory hurdles and treatment standards that need to be worked out prior to its wide scale adoption.

A final area of significant advancement in orthopedics has been the adoption of technology to support and improve patient care. An area of growing technological interest is using navigational systems or robotic systems in surgery. These are of particular interest in spine surgery and joint replacement surgery. These technologies allow for more accurate surgeries, which have the potential to reduce complications and to improve both the outcomes and the durability of these procedures. A more recent technological application has been the use of 3D modeling to assist in patient specific preoperative planning as well as the development of patient specific instruments. Additionally, the use of 3D printing and additive manufacturing allows for the creation of patient specific implants. These technologies support true personalization of surgical care.

Over the last decade, we have witnessed a remarkable advancement in many areas of orthopedic patient care. With improved techniques and more support of technologies we have entered an era where patients can expect less invasive interventions, faster recovery, and more individualized care. In the not so distant future, we will likely see a breakthrough in molecular biology and in genetics. With gene modulation we may be able to slow or arrest certain orthopedic diseases. With gene manipulation we may be able to prevent the development of certain orthopedic diseases altogether. I don't think my day job is at risk quite yet, but who knows what the future holds?

William Balcom, M.D. is Chair of the Departments of Orthopedic Surgery, Podiatry and Rehabilitative Medicine at Reliant Medical Group, and is the Director of Musculoskeletal Services at Saint Vincent Hospital.

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Update in Musculoskeletal "MSK" Imaging

Shams Jubouri MD, Paulomi Kanzaria MD

For more than a century, since the discovery of X-ray in 1895 by Roentgen, physicians have been able to see the inside of patients without the need for invasive open surgeries. Entering a new era of minimally invasive procedures and personalized medicine, radiology plays a vital role in delineating the correct diagnosis as a "third eye" after history and physical exam.

X-ray, whether in the form of conventional radiograph, fluoroscopy, or computed tomography "CT" will always be the mainstay in the evaluation of bones. Introduction of new modalities that have no radiation risk such as ultrasonography and magnetic resonance imaging "MRI" have further supported the practice of orthopedics. Over the years, advanced technology has succeeded in minimizing the risk of radiation not only for patients but for operators as well. Technology has improved image quality and provided easy access to view images by all providers.

In recent years, there has been considerable growth in the need for orthopedic care in the U.S. and globally. With increasing aging population, the American Academy of Orthopedic Surgeons "AAOS" estimated over half of the chronic conditions in the elderly is due to joint disease. Sport injuries are no longer confined to professional athletes. This also include other diagnoses such as tumors, inflamatory joint disease, osteoporosis, and trauma. Driven by this growth, imaging has evolved to match the need for early and precise diagnosis for better outcomes.

Conventional radiograph and fluoroscopy are the historic main imaging tools that help orthopedic surgeons in checking correct alignment during prosthetic placement or fracture fixation. 3D volume rendered CT images are an important tool for orthopedic surgeons to assess overall alignment, subtle fractures, and outline complex congenital or acquired deformities. New image guided, navigation system clinical trials are evolving for precise alignment in a variety of surgical procedures such as fracture fixation, ligament reconstruction, arthroplasty and tumor resection. Optimum alignment in orthopedic surgical procedures is the most important indicator of procedural success.

MRI remains the main imaging technique to evaluate soft tissue abnormalities, allowing physicians to view cartilage, tendons, ligaments, and bone marrow signal in detail. Developing new MRI sequences has helped tissue characterization; for example, chemical shift imaging sequence helps in differentiation between normal marrow and marrow replacement processes and accurately delineates infiltrating tumors or metastatic disease. Similarly, diffusion weighted images "DWI" can help in differentiation between pathologic and osteoporotic fractures of the spine. MRI and MRI arthrography are not only diagnostic tools but also help orthopedic surgeons predict the prognosis and surgical outcome. Whole body MRI (WB-MRI) combining anatomical and functional imaging allows for the comprehensive evaluation of bone and soft tissue involvement in oncological and rheumatologic disease.

The utility of ultrasound in Musculoskeletal Imaging is not confined to guiding procedures. Ultrasound, in the experienced hand, has emerged as an alternative imaging modality to evaluate ligaments, tendons, and cartilage with ability of real time dynamic maneuvers at a low cost and no radiation risk. Sonoelastography "SEL", is an emerging new ultrasound method in evaluating the biomechanical changes in tendons, muscles, and ligaments. Gray scale level "GSL" and quantitative back scatter analysis "QBA", are sonographic techniques used to assess the quantitative changes in muscles; this is particularly important in patients with muscular dystrophies.

An increasing population that uses prosthetics and metallic hardware renders CT and MRI images as non-diagnostic due to significant artifact associated with these prostheses. Metallic artifact reduction applications have been developed in both CT and MRI that significantly improved image quality and enabled evaluation of the regions in close vicinity to the hardware.

In addition to bone scintigraphy "BS", a sensitive and well-established tool in MSK radiology, single photon emission tomography "SPECT" and positron emission tomography "PET" as well as hybrid imaging with SPECT/CT and PET/CT allow for both accurate localization of bone metabolism and assessment of bone morphology in both oncologic and non-oncologic imaging. A promising emerging hybrid modality is PET/MRI, combining high-resolution MRI with functional information from PET, again for use in both oncologic and non-oncologic diagnosis, the latter for indications such as arthritis and neuropathic peripheral pain.

Imaging guided procedures have also evolved in the last decades, particularly in the pain management domain with targeted ultrasound or fluoroscopy-guided joint and bursa steroid or local anesthetic injections. Imaging-guided soft biopsy is an important step in management of various soft tissues and bone masses to formulate the correct management plan. This is a minimally invasive procedure that is usually performed in an outpatient setting which improves patients experience through their treatment journey. Continuous collaboration between radiologists and orthopedic surgeons have become the standard practice in management of soft tissue and bone sarcoma. Images, specifically MRI, provide a road map for the best route to choose for biopsy track to be included during surgical resection to prevent recurrence or tumor seeding.

With respect to artificial intelligence (AI) in radiology, we know there is still a lot to discover. While AI has emerged in some radiology subspecialties such as neuroimaging, breast imaging, and cardiac imaging, the role of AI for disease detection in musculoskeletal radiology will still take years of research to discover its full potential.

Since 1895, we have come a long way in musculoskeletal imaging and we are looking forward to what the future holds! As Warren Buffett once said, "someone is sitting in the shade today because someone planted a tree a long time ago".

Shams Jubouri MD, is a fourth-year radiology resident and is going for a fellowship in MSK. Paulomi Kanzaria MD is an attending radiologist with MSK subspecialty. Both Jubouri and Kanzaria work at Saint Vincent Hospital, Radiology Department

State of the Art Orthopedics

Brian Busconi, MD, Chief of Sports Medicine, Associate Professor of Orthopedics UMMS

Sports medicine is a multidisciplinary subspecialty whose focus involves the prevention, diagnosis and treatment of injuries related to sports and exercise. To ensure an optimal result it requires a team approach, which encompasses specialty physicians, surgeons, athletic trainers, physical therapists, coaches, athletic directors, parents, and athletes. All of these people working together are the foundation for our optimum result.

We try to work with our patients to create a treatment algorithm, which focuses on the patient and their goals. We always discuss non-operative as well as operative approaches to treat their current condition. In regards to the surgical aspect of orthopedic care, modern advancements have led us to taking care of more injuries with minimally invasive and arthroscopic techniques. These allow for less pain, faster recovery and better outcomes.

As sports medicine surgeons our mindset is preservation. This can be taken in two separate ways. First, we preserve the biology the body gives us. Our goal is to create an environment that is advantageous for the body to proliferate healing. Second, we preserve lifestyle. There are certain things that patients want to continue doing whether that is playing sports or picking up grandchildren, we work with our patients to give them the best quality of care possible.

Especially in sports medicine we are blessed with industry advancements, which aid in technique as well as outcomes. We have evolved with biologic injections, self-tightening suture, as well as, compression and ice therapy, just giving a few examples. This has given us a plethora of options to aid in patient care, however, it can also create more questions on what are the best options for each individual patient. This is why we are committed to working closely with our patients to answer questions, provide advice and ultimately form a plan for the path to recovery.

Hitting closer to home the University of Massachusetts Medical Center has partnered with Shields and Reliant to open "The Surgery Center", a brand-new state of the art outpatient surgical center. This has given the hospital system and physicians a new way to provide quality patient care, provide timely surgeries and improve the overall patient experience. There is state of the art equipment, which allows us to provide the latest surgical techniques and monitor all aspects of surgery leading to improved patient care and outcomes.

At the University of Massachusetts sports medicine division of orthopedics, you have access to a broad range of services to care for sports injuries. We provide evaluation and treatment of sports-related injuries for athletes of all ages, sports and levels. We focus on prevention and preservation and when it comes to the surgical aspect of care, we use the latest technologies, techniques and rehabilitation treatment to return our athletes to the field as fast and safe as possible.

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Childhood Obesity: A Growing Problem in Pediatric Orthopedic Surgery

Mark Kraus. MD

Obesity is a multifactorial disease process that has increased in its prevalence significantly over the last several decades. The negative health effects of obesity in adults, including increased overall mortality, cardiovascular disease, hypertension, type II diabetes mellitus, stroke and several forms of cancer are fairly common knowledge amongst health care providers. The problems associated with childhood obesity, specifically the musculoskeletal pathologies, should also be recognized by anyone caring for children and adolescents, as obesity is also affecting younger patients at an alarmingly high rate.

The Centers for Disease Control and Prevention defines obesity in adults as a Body Mass Index (BMI) ≥ 30. For children and adolescents, a BMI ≥ the 85th percentile for people of the same sex and age defines overweight, and a BMI ≥ the 95th percentile indicates obesity. BMI is a screening tool used to categorize individuals as underweight, healthy weight, overweight or obese. BMI is calculated from a person's weight in kilograms divided by the square of their height in meters.

The CDC reports that in 2016 almost 20% of children from ages 6 to 19 years had a diagnosis of obesity. The prevalence of obesity in children has increased significantly over the last several decades, a result of genetic, environmental and behavioral factors. Young people with obesity are at an increased risk for asthma, sleep apnea and type II diabetes. They are further at risk of remaining obese during adulthood.

Obesity in childhood is also strongly associated with several specific orthopedic diseases, including Blount disease and Slipped Capital Femoral Epiphysis (SCFE). Orthopedic trauma and fracture in children have also been affected by obesity.

Blount disease is a disorder of growth resulting in a progressive, pathologic varus deformity of the knee. It is classified based on the age of onset. Infantile Blount disease develops between two and five years of age. Adolescent Blount disease occurs after the age of 10. The primary location of pathology is in the growing proximal tibial physis (growth plate) and epiphyseal region. Abnormal growth along the medial or inner aspect of the proximal tibia leads to a progressive and often severe bow-legged deformity. Infantile disease is bilateral in approximately 50% of the children. Adolescent is more commonly unilateral.

The growth abnormality in Blount disease may be explained by the Heuter-Volkmann principle, in which longitudinal bone growth is inhibited by compressive forces and promoted by tensile forces. A bowed knee in an obese child experiences excessive compressive forces along the medial region of the proximal tibia. This inhibits normal growth in this region, resulting in a worsening, varus deformity. In a child with mild deformity who is less than three years old, brace treatment may be used. Success with brace treatment, however, is not universal. For progressive Blount disease, surgery is indicated. Guided growth can be used by tethering the lateral aspect of the growing physis. This allows relatively greater growth along the inner region of the proximal tibia, resulting in a gradual correction of the deformity. In older children and those with greater deformity, an osteotomy is used. The proximal tibia is cut and the deformity is corrected, either acutely or, with the use of an external fixator, gradually.

The association between obesity and both forms of Blount disease is very strong, and the magnitude of deformity is correlated with the magnitude of obesity. With each whole number increase in BMI the risk of developing Blount disease increases by 3%. Without correction of the bow-legged deformity, mobility decreases and pain and arthritis increase.

Adolescent Blount disease affecting the right knee (Figure 1)

It stands to reason that correction of the deformity would allow children with Blount disease to become more physically active and, thus, potentially lose weight. However, despite surgical correction of the knee malalignment and nutritional counseling, greater than 75% of children with Blount disease had an increased BMI two years after their intervention.

Another orthopedic disease strongly associated with childhood obesity is Slipped Capital Femoral Epiphysis. In this disease the proximal femoral metaphysis displaces from the epiphysis causing a varus, extension, shortened and external rotation deformity of the proximal femur. It is the most common hip disorder in adolescents. Although rarely associated with hormonal pathologies, it is most commonly seen in children with obesity; >80% of children with SCFE have a BMI > the 95th percentile.

The prevalence of SCFE is approximately 10/100,000. In populations where obesity has become more common, SCFE rates have also significantly increased. Obesity increases sheer stresses through the physis causing repetitive trauma and the eventual displacement described above. This causes hip impingement, an abnormal gait, decreased hip motion and eventual arthritis of the hip. In an unstable slip, where the child is unable to bear weight on the hip, there is an increased risk of catastrophic avascular necrosis of the femoral head. Screw fixation is used to prevent further displacement. Acute or delayed osteotomies can also be used to realign the deformity.

Screw fixation of a right SCFE. A large abdominal soft tissue shadow is noted. (Figure 2)

A BMI ≥ 95th percentile increases the risk of developing a slip of the contralateral hip. Fortunately, this risk of a contralateral slip is very significantly decreased in patients who are able to decrease their BMI out of the obese range.

The long-term outcome for patients with SCFE is concerning. Twenty years after treatment for SCFE, 72% of SCFE patients had obesity. Diabetes, hypertension and obesity rates were greater than the general population.

Fracture care is also impacted by obesity. Open reduction and internal fixation of numerous, common fractures is more commonly needed in children with obesity. Fixation implants that work very well for lighter patients, such as flexible intramedullary nails for pediatric femoral shaft fractures, work less well for those with obesity. Length of hospital stay; complications and hospital charges are all increased in pediatric trauma patients with obesity.

Poor functional status and musculoskeletal pain are increased in adolescents with obesity, with 76% reporting significant pain in areas such as the low back, feet and ankles, knees and hips. 26% had pain in all four sites. Fortunately, successful weight loss treatments, particularly those including bariatric surgery, have resulted in decreased rates of pain and improved measurements of physical function.

In conclusion, the prevalence of childhood obesity has increased. Many medical problems, including several specific orthopedic issues, are negatively influenced by obesity. Physicians and healthcare providers need to be aware of these potential problems in children with obesity. We need to appropriately treat these issues and also the underlying, associated pathology, obesity.

Mark Kraus, MD is Assistant Professor of Orthopedic Surgery at UMassMemorial Medical Center.

Advances in Total Joint Arthroplasty Surgery and the Effects on Nursing Care

Karen Wilk, ANP-BC, ACNP-BC

Over the last 30 years, advances in the management of patients undergoing either total hip or total knee arthroplasty surgery has drastically reduced the length of stay due, in part, to the institution of rapid recovery programs (7, 14, 19). Included in these programs are: intra-operative changes such as, anesthesia protocols and surgical techniques, and post-operative changes such as, pain management and early mobilization. These changes influence the care nurses provide to patients having total joint arthroplasty from the decision to undergo surgery through complete recovery.

Modifications in anesthesia and surgical techniques benefit early mobilization and decreased length of stays for patients having total joint arthroplasty. Spinal anesthesia causes less nausea and allows for day of surgery ambulation which in turn is beneficial to earlier discharge (110, 16). The surgical approach of a direct anterior approach, in contrast to a posterior approach, utilized in hip replacement surgery leads to less muscle dissection, less trauma, and less dislocation precautions resulting in prompt mobilization and expeditious discharge (1, 3).

Total joint arthroplasty is considered major surgery and as such, can have serious complications. One significant complication can be postoperative infection. Prophylactic antibiotics, given both prior to and after the surgery, are used as one preventative measure (8, 17). Postoperatively, hyperglycemia can increase the risk of infection (8, 9). As such, moderate blood sugar control during the postoperative period has proven beneficial as another precautionary measure. Nurses must be vigilant with antibiotic administration and with monitoring and treating blood sugars in this patient population, not just those with diabetes or glucose intolerance.

Venous thromboembolism is another potentially consequential complication following total joint arthroplasty surgery. In the past, low molecular weight heparin products (LMWH), such as enoxaparin, dalteparin, or fondaparinux, heparin, or warfarin were chosen as thromboembolism prophylaxis. The choice was dependent upon the patient's risk factors and surgeon preference (3). Recently, there has been a shift to use aspirin to reduce blood clot risk in certain low risk patients (4). Ease of administration has been beneficial to nursing but has required modification of patient education. The LMWH products and heparin requires nurses to teach the patients about self injection; warfarin requires nurses to teach about diet and blood monitoring; and aspirin requires discussions about the lowered risk of major post-operative bleeding and the need to take this medication with food to prevent stomach irritation.

Another potentially inherent complication of total joint arthroplasty surgery is significant blood loss. The use of tranexamic acid (TXA), an antifibrolytic, is used to offset blood loss (12). At the time of surgery, TXA is given intravenously by anesthesia or topically at the surgical site by the surgeon (13). TXA can also be given by mouth three hours prior to surgery (13). Orthopedic surgeons have a higher threshold for blood transfusions; asymptomatic patients with anemia are less likely to be transfused. With the reduction in blood transfusions and brief hospitalizations, nurses can focus their attention on other aspects of care, such as pain management, early mobilization, and patient education.

Pain management following total joint arthroplasty surgery is vital to achieve optimal outcomes and function. Poor pain management can lead to complications, such as delayed recovery, prolonged hospitalization, and poor patient satisfaction (5). As such, multimodal pain management strategies were implemented to improve quality of life without the consumption of large doses of opioids (18). Multimodal management begins prior to surgery with administration of cox-2 selective, non-steroidal, anti-inflammatory drugs (NSAIDs), neuro-modulators, as well as regional anesthetic technique. It continues in surgery with peri-articular injections of local anesthesia at the conclusion of the procedure (6, 18). Postoperatively, acetaminophen-intravenous and oral (11), NSAIDs, anticonvulsants, and opioids are employed and given around the clock rather than on an as-needed basis. Around the clock pain management provides a steady state of postoperative analgesia while decreasing patients' anxiety about having to wait for pain medication (15). Scheduled dosing of pain medications means less chaos for nurses in managing the patients' pain. Additionally, and traditionally, cryotherapy has been a mainstay and concurrent pain management strategy by providing direct analgesia and inducing vasoconstriction, leading to decreases in swelling and inflammation (5). Nurses' knowledge and consideration of the purpose of analgesic medications, the importance of cold therapy, the patients' perceptions of pain, and the patients' expectation for pain management, is critical to positive outcomes and improved patient satisfaction.

The goal of total joint arthroplasty surgery is to improve a patient's quality of life, while limiting adverse outcomes. Achievement of these can be assisted by early mobilization with discharge to home. Immediate mobilization begins the night of surgery and can help decrease the potential postoperative complications of atelectasis, pneumonia, blood clots, and constipation. Prompt mobilization is achieved through a team effort, including physical therapists, nurses, and mobility technicians. Discharge to home can decrease adverse events such as infection (7, 19). As such, nurses must be available to encourage patients to ambulate and provide the patients with support, through education and demonstration of self care, in preparation to go home. Orthopedic surgeons and their teams now view the total joint patient as not "sick" but recovering from surgery. Nurses play an important role in conveying this message.

All these advances in total joint arthroplasty surgery have led to shorter hospital stays. This means that during hospitalizations nurses have less time to prepare the patient for discharge. Patients need to learn: how to take any new medications, how to manage their pain after discharge, how to safely ambulate with assistive devices, how to perform prescribed exercises, and how to prevent dislocation after hip replacement surgery. Additionally, nurses must be knowledgeable about individual surgeon preferences about all aspects of care, including post-op exercises, pain management, dressing changes, bathing, driving, sexual relations, etc. and educate the patients accordingly. Addressing all of these topics with the patients and their families in a short hospital stay after major surgery is challenging. Every available opportunity must be utilized to provide patient education beginning before surgery with an educational class, continuing during the hospitalization with face to face instructions, and concluding post-discharge with being available to answer questions during recovery. Nurses spend more time with these patients than any other member of the health care team during their hospitalization. They are the faces and the voices of the replacement team and their involvement is essential to successful communication, teaching, recovery, and achievement of the desired outcomes from the surgery.

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"When will you become a doctor"? "I won't. I am a Physician Assistant."

Christopher Leahy, PA Orthopedics, Reliant Medical Group.

The white coat can be a bit misleading. Perhaps it's the presumption because of what patients are accustomed to seeing their physicians wear. Occasionally, I pick up on the subtle glance they give to the left side of my coat that dons my credentials. I can tell when a patient realizes they are not seeing a doctor - MD. They may pause after I introduce myself. They will ask, "So, when will you become a doctor?" I simply reply, "I won't. I'm a Physician Assistant".

When I consider the Physician Assistant (PA) profession in the spectrum of healthcare delivery (my profession just celebrated its 50th anniversary just three years ago), I understand the hesitation patients may have in entrusting their care to someone "other than a doctor." Even today, the concept of a PA is still new to most. What is a PA? What can you do? What is the difference between a doctor and a PA? Why didn't you become a doctor? All good questions! I reply - "Everything I ever wanted to accomplish in medicine, I feel as though I can, practicing as a PA." Over the past twelve years, my scope of practice has grown through evaluation and management of orthopedic patients in the ER, hospital, surgical and office settings; performing joint and tendon aspirations and injections, I&D procedures, reductions of fractures and joint dislocations, application of splints and casts, interpreting radiology studies, assisting surgeons in the OR, and managing non-operative soft-tissue and fracture injuries. Am I a doctor? No. In fact, ironically, that is exactly why I became a PA.

The PA profession began in 1965 when Eugene A. Stead, Jr., MD, then Chair of the Department of Medicine at the Duke University began a two-year curriculum to fill a gap between physicians and nurses, and expand the prior education and experience of former military corpsmen. A collaborative relationship between the PA and the physician is the foundation that the PA profession is built upon. This relationship is a team sport, and my past experiences in athletics and the military are a testament to my natural affinity to this medical model. The physician is the hub, the epicenter of the team. PAs are the first cog in the extension of that care. Through our skillset, born out of our education and refined through our clinical experiences, the PA serves as an integral member of that team – almost as an extension of the medical services and expertise routinely provided by the physician. We work together as a team, sharing insights and receiving guidance pertaining to the delivery of high-quality care, increasing access, and offering value to an already taxed healthcare system. Might I practice autonomously, seeing my own patients during my clinical day? Yes. Does this mean I practice independently? No. In fact, the most critical factor in my ability to practice medicine is the relationship I develop with my collaborating physicians and the support they provide me. This is similar to the relationship and support they received from their attending physicians during their residency training. Will the intimate need for regular and routine guidance wane as my clinical experience grows and perspective widens? Yes. Will I ever come to a point where I no longer require that guidance and support? If you consider that the practice of medicine is a life-long journey of professional reflection and education, then I certainly hope not.

In April 2016, the US Bureau of Labor Statistics identified the PA profession as the fifth fasting growing profession in the United States of America with an anticipated growth of 37% from 2016-2026. In my opinion, the most critical factor to this growth is, quite simply, the quality of care delivered by me and my fellow PA colleagues presently practicing medicine across the nation. The continued high-quality care provided by PAs will reinforce the future of my profession. As each new patient comes into contact with a PA, they leave with the confidence in the care they receive and look forward to the same quality care from another PA, whether in their primary care office or in the many medical and surgical specialties where PAs currently practice.

So, when will I become a doctor, you ask? I answer, "I won't. I am a Physician Assistant."

Christopher Leahy is a graduate of Providence College with a degree in Biology. Christopher received his Masters in Physician Assistant Studies from Springfield College. Before becoming a Physician Assistant, Chris spent four years on active duty in the United States Army, earning the rank of Captain.

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The Effect of Music Therapy and Music Medicine on Post-Operative Pain

Kayla C. Daly, MA, MT-BC, LMHC

Music has long served as an integral part of healing practices throughout many world civilizations, rooted in shamanism and serving as a cultural source of story-telling, spiritual enlightening, and creative emotive expression (Winkleman, 2012). In America, music therapy as a profession began in the physiological and psychological treatment of wounded veterans returning from World War I and II. The first established academic program in music therapy began in 1944 at Michigan State University (American Music Therapy Association, 2016). Over the last 10 years, evidence-based research on music therapy and music medicine's physiological and psychological effects has been a focal point of music therapy researchers as well as other related disciplines, (ie. nursing, neuroscience, and psychological researchers). The American Music Therapy Association (AMTA) defines music therapy as, "the clinical and evidence-based use of music interventions to accomplish individualized goals within a therapeutic relationship by a credentialed professional who has completed an approved music therapy program" (AMTA, 2016). Music medicine is defined as the use of pre-recorded music listening as the intervention implemented by medical staff (Bradt, Dileo, Magill, and Teague, 2016). Music medicine interventions are often implemented by nursing staff in order to assist patients with reducing anxiety, stress, pain management, and overall comfort before, during, and after procedures. Music therapy is solely implemented by board-certified music therapists and may include active or passive interventions such as: therapeutic songwriting, clinical improvisation, music listening and re-creation (use of precomposed songs within a clinical context). Music therapy interventions address both psychological as well as physiological outcomes.

Within the context of post-operative pain, an acute music medicine randomized controlled trial was conducted in 2017 with obese patients (n=87). Results showed that patients who were given classical music through headphones reported decreased Visual Analogue Scale scores compared to the control group (Sfakianakis, et al., 2017). Similar outcomes were confirmed within a quasi-experimental study by Schneider, who implemented a music listening intervention to post-operative adult orthopedic patients (Schneider, 2018). She reported a statistically significant reduction in pain scores after music listening interventions and that patients reported they would recommend the intervention to others in the future. While this is notable, a meta-analysis on music interventions and pain shows that music therapy has a stronger effect on reducing patient-rated pain intensity than music medicine (Lee, 2015). Additionally, in a randomized controlled trial studying the effect of music therapy on post elective orthopedic surgery (n=163), researchers found 73% of music therapy patients, as opposed to 41% of control patients, reported significantly improved pain. This study also reported significant same-day improvements in pain, emotional status (mood and anxiety) and nausea symptoms (Gallagher, et al., 2018). These research findings are impactful when applied within the context of acute care.

Some of the challenges with music therapy and music medicine research are within the study designs and the frequent inability to blind the participants to the intervention. Due to this challenge researchers are reporting a high risk of bias within their randomized controlled trials. However, with a unique and innovative treatment method such as music therapy, mixed methods research studies have enabled researchers to reveal the complex nature of the interventions while working diligently to ensure validity and reliability as much as possible. The other challenge that has presented itself is the importance of music selection and implementation. Historically, many empirical studies are missing vital information pertaining to who selected the music, which music choices were available for selection and whether or not the music was pre-recorded or live. With respect to live music interventions, detailed descriptions, decision trees, clarity of intervention implementation and protocol must be included with great rigor in order for the results to be generalized.

The vital importance of music medicine and music therapy intervention effects on pain is emergent in a time when the need for non-pharmacological interventions are required to combat the opioid epidemic. While analgesics are necessary for pain management, Lee's meta-analysis on music and pain has shown that patients required significantly fewer anesthetics, opioids, and non-opioid medications when music interventions were implemented (2015). These results are of great importance to the medical community and our fight to combat opioid addiction and dependency in the city of Worcester. Worcester hospitals have already begun to implement music therapy programs within some of their units such as the NICU, pediatric acute care, oncology, outpatient physical rehabilitation, and substance recovery units. Several studies also cited a significant increase in patient satisfaction when music therapy was implemented (Gallagher, 2018; Lee, 2015; Schneider, 2018; Sfakianakis et al., 2017). With

positive results from this empirical post-operative pain research and a movement to models of holistic patient-centered care, there is hope that music therapy interventions will soon be accessible to all eligible patients within the city of Worcester.

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Refugees and Immigrants in Worcester: Hope and Grit in an Old Industrial City

Laura Santoso

When I say I attend medical school in Worcester, I am often asked how I find the city. Compared to Boston, people often perceive Worcester as being a little grayer, a little grimier, and perhaps at first glance, a less exciting place to live. While I initially shared those impressions, I now tell people that Worcester is one of the most endearing cities I know. Spending time with Worcester's residents led me to develop the utmost appreciation and respect for the city. Simply put, the diverse people of Worcester collectively work hard to support the same American dream. Many families have called Worcester home for generations. However, for the past few decades, numerous refugee and immigrant families have also found success starting new lives in America by coming to Worcester.

My medical training was indelibly impacted by the opportunity to care for Worcester's immigrants and refugees. In fact, the most memorable experience of my family medicine clerkship happened while I was doing a refugee health assessment with a gentleman from Iraq. He had grown up in Baghdad, fled to Syria after several of his family members were kidnapped and killed, then made his way to Bahrain where he was finally processed as a refugee many years later. From a medical standpoint, he was utterly unremarkable. However, throughout the entire visit, the patient was visibly ecstatic to be there. As I stood to leave, he said to me, "Thank you so much. I am so happy to be here. I feel like I am finally home." While I could easily understand this man's relief from escaping life on the run, I was struck by how profoundly he identified with American soil on just his third day in the United States. As complicated as the American identity can be, in that moment, this refugee's hope for his life in Worcester epitomized the best of America's promise and potential.

Remarkably, more refugees that come to Massachusetts resettle in Worcester than any other city, including Boston. In 2016, over 1,700 refugees came to Massachusetts from 46 countries, most represented by people from Bhutan, Iraq, Syria, Somalia, and the Democratic Republic of the Congo.1 Recently with the Trump administration, the flow of refugees to the United States has slowed to a trickle. This stands in contrast to the swell of forcibly displaced people worldwide, estimated at 68.5 million in 2017.2 For example, since my experience with the Iraqi gentleman in Worcester in 2016, the number of refugees accepted in the United States from Iraq has dropped by 98.6%.3

Despite national conflict about immigration, Worcester has always been a city of immigrants, consistent with its significant acceptance of refugees in Massachusetts. Nearly 1 in 5 residents of Worcester are foreign-born, with largest representation from Ghana, the Dominican Republic, Vietnam, Albania, and Brazil according to the U.S. Census Bureau.

While impossible to pinpoint exactly why unassuming Worcester is a promising place to establish a life from scratch, several factors may contribute. For starters, the cost of living in Worcester is nearly half that of Boston, estimated at around $34k a year compared to $57k.4 At the same time, Worcester is the second largest city in New England, creating a critical mass that can organize pooled resources. From a healthcare perspective, Worcester has two federally funded community health centers, Family Health Center and the Edward M. Kennedy Center, which cater to underserved patients, including those unable to speak English. The Worcester Free Clinic Coalition also provides basic care to the community at low costs, especially valuable for people who have not yet established continual care. The care includes work and school physicals necessary for people to start jobs or attend classes. Several volunteer organizations also exist specifically to help refugees, such as the Worcester Refugee Assistant Project and the African Community Education Program. While relocating to a new country is never easy, Worcester perhaps provides many of the most necessary supports for displaced people to achieve a stable life.

Economically, Worcester is also rewarding for budding immigrant entrepreneurs. The streets are lined with locally owned restaurants, auto shops, and hair salons – homegrown businesses opened to support families living down the block. Immigrants even have a disproportionately positive impact growing the city's economy – a whopping 36% of Worcester business owners are foreign born, according to a 2018 Worcester Regional Research Bureau report.5 Sometimes called the immigrant advantage, those who uproot themselves from another country can be incomparably driven because they have no fallback plan if they fail. Worcester natives, many from European immigrant families, are already a hardy bunch, and mixed communities of natives and immigrants have collectively revived the city.

During my medical training in Worcester, I encountered resilient work ethic so frequently that I came to see this fortitude as part of the city's character. I met an Iraqi anesthesiologist working as a clinic language interpreter, an Albanian surgeon working as a nurse, and a Brazilian pediatrician working at…TJ Maxx. While these individuals were highly educated and overqualified, many less educated immigrants work blue-collar jobs. Within healthcare, immigrants have become vital to meet the growing need for home health aides and personal care assistants who care for our elderly population. Despite receiving low pay for challenging work, several immigrants I evaluated in the Worcester free clinics were home health aides in addition to other full time jobs because of the guaranteed employment and honorable work. I find myself repeatedly struck by the clear sacrifices many new Worcesterites are willing to make for a basic, middle class life in America. It is difficult not to appreciate your own rights and liberties when you see how overworked and underpaid others are willing to be for the same opportunities. As individuals create new lives in Worcester, their hard work guides future generations to understand the value of being American.

Although Massachusetts receives less attention surrounding immigration than our country's border states, the city of Worcester has humbly triumphed at integrating refugees and immigrants for decades. What Worcester lacks in glamour it makes up for in grit. The slow burning success of Worcester has finally begun to earn the city a new reputation, recently recognized by NPR as an "It" town. However, while Worcester's development leads to external changes, its internal character will forever inspire me.

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Legal Consult: HPID – The Confused Birth, Troubled Life and Untimely Death of a Federal Regulation

Peter J. Martin, Esq

Congress passes a law, and designates a federal agency charged with promulgating regulations to carry out Congress' intent as expressed in the legislative language. The federal agency seeks input from concerned stakeholders through notice and comment rulemaking, and issues proposed and final rules with prospective effect on the affected industry. Generally, this process works well, at least in the sense that eventually, rules are issued with which the regulated industry must comply.

Why might this process not work well, and what recourse is available when that happens? A case in point might be the health plan identifier (HPID) originally required by section 262 of the HIPAA statute passed in 1996. The HPID was intended to aid providers and third-party payers in electronically engaging in a wide variety of HIPAA transactions such as, patient eligibility determinations, claims billing and remittances of health care payments. The hope was that by instituting a national unique identifier for each "health plan," such transactions could avoid confusion due to the use of different numbers issued by different governmental or private organizations.

The course of HPID's lifetime, thus far, is as follows. After the initial passage of HIPAA, Congress in the 2010 Affordable Care Act renewed the requirement for development of the HPID based on the input of the National Committee on Vital and Health Statistics (NCVHS), which is the statutory advisory committee responsible for providing recommendations on health information policy and standards to the federal Department of Health and Human Services (HHS). A NCVHS subcommittee held public hearings during July of 2010 and, after receiving the NCVHS recommendations, HHS published a proposed rule in April of 2012. A final rule was published in September of 2012 and in October of 2012 organizations began to apply for HPIDs (some 11,000 numbers were assigned through October of 2014). As that process proceeded, payers and providers reported that the HPID policy was problematic, costly and burdensome. NCVHS held hearings in February and June of 2014 and sent HHS follow up letters in May and September of that year. Effective October 31, 2014, HHS issued a "statement of enforcement discretion," which delayed enforcement of the HPID rule. In May of 2015, HHS requested additional public input, which was overwhelmingly negative. NCVHS held a hearing in May of 2017 which "confirmed that the HPID did not satisfy a business need, did not provide other value, and its implementation would be costly and disruptive." A proposed rule to rescind the HPID requirement was issued in December of 2018, with public comments solicited through February of 2019.

If, as this writer anticipates, the HPID rule is rescinded, its lifespan will have reached over six years, though only during the first two of those years was it in practical effect. Its gestation, from initial HIPAA provision to final rule effective date, was approximately 16 years. Given the lengthy period of time and the elaborate public input process devoted to consideration of this rule prior to its promulgation, how did it prove to be so defective?

The first issue may have been that the initial HIPAA definition of "health plan" was confusing, combining as it did both health plans and health insurance issuers. This almost guaranteed that there would be confusion as to whether "health plan" means the corporate payer entities (e.g., commercial insurers, ERISA group health plans, Medicaid programs) and/or the plans and products sponsored or administered by those entities (e.g., health, dental, PPO, HMO and indemnity plans, Medicare Advantage plans, and Medicare supplemental policies). This fundamental definitional problem was pointed out in a letter from NCVHS to HHS as early as September 2010. The resulting confusion was reflected in complaints about how to understand regulatory definitions of "controlling health plan" and "sub-health plan."

Another issue may stem simply from the lengthy period of time it took to promulgate the regulation. HHS originally believed in 2012 that the problem to be solved by the HPID was presented by a large variety of public and private organizations issuing multiple and inconsistent numbers to "health plans" - company codes issued by the National Association of Insurance Commissioners, IRS employer identification numbers, and proprietary numbers assigned by health care clearinghouses. However, as was pointed out by NCVHS in 2014, the industry in the meantime "has moved to the implementation of a standardized national payer identifier based on the [NAIC] identifier. This identifier is now widely used and integrated into all provider, payer and clearinghouse systems." Continued implementation of the HPID requirement would have required the industry to map or crosswalk existing payer ID numbers to the new HPID, possibly resulting in misrouting of claims.

At the end of this lengthy process, HHS conceded late last year that, "we now better understand the significance of providers being able to identify the payer in a HIPAA transaction. . . The organization that needs to be identified in transactions is the payer, rather than the health plan." Before it came to this realization, NCVHS recommended to HHS that it "rectify in rulemaking" that HPAA covered entities not use the HPID and that the current payer ID will not be replaced with HPID. In response, HHS took the step of issuing a "statement of enforcement discretion" that gave it time to review the NCVHS's recommendations and consider any appropriate next steps.

An agency's ability to exercise its enforcement discretion has been the subject of court review under the federal Administrative Procedure Act. The leading case holds that an agency's decision not to take enforcement action is presumed immune from judicial review. That presumption can be overcome, however, if an agency has "consciously and expressly adopted a general policy that is so extreme as to amount to an abdication of its statutory responsibilities." A study published by the Congressional Research Service stated that there is very little case law defining this exception to the general rule, noting that "the dearth of case law relating to agency non-enforcement may be due to the difficulty of finding a plaintiff who has been sufficiently injured by agency inaction to obtain standing." Here, HHS's use of discretionary non-enforcement has enabled it to seek further public input and NCVHS recommendations, leading to the issuance of the recent rule proposing rescission of the HPID requirement. This pause, prior to issuing notice-and-comment rulemaking proposing a prior rule's rescission, can thus be distinguished both from a failure of a regulatory agency to meet a statutory deadline for issuing a rule, and from an agency's blank refusal to undertake its "statutory responsibilities."

Federal case law suggests that if an agency were to make a non-enforcement decision that imposed new legal obligations on the public, or violated specific statutory language specifying when enforcement action is to take place, it might be successfully challenged as acting beyond the recognized limits of its regulatory discretion. An example of how to avoid such a challenge was presented when the IRS issued a notice in 2013 announcing that it would not enforce the "employer mandate" under the Affordable Care Act during 2014, without issuing a new regulation. Because the ACA did not contain specific language as to exactly how that mandate was to be implemented, and the IRS action did not impose any new legal obligations on any parties, issuance of a guidance document announcing its enforcement policy was within the agency's recognized discretionary power. These guardrails around agency discretion may be of some comfort to those concerned about the allegedly unchecked power of "the deep state."

This sad regulatory tale highlights the extraordinary difficulty of interpreting statutory language to effectively carry out legislative intent in a complex and rapidly changing industry, such as health care. It is a tale of how imprecise or vague legislative language can open the door to an expansive exercise of an implementing agency's discretion. It is a tale of how sometimes a large number of intelligent, experienced people can consider a matter at length and get it disastrously wrong. It is not a tale that is unique or limited to the health care industry. Its lesson may be that sometimes complexity in design should be considered not a feature, but a bug.

Peter J. Martin, Esquire, is a partner in the Worcester office of Bowditch & Dewey, LLP, his practice concentrating on health care and nonprofit law.

Age-Related Macular Degeneration: Current Status and Treatment

Michael J. Bradbury, MD[1] and Peter Y. Chang, MD[2]

Age-Related Macular Degeneration (ARMD) is the leading cause of irreversible vision loss over the age of 50. It affects about 15 million men and women in the United States with about 200,000 new cases diagnosed each year. About 1.7 million U.S. citizens have the advanced form of the disease, projected to grow to 3 million by 2020. About 200 million people are affected worldwide. While it does not usually cause total blindness, ARMD is the leading cause of functional or legal blindness. Risk factors include: female gender, white race, family history, obesity, hypertension, hyperlipidemia, and smoking.

"Dry" Versus "Wet" ARMD

Broadly speaking, there are two types of ARMD – non-exudative ARMD (also known as DRY or non-neovascular), and exudative ARMD (WET or neovascular). The non-exudative form accounts for 90% of all ARMD cases and is characterized by changes in the outer retina layers leading to atrophy and loss of the photoreceptor (rods and cones) function. Exudative ARMD is defined by the invasion into the retina of abnormal choroidal vessels (called choroidal neovascularization, or CNV) that results in leakage of serous fluid or hemorrhage which can be devastating to the photoreceptors. Even though only 10% of ARMD is exudative, these cases are responsible for the greatest visual disability- and thus economic burden- among all ocular diseases in developed countries. It is important to recognize that non-exudative diseases may undergo exudative conversion at any time, hence the importance of routine eye exams and patient education so that any vision change is detected as early as possible.

Symptoms

Patients with non-exudative ARMD may complain of gradual visual acuity loss or distorted vision (metamorphopsia), whereas patients with the exudative disease can have more acute onset of such complaints. Vision loss is painless and not associated with any systemic symptoms. Color vision may also be affected.

Diagnosis

The diagnosis of ARMD is made during a comprehensive eye exam, supported by imaging studies, while ruling out other causes of macular or retinal disease such as diabetic maculopathy, retinal vascular disease, and macular hole or pucker. The characteristic exam findings for non-exudative ARMD are drusen (pale yellow deposits under the retina) and pigmentary atrophy of the outer retina layer (Figure 1). Exudative ARMD eyes exhibit subretinal fluid, hard exudate, subretinal fibrosis, and/or hemorrhage secondary to choroidal neovascularization (Figure 2).

Confirmatory studies can be done in the office and include fundus photos, fluorescein angiograph, and optical coherence tomography (OCT). Fundus photos are especially useful in monitoring non-exudative ARMD, as the increase in the number and size of drusen can be very subtle and annual photos allow for side-by-side comparison. Fluorescein angiography is a series of photographs taken with special filters after the intravenous injection of fluorescein dye, which allows imaging of the retinal vasculature and the retinal layers. This imaging can help detect leakage otherwise not apparent on a fundus exam. OCT is a detailed high-resolution laser scan of the retina, showing drusen, atrophy of retinal layers, abnormal blood vessels, edema, hemorrhage and other abnormalities otherwise nearly impossible to discern. The OCT is essentially an "optical biopsy" of the retina and the choroid (Figure 5). These studies are useful for diagnosis, patient education, follow-up, and treatment guidance.

Treatment

Treatment differs greatly between non-exudative and exudative ARMD. Currently, there is no effective treatment for non-exudative ARMD, but fortunately most cases do not lead to severe visual loss. It is managed with periodic exams, self-monitoring by patients, antioxidant vitamin supplements (AREDS vitamins, which contain zinc, copper, vitamin C, vitamin E, lutein, and zeaxanthin), and low-vision aids when appropriate. A healthy diet, control of hypertension, smoking avoidance, and wearing sunglasses are recommended. Some evidence suggests a benefit from lenses blocking blue light that is emitted from smart devices and LED light bulbs. Patients are instructed to report new symptoms suggestive of exudative conversion.

Treatment of exudative ARMD is targeted at CNV to reverse retinal edema and hemorrhage. In the past, direct destruction of CNV by thermal laser was the only method. This process rarely improved vision and was associated with disease recurrences and scar formation that led to further vision loss. Another type of treatment called photodynamic therapy (PDT) involves intravenous injection of a photoactivated chemical dye, followed by laser activation of the dye to coagulate CNV. However, this treatment tends to stabilize but not reverse vision loss.

The mainstay of current treatment is an intraocular injection of anti-VEGF (vascular endothelial growth factor), which has been in widespread use since 2005. These biologic drugs work by either inhibiting VEGF receptors or by removing VEGF from the vitreal cavity. Treatment is given initially monthly and then at extended intervals depending on the patient's response. There are three anti-VEGF drugs currently in use – bevacizumab (Avastin®), ranibizumab (Lucentis®), and aflibercept (Eylea®). Bevacizumab was developed to treat colorectal cancer, but is specially formulated by compounding pharmacies in doses safe for the eye. Ranibizumab and aflibercept were designed specifically for ophthalmic uses, including ARMD, diabetic macular edema, and retinal edema associated with retinal vein occlusion. This new class of drugs has revolutionized the management, prognosis and visual outcomes for patients with exudative ARMD. Many patients are now able to regain lost vision, and almost all are stabilized. Once the diagnosis of exudative ARMD is made, anti-VEGF therapy can be given by a retina specialist in the office setting, with minimal ocular and systemic risks. Endophthalmitis is the main ocular complication which can result in blindness, but its incidence is about 1 in 5000.

Patient Counseling

ARMD patients are instructed to monitor their own disease with an Amsler Grid at home. This should be done at least once a week to detect any changes in vision or distortion. Changes should be reported to their Ophthalmologist so that the necessary treatment can be implemented quickly. With the advent of OCT technology, patients and family can now more easily understand the disease process of ARMD and appreciate the treatment impact. Patients who require anti-VEGF injections for exudative ARMD are educated about the need for frequent injections initially (i.e. every 4 weeks), but the interval between injections typically is extended to 6, 8, 10, 12 weeks, etc. once exudation is under control. Patients are reassured that while central vision may be affected, they will not lose all vision. Family members and caretakers are advised on how to assist their vision-impaired relatives. Consultation with a low vision specialist- usually an Optometrist or Vision Therapist- may be recommended so that the patient can learn to utilize low-vision aids, including illuminated magnifiers, special spectacles, closed circuit TV magnification, reading machines, large print books, large number telephones, etc. Because peripheral vision is not affected in ARMD, mobility is usually not an issue, in contrast to patients with advanced glaucoma or retinal degeneration.

On the Horizon

Imaging technologies are fast evolving: higher-definition OCT and OCT angiography are becoming commonplace. Even optometric practices are often equipped with basic OCT machines to help diagnose AMRD during routine eye exams. Future therapies for exudative ARMD include longer acting anti-VEGF drugs, an extraocular reservoir that allows anti-VEGF to enter into the eye without the need for repeat injections (thereby decreasing the risk of endophthalmitis and other complications), gene therapy that stimulates the retina to produce endogenous anti-VEGF, and viral vector delivery of genes for photoreceptor Rhodopsin production. For non-exudative ARMD and its advanced form (geographic atrophy), anti-complement therapy and stem cell transplants to regenerate photoreceptors are being studied.

Conclusion

ARMD is common and potentially blinding, but with proper diagnosis and timely treatment, it seldom has the same grim prognosis as it did two decades ago. When a patient complains of symptoms of painless central vision loss or appearance of wavy vision, they should be promptly referred to an Ophthalmologist for a thorough evaluation.

Recommended links for further reading and multimedia:

1. American Academy of Ophthalmology (AAO): https://www.aao.org/eye-health/diseases/amd-macular-degeneration
2. American Society of Retina Specialists (ASRS): https://www.asrs.org/patients/retinal-diseases/2/agerelated-macular-degeneration

[1] *Retina Consultants of Worcester, PC, Worcester, MA, retinacenter@msn.com*

[2] *Massachusetts Eye Research and Surgery Institution (MERSI), Waltham, MA, pchang@mersi.com*

Figure 1.
Color fundus photo demonstrating the classic findings in non-exudative (dry) ARMD: drusen and pigmentary change near the fovea.

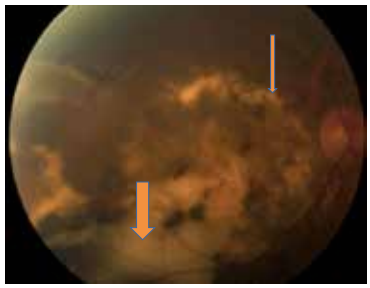

Figure 2.
Color fundus photo of the right eye, showing very advanced exudative, or wet, ARMD with hard exudates (thin arrow), subretinal fibrosis (thick arrow), and pigment clumping. The vision in this eye is finger-counting at 3 feet

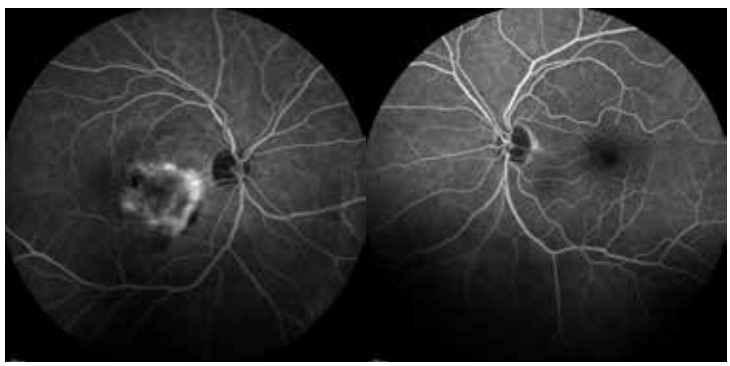

Figure 3.
(Left panel) Fluorescein angiography of the right eye demonstrating dye leakage (bright areas) and hemorrhage (dark areas) characteristic of choroidal neovascularization seen in exudative ARMD; (Right panel) Same patient's left eye with mild drusen staining in the foveal region, consistent with non-exudative ARMD.

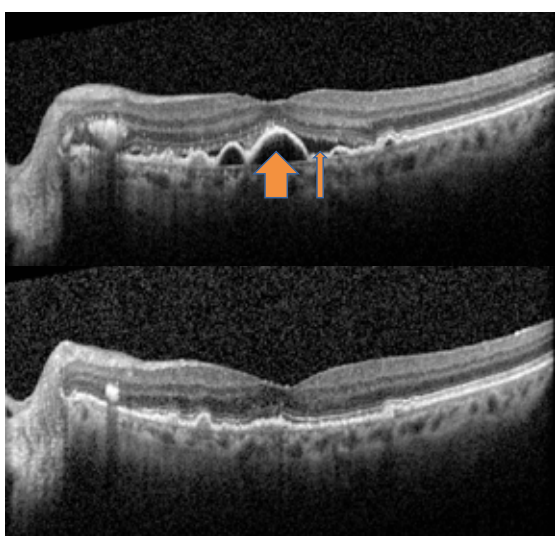

Figure 4.
(Top panel) OCT of the right eye before anti-VEGF injection, showing both subretinal fluid (thin arrow) and pigmented epithelial detachment (thick arrow); (Bottom panel) OCT of the same eye after 3 monthly anti-VEGF injections. Patient's vision improved from 20/80 to 20/25.

An Introduction to The Greater Worcester Free Medical Consortium

Havisha Bindu Karnam, John Romano and Filia VanDessel

The Worcester free medical programs have had a long history of impact in the Worcester area. In 1996, Dr. Harvey Clermont founded St. Anne's Free Medical Program and Dr. Paul Hart founded Epworth's Worcester Free Medical Service Program. Over time, three other clinics were established: Akwaaba Free Health Program, Greenwood Street Medical Clinic and the India Society of Worcester Free Health Stop. These five clinics work together under the umbrella of the Greater Worcester Free Medical Consortium (GWFMC) (previously the Worcester Free Clinic Coalition). Our mission is to provide compassionate, culturally sensitive health care to those who are uninsured, underinsured or who otherwise lack resources, and to connect patients to primary care and social services.

The GWFMC encompasses student volunteers from the University of Massachusetts Medical School, as well as physicians, other healthcare personnel, and community volunteers. Our volunteers work tirelessly to meet the needs of individuals with limited or no access to healthcare, and are driven by the sense of satisfaction that serving the diverse Worcester population brings. The common thread that weaves through the stories of our volunteers is that providing compassionate care to those most vulnerable and giving back to the community drives our passion for medicine.

For Filia Van Dessel, a first-year medical student and student co-President of the GWFMC, volunteering at the free clinics is meaningful because it provides a larger context to medicine. She writes that she was struck by the diversity of patients and lack of resources available to them during her first-time volunteering at the clinics:

> I was a little nervous opening the wooden doors at St. Anne's with my white coat in my hand and my stethoscope around my neck. There was already a long line of patients waiting for the clinic to open. We had just started learning how to take a patient history a couple of weeks earlier, and I barely even knew how to use my stethoscope properly. Soon my anxiety took a backseat as a second-year student and I saw several patients, including a young boy from Brazil for a school physical, two children from South Africa who needed vaccinations, and an elderly woman from India who needed help managing her diabetes. One of our patients had taken public transportation for a whole hour and a half to come see the physician and talk to case management.
>
> Volunteering at the free clinics has been one of the most rewarding experiences in my first year of medical school. The clinics serve not only to develop clinical skills, but have also opened my eyes to the diversity of the Worcester population and the role that the social determinants of health play in people's wellbeing.

Jing Xu, another first-year medical student, describes the free clinics as a place to learn the unwritten curriculum of caring for patients, which drives his passion to learn the written curriculum:

> My first patient at St. Anne's was a mother of three who had recently immigrated to the U.S. She was hoping to get her kids' vaccination records ready for school, handing me a pile of vaccination records, none of which were written in English. I spent nearly two hours sorting through the records and extracting information from the mother, who spoke very little English. While our curriculum was very comprehensive, it did not and could not prepare me for what I encountered on my first day. It's been several months since that day, and I've worked with numerous patients at St. Anne's. As expected, I became much more comfortable with taking history and performing physical exams. In addition, I also learned a new set of knowledge that was never taught to me in class—like where to refer a patient for cheaper medications for diabetes and how to perform a physical exam using a telephone interpreting service. Like many of my colleagues, volunteering at the Free Clinics motivates me to learn the countless drugs and bacteria so that we can ultimately protect the health of real patients, like those we encounter at the free clinics.

It is not only the students that derive satisfaction from participating in the GWFMC. Many physician volunteers find enjoyment in serving those in need without the administrative burdens of the hospital system. Rather, volunteering at the free clinics provides the opportunity to focus on the core of why they joined medicine in the first place. Without the stresses and hassles of hospital quotas, electronic charting, and meetings, "It's health care like it was meant to be," as John Smithhisler, volunteer and board member of St. Anne's, describes.

Moreover, some physicians, such Dr. Jane Lochrie, the medical director at St. Anne's, find fulfilment in knowing that volunteering their time helps to better Worcester by fostering a sense of community:

> Twenty-two percent of the population in Worcester live below the poverty level, many of these are immigrants who do not have access the health care or do not know how to access healthcare. These are the most vulnerable members of our community. Volunteering at St. Anne's is a lot more than giving back to the community. It makes Worcester a better place and helps serve those who may not be able to receive these services. The faculty instills in the volunteer college, nursing and medical students and residents a life-long commitment of service to the community and others in need.

Our dedicated and passionate health services and community volunteers come together to provide high-quality medical care by seeing patients for sick visits, school and work physicals, childhood vaccinations, lab services, and case management services. We are always looking for volunteers, and currently have a shortage of physician volunteers. If you are a healthcare professional, student, or member of the community interested in making a difference by volunteering with the GWFMC, visit our website at https://www.worcesterfreeclinics.org/volunteer.html. Clinics are open Monday through Thursday from 6-8pm. If you have any questions, contact us at worcesterfreeclinics@gmail.com.

We are supported primarily through the donations of generous individuals and organizations. If you would like to donate, please visit our website at https://www.worcesterfreeclinics.org/donate.html. Donations are tax-deductible and are used to purchase medical supplies and equipment. We also accept donations of select medical supplies, please email us for more information. To learn more about the GWFMC, please visit our website at https://www.worcesterfreeclinics.org/. We look forward to connecting with you!

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When the British Beer Company (BBC) opened at this location on 225 Shrewsbury St., not so many years ago, I was surprised to see such a lavish investment with theme-park elements touch down on Worcester's Restaurant Row. After all, the town's dining renaissance was based on flavor, innovative cuisines and the excitement of discovering what we, as a community, could achieve.

The BBC didn't feel like any of that, so when they closed, I wasn't sure if I should feel vindicated or sorry for the failure. Chalk up another one for Darwin's Theory of Natural Selection.

On the street built by Italian cuisine, it was surprising to see Mexican fare fill the void that the BBC left behind. Mexican might work, but it would take more than hanging a few sombreros on the wall and frying churros for dessert.

These thoughts were on my mind when I met my friend for our first meal at Mexicali Cantina. I'd been to their location in Holden, so I knew it wasn't a freezer-to-deep-fryer operation. Still, I promised myself to focus laser-sharp on the cuisine.

Forgoing my usual draft beer selection process, I asked Juanita, our server, for a margarita recommendation. For some reason she intuited I wanted 'strong' drink and guided me to the Presidente, a mix of Casadores Tequila, orange liqueur and Presidente brandy. It arrived in a thick glass chalice whose stem was made of globs of green glass shaped like cacti.

The first indication that dinner at Mexicali might transcend my expectations was, innocently enough, their salsa. I'd come to expect little more than something poured out of a jar at most Mexican-American restaurants, but this one was different and was even subtle. With flecks of cilantro and bits of red pepper it had something of a smoky smolder that gathered to a pleasant after-burn. Forget the tortilla chips, I finished my little bowl with a spoon!

Our appetizer, Guacamole Fresco for two, was billed as 'made to order'. Within moments of ordering it a young woman was wheeling a cart to our table and slicing open creamy-ripe avocadoes. Delightfully bashful, her command of English was sufficient to guide us through the specifications. Lime? Yes. Chilis? Yes. Cilantro? Yes. Basically, 'Yes' to all options.

The mashed-up results were a vibrantly delicious guacamole. The touch of lime accented the avocado flavor and she deftly balanced the textures and flavors with all the other ingredients.

Mexicali's menu is extensive with all the sections you've come to expect in Mexican cuisine. But they also had a full-color laminated supplement with an item that piqued my interest. I usually ignore plastic-coated menus on the presumption that they're pushing pre-packaged fare that's the most profitable and least fulfilling. However, when I spotted Sopa de Mariscos my entrée decision was made.

So much for that belief system! My bowl of seafood soup proved to be a special treat. I was served a deep bowl of spicy-rich sofrito based broth just packed with seafood and a few stray slices of savory vegetables. The chef lavished the portion with several jumbo shrimp, chunks of white fish, scallops, mussels and baby clams 'in shell'. The steaming bowl had just the right degree of spicy heat and luxurious fish-flavored brothiness. Each species of mariscos was tender, juicy and fresh. Lovers of bouillabaisse should take note of this dish; Mexicali's Sopa de Mariscos is a great value and wonderfully tasty dining opportunity.

Generous portioning was also in force with my friend's entrée, Pork Carnitas. This huge plate-load featured guacamole, rice and refried beans topped with melted queso fresco. The real attraction, though, was the pork; five or six large cuts of slow cooked pork loin in a garlicky tomato broth. My friend enthused, "The star of the dish is the pork with big, robust flavors. This place isn't bashful with flavor!"

Even our dessert, Flan, was exceptional. Another large portion, it had the classic creamy custard consistency one expects. However, its flavor was extended dimensionally by the infusion of coffee liqueur. Fear not, this wasn't a cloyingly sweet adjustment; the hint of coffee flavor was perfectly restrained.

Our visit to Mexicali Cantina Grill was a welcome surprise. The décor had been updated with restraint; the music was Pan-American with flourishes of salsa you'll want to tag with Shazam. But the best part was the cuisine; generous flavors and portions served by a team that delivered friendly hospitality.

Isn't that the formula that made Shrewsbury Street famous?

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Women in Medicine Leadership Forum

March 13, 2019

"Cyber-Security: What You Need to Know for Your Professional and Personal Life"

Moderator: Lynda Young, MD, Chair, Women's Caucus

Panel: (L-R) Adam J. Egdall, President and Owner, Technical Computer Solutions, Inc. (TCS3), Bruce M. Forman, Chief Information Security Officer, UMass Memorial Medical Center, Michael Desrosiers, Founder and Principal, m3ip, Inc.

In Memoriam

Robert Lebow, MD
1944 to 2019

Robert Lebow passed away on March 15, 2019. He had a major heart attack while getting ready for a valve replacement.

We already miss him. We will miss his knowledgeable commentary at our gatherings. We will miss his succinct treasurer's reports at our WDMS meetings (he served as treasurer for decades at WDMS). He served as a delegate to the Massachusetts Medical Society House of Delegates always providing informed, articulate, testimony on the resolutions we were discussing. I will miss writing the occasional resolution with him. He loved trying new ideas, even those unlikely to pass, as long as they promoted a good discussion. Bob always challenged us to think. He did not boast about earlier accomplishments but would surprise us with hidden facets at the appropriate occasion. As a casual aside, we once learned that Bob had been integral to some of the initial AMA discussions about coding and billing and that he continued to serve on the Mass. Medical Society's Health and Public Policy Committee. He was always a wellspring of legislative knowledge often quoting specific laws. I will miss the occasional call to discuss the latest madness affecting the medical landscape. Our meetings will be poorer for his absence.

His c.v. while impressive does not sufficiently measure his skills. He was the consummate primary care physician. In 2008, the Massachusetts chapter of the ACP named him "Internist of the Year". He was the Chief of Medicine at Harrington Memorial Hospital for many years and the Town Physician for Southbridge. He spoke fluent Spanish. While many PCP's gave up nursing home privileges, Bob continued to follow his patients in nursing homes. When he retired, he continued on as Medical Director for some of these nursing homes.

He leaves a devoted family: his wife, Marge; his son, John; and John's wife Jill; his son, Matt; and his daughter Kathryn.

Respectfully,
Bruce Karlin, MD

Dr. Lillian Luksis:

Born on October 2, 1923 in Worcester, Dr. Luksis graduated from Commerce High School Class of 1941 followed by Clark University in 1944. She attended Boston University Medical School graduating in 1949. She trained as a radiologist, and served for many years at Worcester City Hospital in that capacity. She was a member of the WDMS for 64 years. She resided in Boylston. Luksis died on July 1, 2018.

Dr. Philip A. Wood:

Philip A. Wood was born in Providence, RI on January 15, 1937. He attended Chapel Hill School in Waltham, but graduated from the Wrentham Center School. He graduated from the University of Massachusetts Amherst and later completed graduate school. He volunteered for the U.S. Navy, attending Officers Candidate School in Newport, RI. In 1962, he was commissioned as an ensign and served in San Diego, Hawaii, and Vietnam. Upon discharge, he was employed at Digital Equipment Corp. serving as a plant manager in Puerto Rico until 1992.

At age 55, he applied to the Tufts University School of Medicine from which he graduated. He was employed by the Mass. Dept of Public Health, serving as Director of Men's Health Partnership, working with underserved men in community health centers throughout the Commonwealth. Later, he was Principal and Founder of Healthcare Management Consultants.

He was a 28-year member of the WDMS. He died on February 17, 2019.

Louis Grace MD:

Born on February 8, 1928, Dr. Louis Grace resided in North Brookfield, MA. He graduated from North Brookfield High School in 1945 and served in the U.S. Army in Japan from 1947 to 1948. On discharge, he enrolled in Cornell and received a BA in 1950. He received an MD degree from Tufts University in 1954. After an internship at Tripler Army Medical Center in Honolulu, he opened a general medical practice in his home in North Brookfield in 1962. He did an obstetrical residency at Providence Lying-In Hospital.

Dr. Grace was a staff member of Mary Lane Hospital in Ware, MA for 50 years. He served as chief-of-staff during 1967-1970 and 1981-1983. He delivered 5,000 babies between 1962 and 1988, but then restricted his practice to family medicine. He retired in 2005, after serving 43 years.

Dr. Grace was a member of the WDMS since 1955. He moved to Florida in 2015 and died on March 17, 2019.

Respectfully,
Sidney P. Kadish MD

Worcester District Medical Society

Calendar of Events

2018

September 14 (Friday, 7:30 a.m., Beechwood Hotel)

27TH ANNUAL WOMEN IN MEDICINE BREAKFAST

Speaker: The Honorable Harriette L. Chandler, Massachusetts State Senator for the 1st Worcester District

Cosponsored by Physicians Insurance Agency of Massachusetts (PIAM)

October 11 (Thursday, 5:30 p.m., Beechwood Hotel)

13TH ANNUAL LOUIS A. COTTLE LECTURE

Topic: TBD

A generous bequest from the Louis A. Cottle Trust was received allowing WDMS to establish an annual lecture series in memory of Dr. Cottle, a dedicated Worcester physician.

November 14 (Wednesday, 5:30 p.m., Beechwood Hotel)

FALL DISTRICT MEETING AND AWARDS CEREMONY

The dinner meeting includes the Dr. A. Jane Fitzpatrick Community Service Award, the WDMS Career Achievement Award, and Scholarship Award Presentations.

November–December 30 & 1 (Friday and Saturday, 9:00 a.m., MMS Headquarters and the Westin Hotel, Waltham, MA)

2018 INTERIM MEETING AND MEETING OF THE MMS HOUSE OF DELEGATES

All WDMS members are invited to attend as guests and may submit a resolution to the Massachusetts Medical Society.

December 13 (Thursday, 5:30 p.m., Washburn Hall, Mechanics Hall)

HOLIDAY RECEPTION AND A NIGHT AT THE MOVIES

Join us for a holiday buffet and movie with a group discussion to follow.

2019

February 13 (Wednesday, 5:30 p.m., Beechwood Hotel)

223RD ANNUAL ORATION

Hope for Haiti; Healing One Patient at a Time

Orator: Jane Lochrie, MD

Dr. Lochrie is the medical director of the St. Anne's Free Medical Program, editor of *Worcester Medicine*, past-president of the WDMS, and current chair of the Personnel Committee. She recently traveled to Haiti for a medical mission.

March 1 (Friday, 7:00 p.m. reception; 8:00 p.m. program, Mechanics Hall)

CZECH NATIONAL SYMPHONY

100 Years of Leonard Bernstein, *Candide Overture*, *West Side Story* Dances, Selections from *Trouble in Tahiti* and *Songfest*, and *Mass* Meditations

March 13 (Wednesday, 5:30 p.m., Beechwood Hotel)

WOMEN IN MEDICINE LEADERSHIP FORUM

Program to be determined

March 30

DOCTORS' DAY

Event to be announced

March 30 is National Doctors' Day when patients, friends, family and colleagues honor physicians and express their gratitude for physicians' continuing commitment to patients and exceptional medical care.

The event will be sponsored by the Worcester District Medical Society Alliance.

April 10 (Wednesday, 5:30 p.m., Beechwood Hotel)

ANNUAL BUSINESS MEETING

Meeting includes presentation of the 2019 Community Clinician of the Year Award.

May 2 & 4 (Thursday and Saturday, 9:00 a.m., the Seaport Hotel and World Trade Center, Boston)

2019 MMS ANNUAL MEETING AND HOUSE OF DELEGATES

All WDMS members are invited to attend as a guest and may submit a resolution to the Massachusetts Medical Society.

May 16 (Thursday, 5:30 p.m., University of Massachusetts Medical School)

MEET THE AUTHOR SERIES

"Attending"

Author: Ronald Epstein, MD, professor of Family Medicine, Psychiatry, Oncology and Medicine (Palliative Care), University of Rochester School of Medicine and Dentistry

Cosponsored by WDMS and Humanities in Medicine Committee of the Lamar Soutter Library at the University of Massachusetts Medical School

The Worcester District Medical Society

would like to thank its committee members for their hard work as we celebrate another year of successful events and community outreach.

Save the Date

Worcester District Medical Society

225th Anniversary

1794 - 2019

Gala Celebration

Friday, September 27, 2019

Central Massachusetts Agency on Aging, Inc.

ElderCare 2019

Educational Event for Seniors including Raffle Bonanza!!

FREE Admission

FREE EDUCATIONAL EVENT

Plenty of Free Parking

Twelve Dynamic & Distinguished Speakers

Including:

Dr. Michelle Hadley, Cardiologist St. Vincent Hospital

Worcester County Sheriff Lew Evangelidis

Worcester County's Finest - First Responder Panel featuring

WPD Chief Steven Sargent & District Attorney Joseph D. Early Jr.

Special Retirement Celebration — Dr. Robert Dwyer, CMAA Executive Director

SIXTY EXHIBITORS, DISCOUNTED LUNCH AVAILABLE & BLOOD PRESSURE CLINIC

Wednesday, June 12, 2019 from 9:30 am - 1:30 pm

Worcester State University - Wellness Center
486 Chandler Street, Worcester, MA

Sponsored by