

Orthopaedic Connections

Beth Israel Lahey Health
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Medical Center

SPRING 2022 The newsletter of the Carl J. Shapiro Department
of Orthopaedics at Beth Israel Deaconess Medical Center

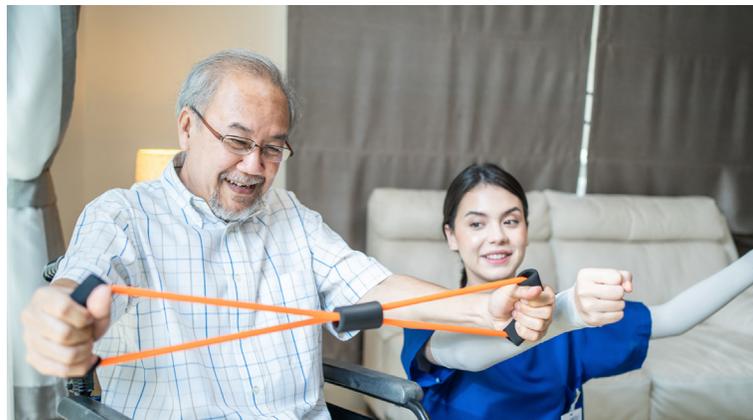
BIDMC expands patient-reported outcomes measurement across all orthopedic services

Beth Israel Deaconess Medical Center (BIDMC) is rolling out a patient-reported outcomes assessment platform that will gather valuable information across the entire spectrum of its orthopedic care providers.

The health assessment platform, PatientIQ, replaces a similar system in place for patients of BIDMC orthopedic surgeons while for the first time capturing such feedback for all patients of Spine Center providers. The Spine Center is a multidisciplinary group that includes orthopedic surgeons plus neurosurgeons, pain specialists, physiatrists and advanced practice providers.

In a later phase, the system will be implemented for the medical center's Physical Therapy and Occupational Therapy service for a total view of every orthopedic patient's experience.

Patient-reported outcomes data serve a key role in clinical research by helping to identify predictors of patient outcomes as well as in helping healthcare providers understand the patient experience. These data are also required by healthcare regulators and are key to value-based payment models. In addition, they are increasingly being requested by insurers as criteria for coverage.



An expanded BIDMC reporting system will enable orthopedic clinicians, physical therapists, and ancillary staff to have a 360-degree view of a patient's progress that includes the valuable perspective of the patient.

Surveys for physical and mental health

The PatientIQ system streamlines the collection, transmission and reporting of patient feedback on their physical and mental health before and after clinical encounters.

Via PatientIQ, BIDMC will send patients questions from the PROMIS® (Patient-Reported Outcomes Measurement

Information System) library that measure functional improvement—a focus for orthopedic treatment—as well as pain and depression.

“PROMIS is a national score the orthopedic world has adopted; it's the gold standard used by healthcare systems,” said Stacy Lewis, Administrative Director of Operations for the Department of Orthopaedics.

In addition, patients will receive surveys that assess outcomes for their specific procedure.

“Independent professional organizations develop and validate surveys for hundreds of types of surgeries,” explained Kelly Orlando, Executive Director of Ambulatory Operations at BIDMC and the executive leader at the Spine Center. “The survey tools that are decided

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“The reported data from PatientIQ will not only serve for research purposes but also to assess the quality of the care we provide and meet all future CMS outcome reporting requirements,” said Orthopaedic Department Chair Edward K. Rodriguez, MD, PhD.

The new system is already in place at New England Baptist Hospital, with whom BIDMC Orthopaedics partners.

Orthopaedic Connections

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In addition to phone and online requests, referring physicians can send an email including the patient's name, birth date or BIDMC medical record number, phone number and presenting problem, and we will contact the patient within one business day to schedule an appointment.

Letter from the Chair

Spring is a universal season of renewal and hope. This year the arrival of spring coincided with signs the "acute phase" of COVID-19 is in decline. And as the flora bloomed, patients gradually resumed visits to their physicians and medical facilities to receive much-needed preventive care and treatment for chronic issues. I am hopeful that the trend toward people keeping up with all of their healthcare needs will remain steady even as the future of COVID is uncertain.



In this newsletter, we often feature the latest approaches our clinicians and researchers are using to help improve the quality of care. While these advances are critical, we sometimes overlook another key aspect of providing effective care: the patient experience. The cover story in this issue focuses on a renewed and expanded program that enables us to listen to patients across all the BIDMC orthopedic-related services. Patient feedback—which encompasses physical function specific to their issue and mental health—informs clinical research for improving care paths. What's more, it can benefit the individual patient in real time.

Another feature in this Orthopaedic Connections relates how an orthopedic trauma surgeon developed a simple yet life-saving device and the clinical protocol for patients with tibia fractures in emergency and intensive care settings. Dr. Paul Appleton, an orthopedic trauma surgeon, learned from his colleagues in Scotland that inserting a monitor in all leg fracture patients prevents non-reversible damage from pressures that can build up in the leg. Now, he's implementing that protocol at BIDMC.

Finally, you can read about two recent additions to the department. Dr. Geoff Stoker joined the BIDMC knee and hip replacement division. Through a new cooperative arrangement between BIDMC and Mt. Auburn Hospital, he will also perform procedures in Cambridge. In addition, Dr. Sapan Gandhi joined our panel of spine surgeons. I am pleased to welcome both of these highly qualified physicians to our orthopedic team.

Edward K. Rodriguez, MD, PhD

Chief, Department of Orthopaedic Surgery
Orthopaedic Surgeon-in-Chief

Preventing serious leg muscle damage with inventive use of monitoring device

When Octavia arrived at the Beth Israel Deaconess Medical Center (BIDMC) emergency room one wintry day in Boston following a car accident that broke her lower left leg, the injury had not only impacted her bone but had the potential to cause permanent damage to her leg muscles. That risk can now be eliminated with a device developed by BIDMC orthopedic trauma surgeon Paul Appleton, MD, based on knowledge he gained while practicing in Scotland.

Trauma surgeons treating acute injury to the tibia must monitor patients for a condition known as acute compartment syndrome. The condition arises when the injury causes swelling and bleeding that creates pressure within the anterior compartment of the lower leg. That decreases blood flow to the muscle and nerves, which can lead to the death of muscle tissue.

To alleviate high pressures, surgeons perform a fasciotomy. “We cut the skin on the inside and the outside of the leg and release the muscle so that it can recover,” explained Appleton.

“Usually the pressure levels in a compartment are determined by how much pain and other symptoms the patient reports,” he said. “But emergency patients are often intubated or sedated and can’t communicate.”

Even when a patient is conscious, the reporting of pain is subjective, Appleton added. He got the idea for a solution that objectively measures compartmental pressures he had seen successfully used during his three-year stint at an Edinburgh hospital: a compartment syndrome monitor.

Building a monitoring device

Compartment syndrome monitors consist of a needle or catheter that is inserted into the affected area and is attached to a machine that measures pressures inside the muscle. Although



A device created in-house at BIDMC monitors potentially damaging pressures in the leg when patients experience a tibia fracture.

several models are on the market, Appleton, fellow orthopedic trauma surgeon John Wixted, MD, and BIDMC residents were able to devise their own in just three months.

“There are monitoring companies that sell devices for a thousand dollars each. We decided we could build a more cost-effective monitor on our own,” said Appleton. Building more economical monitors would better enable BIDMC to have several readily available for the ICU and on inpatient floors as well as the emergency room.

The resulting homegrown design is simple: a needle hooked up to an anesthesia machine, which gauges pressures. And it costs a fraction of the price of a commercial model.

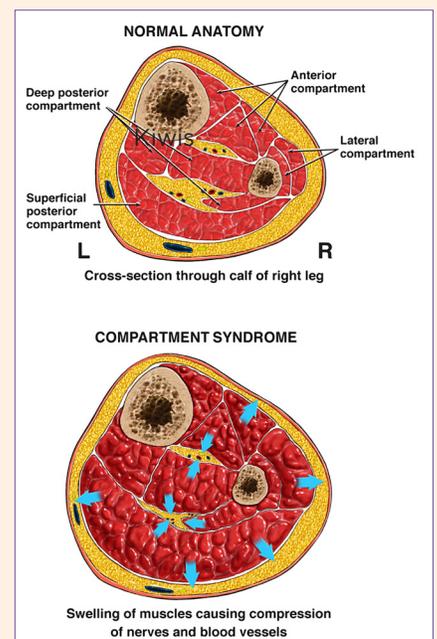
Preventing muscle damage

The practice of continuous compartment monitoring of the leg was developed and assessed in

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What is acute compartment syndrome?

A compartment is a group of muscles, nerves and blood vessels encased in fascia, a tough membrane that doesn’t stretch easily. When a bone is broken by a severe injury, like a car accident, pressure can build up within the muscles of a compartment, known as acute compartment syndrome. This most often occurs in the anterior (front) compartment of the lower leg, but can also occur in one of the other three compartments in the leg, or the arms, feet, or abdomen.



Joint replacement surgeon joins BIDMC, Mt. Auburn Hospital



Geoffrey E. Stoker, MD

Education and Training

Fellowship: Orthopaedic Surgery (hip and knee arthroplasty)

New England Baptist Hospital, Boston, MA

Residency: Orthopaedics

Tufts-Affiliated Hospitals
Orthopaedic Residency Program, Boston, MA

Medical School

Washington University School of Medicine in St. Louis, St. Louis, MO

Geoffrey E. Stoker, MD, recently joined the joint replacement team at the BIDMC Department of Orthopaedics and, through the department's newly forged partnership with Mt. Auburn Hospital, he will also provide care for patients in the Cambridge area.

Stoker was inspired to become a surgeon by his father, who practiced general surgery in the Worcester area. He also had the opportunity to shadow some orthopedic surgeons in his father's practice.

Within orthopedics, Stoker selected the total hip and knee replacement subspecialty for several reasons. "For one, innovation is going on constantly," he said, noting advancements in materials and techniques.

Quick improvement

Stoker also found the relatively quick results that patients experience gratifying. "Patients might be in a wheelchair or walker from hip or knee arthritis, and within a few weeks are walking without a device and are relatively pain-free," he said. "It's pretty rare that you get to have so much improvement so quickly with relatively low associated risk."

In his practice, Stoker focuses on partial and total knee and hip replacement, including revision procedures. He evaluates and treats patients with a variety of hip and knee problems, such as arthritis, avascular necrosis and other joint conditions. He has a special interest in preoperative optimization for medically complicated patients and enhanced recovery after surgery, including same-day, outpatient joint replacement.

Stoker's patients and their physicians appreciate his attention to detail to help ensure a successful outcome. "We work with them on optimizing what risk factors they have for issues such as infection after surgery," he said. He readily communicates with PCPs to this end.

Stoker was drawn to BIDMC because as an academic medical center, there's a large variety of cases. "I can perform regular hip and knee replacements as well as more complex primary and revision cases that I'm interested in," he said. "And I wanted to be in Boston."

Multi-faceted role

Stoker also welcomes other facets of his role at an academic medical center, which include teaching residents, fellows and medical students as well as performing research. His research focuses on clinical outcomes for replacement surgery. Currently, Stoker is engaged in a study looking at different methods of treating chronic infection of a joint replacement.

"Our traditional approach is to place a spacer—a temporary replacement for the joint—and administer antibiotics. When the infection clears months later, we put in a revision joint replacement," he explained. "We're participating in a multi-center, randomized trial where one study arm gets this two-stage approach and the other arm receives antibiotics and the final joint replacement all at once."

In addition to his commitment to caring for patients in the Boston area, Stoker seeks to help people who don't have regular access to the advanced procedures he can provide. While in medical school, he joined medical missions to Guatemala and Costa Rica. Now, after a hectic residency and a hiatus in medical missions due to COVID-19, Stoker hopes to join a group of orthopedic surgeons in the Boston area on future missions to underserved countries.

In his free time, Stoker enjoys fishing, going to the beach, hiking and skiing in the mountains of New England.

For an appointment with Dr. Stoker at BIDMC in Boston or Lexington, call 617-667-3940 or email orthoappointments@bidmc.harvard.edu. For an appointment at Mt. Auburn Hospital in Cambridge, call 617-667-3940 or email orthoMAH@bidmc.harvard.edu.

Orthopedic surgery team welcomes spine specialist



Sapan Gandhi, MD

Education and Training

Fellowship: *Spinal Surgery*

Rush University Medical Center, Chicago, IL

Residency: *Orthopaedic Surgery*

Beaumont Health System, Royal Oak, MI

Medical School

Drexel University College of Medicine, Philadelphia, PA

Another key element in Gandhi's approach to patient care is collaborating with other orthopedic specialists. When a problem is complex, he will discuss it with other surgeons as well as non-operative physicians and physical therapists to get their perspectives.

Aims for transparency

Gandhi aims to be transparent with patients. For example, he may tell a patient, "You have kind of an unusual case. I'm going to share it with my partners at our weekly meeting and then you and I can talk about what they said." Gandhi finds people appreciate this openness. "It's what I would want if I was in their place."

Sapan Gandhi, MD, recently joined the Beth Israel Deaconess Medical Center team of spine surgeons. After completing medical training in Philadelphia and specialty training in the Midwest, he has returned to his native New England.

Growing up in South Windsor, Connecticut, Gandhi's interest in medicine began early. "My dad is a doctor, and a lot of family members are in the medical field," he said. "They're all physicians, so I thought I was going to follow their lead."

But when Gandhi entered medical school, he was quickly captivated by surgery. "I loved the idea of using your hands and tools to physically make a person better," he explained. He chose orthopedics because he found the personalities of the people who work in the field appealing.

Choosing a subspecialty during his residency was a challenge. "I liked everything—hips, knees, shoulders, trauma. But I was really drawn to the intricacies involved in spine surgery and the nuances between diagnoses—zeroing in on what the issue is and actually fixing it."

Conservative approach

Gandhi sees patients with a range of degenerative problems of the spine, which include arthritis, cervical stenosis, cervical disc herniations and slipped vertebral bodies. "Usually patients with these issues have radiating leg or arm pain; that's what we try to fix," he said. He also treats spine trauma patients and those with spinal fractures.

"I treat people the way I would want to receive care myself, or one of my family members to receive care."

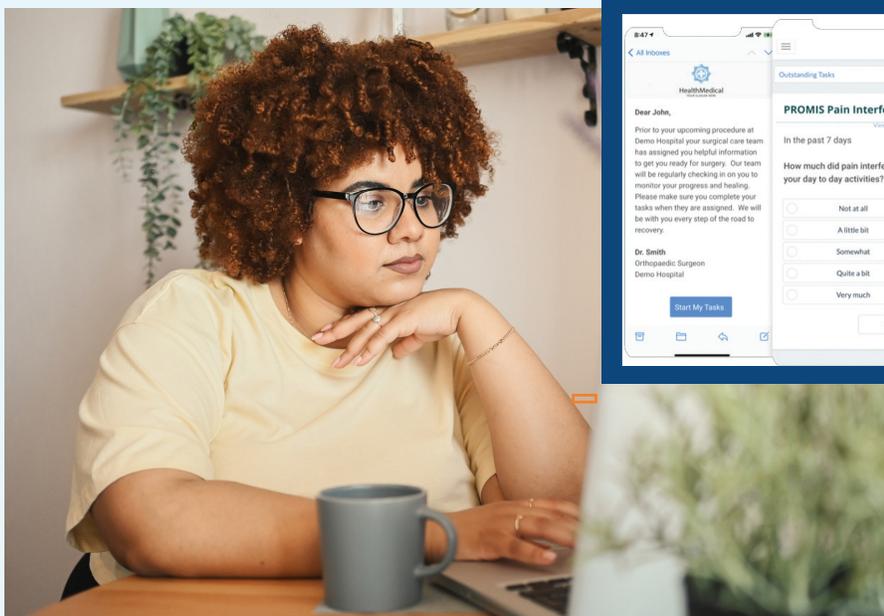
Sapan Gandhi, MD
Spine Surgeon

Gandhi is conservative about recommending surgery. "I treat people the way I would want to receive care myself, or one of my family members to receive care," he said. "That means I only recommend surgery when it's needed, and then, the least amount of surgery we can do to help the patient get better."

Keeping primary care physicians in the loop is also central to Gandhi's clinical practice, especially in difficult scenarios. "Patients and their primary care physicians often have a long and deep relationship. Joining forces with the patient's PCP, as well as keeping an open line of communication, often leads to better care," he said.

Gandhi and his wife, a dentist, are parents to a one-year-old boy. Outside of work, he enjoys spending time with them and his extended family, watching Boston sports and traveling.

For an appointment with Dr. Gandhi, call 617-754-9000 or email spinecallcenter@bidmc.harvard.edu.



A newly expanded program at BIDMC reaches out to individuals at many points in the course of their orthopedic care to provide direct feedback about the course of their recovery in their own words.

upon in hand service will be very different than, for example, what the joint replacement service would use.”

The surveys are short—no more than 10 questions—to maximize completion rates. Once feedback is collected, providers can readily view it in the patient’s electronic medical record.

Enhancing clinical care

Beyond the value of patient-reported outcomes for research, such feedback can also help physicians make medical care decisions when combined with other information. For example, a physician may factor in a person’s survey responses about their mental health when deciding whether pain medication is appropriate post-surgery.

Patient-reported outcomes can also play a role in flagging clinical problems. The PatientIQ system has the ability to send alerts to the physician’s office when a survey response is out of the norm; for example, when a patient indicates their pain level is higher than is typical three months post-surgery. “If we receive a message that a patient is an outlier, we can ask them to come in or call them to figure out what’s going on,”

explained Sammy Dowlatshahi, MD, BIDMC orthopedic and plastic and reconstructive surgeon.

Patient-reported outcomes measures can even enable patients to gain perspective on their own health. “Sometimes patients feel like they’re not making progress, but then when we look back at their previous scores, the latest measures are much better,” Dowlatshahi noted. “Patients can be surprised in a very positive way.”

Beyond benefitting individual patients, collecting patient-reported outcomes data can give physicians valuable feedback on their performance. “Let’s say I view the scores for all my patients with wrist fractures six months post-surgery,” said Dowlatshahi. “I can see if my outcomes are on par, better or worse than other surgeons’ across the country. Then I can figure out where I can potentially change my practice. That’s a powerful tool for providers.”

Fostering patient engagement

Trying to collect patient feedback can be challenging with the competition for people’s time and attention in our fast-moving culture. The automated support of PatientIQ enables a level of

patient engagement beginning even before the first appointment.

“PatientIQ integrates with our patient scheduling system, setting up a pathway to push out communications to patients,” said Orlando.

That pathway enables text messaging in addition to sending emails. “Texting has become so important in any communication,” she noted.

For example, once a patient is scheduled for an appointment, PatientIQ sends them an email with a link to a survey. If the patient doesn’t complete it, the original email is followed by several reminders. Then, if they haven’t responded by the time they check in for their appointment, the intake person sends them a link to their cell phone so they can complete the survey on the spot.

The number and timing of patient surveys vary based on the specific orthopedic service. Some providers prefer surveys at every visit, while others select milestones, such as the first, pre-surgery, post-surgery and follow-up visits.

In addition to emails and messages, Orlando foresees using the new system as a platform to deliver short educational videos to patients at the click of a button. The Spine Center has developed several, including ones that focus on making the decision to have spine surgery, preparing for surgery, and what to expect when you’re at the hospital and post-discharge.

“Such communication can help establish patient confidence in

providers and help them feel more comfortable. It's all about patient education and patient-centered care," said Orlando.

Every patient heard

In addition to being an IT platform for outcomes-based reporting, PatientIQ supports the distribution and collection of patient satisfaction surveys. It will host an automated patient satisfaction survey the Orthopaedic Department implemented over a year ago.

The survey, which consists of five questions and an open-ended comments field, is sent to patients after every visit. "We want to know what patients are thinking and respond to their comments. That has been monumental for us," said Lewis.

A dedicated patient outcomes administrator, Dave Gore, runs patient satisfaction reports twice a week and reviews the comments along with Lewis. Gore follows up with all patients who write a comment, negative or positive. If the comment is clinically orientated, Lewis follows up with the physician or advanced practice

provider and responds back to Gore to convey a response to the patient.

For individuals who leave negative comments, Gore reaches out by phone. "It's important for someone to be heard, to tell their side of the story, uninterrupted," he said. After resolving the issue, he offers them his direct extension. "I want them to feel they have a liaison they can talk to right away, and I can give them help as needed."

One example of a change spurred by patient feedback is the modification of a provider's appointment schedule. "It was clear they just couldn't see the patients in the time allotted," said Lewis. "Their schedule wasn't matching how they practiced." When Lewis changed the appointments from every 15 minutes to every 20, the time patients waited to be seen plummeted.

"Patients are absolutely floored that we're reading the comments," Lewis said. "It's so important to us to get this program right because asking patients for comments and not responding is pointless. They really appreciate that we're listening and we're making changes."

PatientIQ calculates a patient satisfaction score for each provider. Providers receive a monthly scorecard so they and their staff can see how their patients are rating them and consider making changes.

Demonstrating quality

The data PatientIQ collects and reports will allow BIDMC to quantify patient feedback about their health and demonstrate the value interventions have on patients.

"This is a fantastic opportunity to leverage technology to help impact patient care," said Orlando. "Every service can say they provide excellent care. Implementing PatientIQ is opening a brand new world for us to validate and demonstrate the quality of our service."

Looking at the future, Lewis and Orlando hope to make patient feedback available on the web to help individuals make healthcare decisions. Concluded Orlando, "Producing validated information to support patient engagement is a win for us and a win for our patients."

Compartment syndrome monitor continued from page 3

Scotland. It has been well documented as a successful method for preventing muscle damage.

"Over there, they monitor the pressures of the leg muscles for every tibia fracture that comes to the ER. If at any point the pressures go high, they perform surgery to release it," explained Appleton. The result has been 100% effective in avoiding muscle injury.

While Scotland has used this protocol for over 20 years, it's not common in this country. Appleton's aim is to make it the standard of care at BIDMC.

"My goal is for every patient that comes to the ER with a tibia fracture to be placed on a compartment syndrome monitor right away and monitored for 24 hours. Even if someone on the team thinks there's no chance a patient will have

compartment syndrome, we will follow the protocol so we will never miss one."



Danielle Duffy/BIDMC

"My goal is for every patient that comes to the ER with a tibia fracture to be placed on a compartment syndrome monitor right away and monitored for 24 hours."

Paul Appleton, MD
Orthopedic Trauma Surgeon

NEWS AND NOTES

AWARDS AND HONORS

Ara Nazarian, PhD, who leads a Center for Advanced Orthopaedics Studies research group and serves as director of the Department of Orthopaedics Musculoskeletal Translational Innovation Initiative, received a Harvard Medical School Blavatnik Therapeutics Challenge Award in 2021. His project will address the use of Relaxin-2 as novel protein therapy for the treatment of frozen shoulder.

Research fellow **Mehdi Alemi, PhD**, received a 3-year National Institutes of Health postdoctoral fellowship award to study a novel passive back-support exosuit for back injury prevention in older adults. For more on this work, see the Orthopaedic Connections Summer 2021 edition.

Mary Bouxsein, PhD, director of the Center for Advanced Orthopaedic Studies, was appointed as a member of the Advisory Council for the National Institute of Arthritis and Musculoskeletal and Skin Diseases. She also served as editor for the two-volume textbook, Marcus and Feldman's *Osteoporosis*, Fifth Edition, published in 2020 by Academic Press.

PUBLICATION HIGHLIGHTS

The BIDMC Center for Advanced Orthopaedic Studies researchers and Department of Orthopaedics physicians publish their work regularly in academic journals. Here are a few recent examples.

Jacob Drew, MD, arthroscopic surgeon, was a contributing author to "Lower extremity girth does not predict complications in TKA," which appeared in August 2021 in the *Journal of Arthroplasty*.

Foot and ankle surgeon **Christopher Miller, MD**, was the lead author of "Giving up the burr: teaching minimally invasive surgery," published in *Foot & Ankle International* in June 2021.

"Prospective fellows' appraisal of hand surgery fellowships," co-authored by hand surgeon **Carl Harper, MD**, Chief of Hand and Upper Extremity Surgery **Tamara Rozental, MD**, and Principal Investigator **Fjóla Jóhannesdóttir, PhD**, appeared in the October 2021 *Journal of Hand Surgery*.

Mary Bouxsein, PhD, contributed to "Rocket science: what can spaceflight tell us about skeletal health on Earth?" The article appeared in the April 2021 *British Journal of Sports Medicine*.

Bouxsein and **Jóhannesdóttir** were among the authors of "Age-related changes in bone density, microarchitecture, and strength in postmenopausal Black and White women: the SWAN Longitudinal HR-pQCT Study," published online in the *Journal of Bone Mineral Research* in October 2021.

Chief of Orthopedic Oncology **Megan Anderson, MD**, contributed to "Surgical treatment of solitary periarticular osteochondromas about the knee in pediatric and adolescent patients: complications and functional outcomes" printed in the July 2021 issue of the *Journal of Bone & Joint Surgery, America Volume*.

Trauma surgeons **Edward Rodriguez, MD, PhD**; **Paul Appleton, MD**; and **John Wixted, MD**, were among the authors of "Lack of surgeon standardization on implant selection in ankle fracture fixation may increase costs and decrease contribution margin." The article appeared in the June 2021 *Foot & Ankle Specialist*.

Principal investigator **Ron Alkalay, PhD**, was the lead author of "Large lytic defects produce kinematic instability and loss of compressive strength in human spines: an in-vitro study," published in the May 2021 issue of the *Journal of Bone & Joint Surgery*.

Bouxsein receives Boskey Award for bone and mineral research

Mary Bouxsein, PhD, director of the Center for Advanced Orthopaedic Studies at BIDMC, was recently honored with the Adele L. Boskey Esteemed Award for Bone and Mineral Research. The award recognizes a member of the American Society for Bone and Mineral Research (ASBMR) for outstanding and major scientific contributions, leadership and mentorship in the area of bone and mineral research.

Bouxsein was awarded an honorarium and a plaque, which she accepted at the plenary session of the ASBMR Annual Meeting in San Diego in October 2021. In addition, she was elected to serve as the society's president in 2023.



Mary Bouxsein, PhD, (left) accepts 2021 Boskey Award for Bone and Mineral Research from Suzanne Jan de Beur, MD, ASBMR president at time of photo.

Bouxsein is a world-recognized leader in osteoporosis, bone biomechanics and non-invasive imaging of skeletal

health. She has authored hundreds of peer-reviewed studies and served as principal investigator on dozens of nationally and internally funded research projects.

Adele L. Boskey, PhD, was a pioneer and leader in the field of biomineralization. Her passion was promoting the careers of young investigators, especially female investigators, and the mentoring of clinician investigators.

ASBMR is a professional, scientific and medical society established to bring together clinical and experimental scientists who are involved in the study of bone and mineral metabolism. It has more than 4,000 members worldwide.