Expert Care for Every Case
It is with great pleasure that I introduce the NorthShore University HealthSystem (NorthShore) Orthopaedic Institute 2016–2017 Annual Report. The summary we present here provides a glimpse of the world-class work our specialists perform at the NorthShore Orthopaedic Institute, from the development of cutting-edge techniques to some of the best quality and outcome results in the nation.

We care for the most complex cases—including revision hip and knee surgery, pediatric ACL reconstruction, revision spine surgery, and trochlear dysplasia—using the most advanced techniques that include 3-D printing and robotic surgery. We are pioneering the use of minimally invasive procedures and regenerative medicine that can, in many cases, non-operatively address musculoskeletal injuries with biologic treatments. Our impressive quality and outcomes are the culmination of a tremendous team effort by our physicians, affiliated healthcare providers and administrative staff.

We have enjoyed tremendous growth over the past few years, becoming a leader in orthopaedic care. We have added numerous expert physicians in every subspecialty to treat the increasing number of patients who seek treatment here. We are a leading nationwide provider of joint and total joint replacement, and we offer a full complement of comprehensive, multidisciplinary programs that center around our patients—from children to geriatric patients coming with sports injuries, arthritis, spinal problems or anything in between.

Our quality, as ranked by the Centers for Medicare & Medicaid Services, puts us in the top 1.3 percent in the nation in readmissions, and our postoperative infection rates are less than half of the national average, which was too good to qualify for a new infection-preventing vaccine research study. We have been a leader in the implementation of departmental quality dashboards, and we are pioneering the use of predictive modeling to assist in the care of our most high-risk patients.

Care goes beyond the operating suite, and we work tirelessly to reduce patient recovery times, improve pain control and improve the specificity of our diagnostic technologies. The dedicated hospital staff, modern private inpatient rooms and compassionate care create an experience that is ranked in the top decile of orthopaedic hospital care by Hospital Consumer Assessment of Healthcare Providers and Systems scores, and contributes to the rapid recovery and restoration of function that are hallmarks of our care.

Another aspect of our mission is advancement of orthopaedics through research and education. We invest in groundbreaking research to develop cutting-edge technologies, diagnostics and devices that help our patients achieve remarkable results. As you peruse this report, you will see our pioneering work in regenerative medicine, tissue engineering, 3-D printing, robotic surgery and total joint replacement. We also educate dozens of students and physicians, in part through our close relationship as the primary academic partner of the University of Chicago, and have an international reputation as a leader in surgical skills training and simulation.

Thank you for taking the time to get to know us. Our dedicated team of clinicians and our caring staff welcome you to look inside and learn more about how we continue to lead in restoring patients to an active and pain-free life. We have been able to accomplish so much, and we look forward to building on our successes in the future.

Jason L. Koh, MD, MBA
Board of Directors Endowed Chair of Orthopaedic Surgery
Director, the NorthShore Orthopaedic Institute
NorthShore University HealthSystem
Academic Appointment at University of Chicago Pritzker School of Medicine
As patient needs (such as the desire to have care closer to home) change, we adapt the way we deliver care. In fiscal year 2017, approximately 10,000 orthopaedic and podiatric surgical cases were performed across NorthShore’s four hospitals, with approximately 2,500 additional cases performed in three affiliated surgicenters. Nearly a quarter of our surgical patients come from outside our 51 ZIP code service area.

By external measures, our excellent quality of surgical care continues to improve consistently as the NorthShore Orthopaedic Institute Divisions expanded subspecialty care in the NorthShore system. The hospital and surgical practices are supported by Medical Group and affiliated Illinois Bone and Joint locations ranging from downtown Chicago to the Wisconsin border for easy patient access. All of our locations offer same-day appointments, radiologic services, physical therapy, and durable medical equipment. In addition, some offices have access to sports performance programs and concussion evaluation and management.

Our Hospital Locations

**Evanston Hospital**
2650 Ridge Avenue
Evanston, IL 60201

**Glenbrook Hospital**
2100 Pfingsten Road
Glenview, IL 60026

**Highland Park Hospital**
777 Park Avenue West
Highland Park, IL 60035

**Skokie Hospital**
9600 Gross Point Road
Skokie, IL 60076
### Medical Group Locations

**Chicago**  
680 N. Lake Shore Drive, Ste. 924  
Chicago, IL 60611

**Glenview**  
2180 Pfingsten Road, Ste. 3100  
Glenview, IL 60026

**Gurnee**  
7900 Rollins Road  
Gurnee, IL 60031

**Highland Park**  
777 Park Ave. West, Ste. 1241  
Highland Park, IL 60035

**Lincolnshire**  
920 Milwaukee Ave., Ste. 1000  
Lincolnshire, IL 60069

**Skokie**  
9650 Gross Point Road, Ste. 2900  
Skokie, IL 60076

### Medical Group Walk-In Clinics

**Chicago**  
680 N. Lake Shore Drive, Ste. 924  
Chicago, IL 60611

**Glenbrook Ambulatory Care Center**  
2180 Pfingsten Road, Ste. 3100  
Glenview, IL 60026

**Lincolnshire Medical Group**  
920 Milwaukee Ave., Ste. 1000  
Lincolnshire, IL 60069

**Skokie Hospital Ambulatory Care Center**  
9650 Gross Point Road, Ste. 2900  
Skokie, IL 60076

### Illinois Bone & Joint Institute (IBJI) Locations

**Bannockburn**  
2101 Waukegan Road, Ste. 110  
Bannockburn, IL 60015

**Glenview**  
2401 Ravine Way, Ste. 103  
Glenview, IL 60025

**Morton Grove**  
9000 Waukegan Road, Ste. 200  
Morton Grove, IL 60053

**Wilmette**  
521 Green Bay Road  
Wilmette, IL 60093

### IBJI OrthoAccess Immediate Care

**Glenview**  
2401 Ravine Way, Ste. 103  
Glenview, IL 60025

### Affiliated Surgicenters

**Ravine Way Surgery Center**  
2350 Ravine Way, Ste. 600  
Glenview, IL 60025

**Orthopaedic Specialists of the North Shore**  
4433 W. Touhy Ave, Ste. 301  
Lincolnwood, IL 60712

**Sameday Surgery Network River North**  
One East Erie, Ste. 300  
Chicago, IL 60611
Services List

**Adult Reconstruction (Joint Replacement)**
- Complex and Revision Cases
- Robotic- and Computer-Assisted Surgery
- Rapid Recovery Pathways

**Spine**
- Spine Center of Excellence
- Motion-Preserving Technologies
- Regenerative Medicine Research

**Sports Medicine**
- Professional Team Expertise
- Regenerative Scaffolds and Growth Factors
- Pediatric and Revision ACL Surgery and Research

**Hand and Upper Extremity**
- Minimally Invasive New Techniques
- Innovative Implant Design
- Fellowship Training the Surgeons of the Future

**Foot and Ankle**
- Complex Ankle Replacement
- Hydrogel Implants for Arthritis
- Arthroscopic Ankle Surgery and Biologics

**Trauma**
- Team Approach to Geriatric Fractures
- Orthopaedic Trauma Rapid Care
- State-of-the-Art Skills Training

**Podiatry**
- Stem Cells and Plasma Injection
- Synthetic Cartilage
- Multidisciplinary Foot Care

**Pediatric Orthopaedics**
- Deformity Correction with 3-D Printed Models
- Nonoperative Infantile Scoliosis Treatment
- Magnetic Growing Rod Implants
High-Quality Patient Care

NorthShore Orthopaedic Institute is nationally recognized for delivering the highest quality care to patients. Outstanding surgeons combined with an ongoing partnership and team approach for more than 30 years has resulted in a culture dedicated to the best possible care. The result is truly “best-in-class” outcomes, with the lowest statewide total joint readmission rates, ranked in the top 1.3 percent of hospitals in the nation.

Overall complication and readmission rates are half the national average and continue to improve, while more than 10,000 cases per year are performed by our surgeons. Our outstanding nursing staff has been recognized by our Nursing Magnet designation. Our total joint and spine programs earned the highest Blue Cross Blue Shield Blue Distinction rating, and we have been selected as the sole Chicago area United Health Care/Optum Center of Excellence for Orthopaedics and Spine for bundled care, recognizing our quality and value.

The expert surgeons of the NorthShore Orthopaedic Institute work together with nursing and administrative staff using technology advancements and sophisticated data analytics to continuously improve patient care. Dedicated care pathways and standardization have helped reduce variability, and virtual dashboards are provided to the team to continuously monitor patient outcomes. We continue to invest in informatics, and now predictive modeling, to help use a data-driven approach to enhance our personalized patient care.

The Quality Committee, led by Arnold Cohn, MD, a member of the NorthShore Orthopaedic Institute affiliate practice, the Illinois Bone & Joint Institute (IBJI), is charged with reviewing quality issues, implementing quality initiatives, and monitoring indications and complications of orthopaedic and podiatric surgery.

The Spine Division achieved significant milestones in its efforts to decrease readmissions and surgical site infections based on the Center of Excellence benchmarks. Even as surgical volumes increase to nearly 1,000 cases per year, patient outcomes continue to improve, with only one return-to-surgery within 24 hours in 2016, and zero returns in 24 hours in 2017.

The use of data analytics continues to improve monitoring and quality of care, creating new dashboards for physicians and care teams. New predictive models for patient outcomes are being developed to help identify which patients would benefit from additional intervention based on individual factors. In addition, NorthShore Orthopaedic Institute has been expanding its collection of National Surgical Quality Improvement data to all four campuses, which provides risk-adjusted data for both inpatient and outpatient cases, as well as national benchmarking.
Outcomes

Low Hospital Readmissions
Compared against Centers for Medicare and Medicaid Services national averages, patients who undergo total knee and hip replacements at NorthShore Hospital Campuses, experience far lower readmissions than other hospitals across the country. Our low readmission rates earned us top designations in the nation and state.

Low Infection Rates
Cases of post-operative infection after total knee and hip replacement at NorthShore are less than half of the Centers for Medicare and Medicaid Services national averages.
New Physicians

Jamal Ahmad, MD  
Foot & Ankle

Trevor Bullock, DO  
Family Medicine Sports Medicine

Matthew Cavallero, MD  
Trauma

Jordan Goldstein, MD  
Sports Medicine

Verena Schreiber, MD  
Pediatric Orthopaedics

Christian Skjong, MD (IBJI)  
Hand & Upper Extremity

Anna Marie Zeller, DO  
Primary Care Sports Medicine

Brian Weatherford, MD (IBJI)  
Trauma

Stephen Wielgus, MD  
Primary Care Sports Medicine

Diego Villacis, MD  
Sports Medicine

Ward McCracken, DO  
Family Medicine Sports Medicine

Alexander Tauchen, MD  
Adult Reconstruction

Jordan Goldstein, MD  
Sports Medicine

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## Leadership

### NorthShore Orthopaedic Institute Committees and Members

#### Executive Committee

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<tr>
<th>Member</th>
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<tr>
<td>Jason Koh, MD, MBA (Committee Chair)</td>
<td>James Kudrna, MD</td>
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<td>David Beigler, MD</td>
<td>Seth Levitz, MD</td>
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<td>Leon Benson, MD</td>
<td>Kristen Murto, President, Skokie Hospital</td>
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<td>Mark Bowen, MD</td>
<td>Mark Nolden, MD</td>
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<td>Arnold Cohn, MD</td>
<td>Michael O’Rourke, MD</td>
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<td>Raju Ghate, MD</td>
<td>Amy Jo Ptaszek, MD</td>
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<td>James Kudrna, MD, PhD</td>
<td>LeslieMcClellan, Education Coordinator</td>
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<td>Mark Nolden, MD</td>
<td>Craig Phillips, MD</td>
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<td>Amy Jo Ptaszek, MD</td>
<td>Nancy Goodman, Research Manager</td>
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#### Education Committee

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<td>Leon Benson, MD (Committee Chair)</td>
<td>James Kudrna, MD, PhD</td>
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<td>Ravi Badiyal, MD</td>
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<td>Amy Jo Ptaszek, MD</td>
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#### Research Committee

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<td>Richard Watson, MD (Committee Chair)</td>
<td>Robert Gray, MD</td>
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<td>David Beigler, MD</td>
<td>Carrie Jaworski, MD</td>
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<td>Leon Benson, MD</td>
<td>Erin Klein, DPM</td>
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<td>Patrick Birmingham, MD</td>
<td>Jason Koh, MD, MBA</td>
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<td>Mark Bowen, MD</td>
<td>James Kudrna, MD, PhD</td>
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<td>Nancy Goodman, Research Manager</td>
<td>Steven Levin, MD</td>
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<td>Mark Mikhael, MD</td>
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#### Quality Committee

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<td>Arnold Cohn, MD (Committee Chair)</td>
<td>Eric Chehab, MD</td>
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<tr>
<td>Zemen Abiase, Dir. Periop Services SK</td>
<td>Erin Duval, Quality Improvement</td>
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<td>Sandy Alexander, RN</td>
<td>Marc Falleroni, MD</td>
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<td>David Beigler, MD</td>
<td>Carol Heurich, PharmD</td>
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<td>Beverly Beine, VP Periop Services</td>
<td>James Kudrna, MD, PhD</td>
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<td>Rose Boushek, Dir. Periop Services GB</td>
<td>Robert McMillan, MD</td>
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#### Committee Chairs

**Dr. Lalit Puri**
Director, NorthShore Orthopaedic Institute
Board of Directors Endowed Chair of Orthopaedic Surgery

**Dr. Jason L. Koh**
Director, NorthShore Orthopaedic Institute
Board of Directors Endowed Chair of Orthopaedic Surgery

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8 NorthShore Orthopaedic Institute
In 2005, Drs. Victoria Brander and David Stulberg (both members of NOI) helped found Operation Walk Chicago, which sends volunteer clinicians to such countries as Vietnam, Nepal, and Brazil to provide hip and knee replacements at no cost to indigent patients, while training local orthopaedic surgeons and building lasting partnerships. Recently, Drs. Brander and Stulberg led a team of more than 50 physicians, nurses, and volunteers to Recife, Brazil on a two-week mission where they performed dozens of hip and knee replacement operations. Her work has been recognized by the Unsung Heroes of Compassion Award, presented by the Dalai Lama.

In addition, NorthShore Orthopaedic Institute physicians travelled to Katmandu, Nepal, to aid in disaster relief after the devastating earthquake. Their continued efforts have helped establish one of the few orthopaedic centers in the entire country to provide ongoing assistance to the community. Future projects include returning to Recife and Katmandu, as well as the Philippines.

Amy Jo Ptaszek, MD, leads, with CRNA support from NorthShore anesthesiology, orthopaedic medical missions affiliated with Nuestros Pequeños Hermanos and Holy Family Surgical Center in Honduras. Underserved Hondurans with neglected, chronic pathology and post-traumatic deformity undergo surgery and follow up in the clinic.
From developing new surgical techniques in regenerative medicine to the use of “big data” to track and predict patient outcomes, the researchers at the NorthShore Orthopaedic Institute continue to identify new ways to help transform patient care and treat the most complex cases. Over 90 scientific articles (see Publications, beginning on page 36) were published by our physicians during the past year in peer-reviewed literature, including award-winning papers and cover articles. Collaborative partners include NorthShore Research Institute, Illinois Bone & Joint Institute, University of Chicago, Rehabilitation Institute of Chicago, Northwestern University McCormick School of Engineering and Cleveland Clinic. Multicenter trials were also established with Mayo Clinic, the Hospital for Special Surgery, Cincinnati Children’s Hospital and other nationally recognized organizations.

A strong research team provides comprehensive assistance to investigators and physicians in the following areas: literature reviews, protocol revision, regulatory submission and annual reviews, patient screening, patient recruitment and enrollment, data collection, and study closure. In addition, the Orthopaedic Biomechanics Lab allows investigators to develop and test innovative new techniques for the treatment of musculoskeletal disorders.
Partnering to Assess New Techniques for Knee Regeneration and Reconstruction

NorthShore researchers work closely with industry partners to develop and test new techniques to aid in the treatment of complex injuries and to make surgery more precise. Dr. Jason Koh helped develop the pivotal FDA trial to assess the ability of a scaffold-based autologous chondrocyte transplantation system (Novocart 3D™, Aesculap Biologics) to regrow cartilage to treat chondral defects of the knee.

Researching Mesenchymal Cell Allogeneic Grafts for Spine Surgery

In a constant pursuit to find treatments that improve fusion rates and patient outcomes, Mark Mikhael, MD, is conducting an independent study about the mesenchymal allogeneic graft (ViviGraft®), which uses donor stem cells. Expanding on work done in the lumbar spine, Dr. Mikhael is exploring the use of this novel graft to treat patients who have degenerative discs in necks with nerve compression causing arm and neck pain or even paralysis. The disc material or bony spurs that are compressing spinal cord or nerve roots are first removed; then the spine is stabilized using implants along with the donor graft, which contains stem cells and proteins that send signals to the body to heal. Patients are evaluated at different points of their recovery through outcome surveys, X-rays and CT scans to assess healing. Dr. Mikhael said of the study thus far, “While it’s early in the research process, results to date are very promising. Every patient is experiencing very good outcomes and fusion is occurring. It’s exciting to see that this research may improve the way we treat these cases moving forward.”

Informatics

Physicians at the NorthShore Orthopaedic Institute identified the need for the organized collection of clinical data on patients, as well as patient-reported outcomes, for both quality and research endeavors. Under the leadership of Richard Wixson, MD, Vice Chair for Research and Informatics, new structured clinical documentation forms were built into the Electronic Medical Record (EMR), allowing for the efficient, accurate and complete collection of patient information. Using existing data, NorthShore Orthopaedic Institute built one of the most robust predictive models for readmission and complications in joint replacement patients, which has astonishing accuracy. This allows our care team to provide targeted interventions to the patients who need it the most.

Grant-Supported Studies Explore Regenerative Medicine Treatments for Knee Arthritis

The Department of Orthopaedic Surgery received the NorthShore University HealthSystem Auxiliary Fund Award for 2016 to 2018 (initial award $325,000), which provides the opportunity to advance research in the area of intra-articular platelet-rich plasma injections (PRP) in the treatment of knee osteoarthritis. This study, represented by Dr. Koh and Trevor Bullock, DO, explores using a patient’s own bioactive factors which play a fundamental role in tissue healing. During a single visit, growth factors, are retrieved from a simple blood draw and injected into the patient’s knee. The effects on the knee are assessed by patient-reported outcomes as well as by using advanced qualitative MRI imaging techniques to assess cartilage.
Orthopaedics Biomechanics Laboratory

In 2014, the NorthShore Orthopaedic Institute established an Orthopaedics Biomechanics Laboratory to examine the mechanics of joint injury and develop and test new techniques to improve our physicians’ ability to help patients. The lab has the capability to perform single and multi-axis biomechanical testing; finite element analysis; contact pressure; and area, strain and motion analysis. Current research efforts focus on cartilage repair and regeneration techniques, as well as shoulder repair techniques. In this facility, advanced custom devices under robotic control apply precise loads to specimens under dynamic conditions to evaluate the ability of new procedures to restore normal joint biomechanics. The work of the lab in such areas as meniscus damage and repair has been featured in the leading orthopaedic journals and has helped establish fundamental knowledge.

Justifying Patellar Instability Treatment by Early Results (JUPITER)

Patella instability and dislocation can be devastating to young patients, causing pain and loss of function, and can lead to arthritis. To determine the best possible treatment for these injuries, Dr. Koh and researchers from the Hospital for Special Surgery and Cincinnati Children’s Hospital initiated “JUPITER”, a hypothesis-driven, multi-center, prospective cohort study. Its specific aims are to compare the results of non-operative and various surgical treatments, such as medial patellofemoral reconstruction (MPFL) for patients under the age of 30. Outcomes are assessed at 6, 12, 24, and 60 months, including assessment of function, activity, and quality of life. Joining Dr. Koh in participating are Drs. David Roberts and Verena Schreiber. Investigators from Harvard, the Mayo Clinic, and Shriner’s Hospital system have also joined this trial.

(A) Computer-controlled knee testing robot
(B) Contact pressure map showing increased pressure with meniscus injury (Koh et al., JBJS 2016)
Advancing Ankle Replacement Surgery

In the mid-2000s, it was identified that first-generation ankle replacements were prone to early failure. It was at this point that Steve Haddad, MD, became involved in the design and implementation of three ankle replacement systems (INBONE II™, INFINITY™ and INVISION™, Wright Medical Technology).

Dr. Haddad and the team first worked to create an implant that anatomically matches the three major bones of the ankle. He then worked to develop a second prosthesis (INFINITY) that removes less of the patient’s bone than prior implants. By preserving the patient’s natural bone, any future revision ankle replacement surgery becomes technically feasible. Finally, with the recently launched INVISION ankle replacement, surgeons can revise implants that have failed, even those that have failed with significant bone loss.

Most recently, Dr. Haddad received a $100,000 grant from the Orthopaedic Research and Education Foundation to study wear patterns among ankle replacements and improve durability. This is a critical element to making sustainable ankle replacements for the future, something Dr. Haddad considers to be the most important contribution to the next generation of surgeons.

Evaluation of Zimmer® CAS PSI X-Ray Knee in Total Knee Arthroplasty: Technical Outcomes

Raju Ghate, MD, is working closely with Zimmer to investigate how custom patient-specific 3-D printed guides can enhance total knee replacement.

The purpose of this clinical study is to assess the positioning of customized guides of Zimmer CAS PSI X-Ray Knee using optical navigation in patients with osteoarthritis requiring primary total knee arthroplasty (TKA).

The proposed study is a single-center, prospective, case series, and non-controlled clinical trial. Patients will get a total of seven to nine radiographs depending on the anatomy of the leg to generate the CAS PSI X-Ray Knee guides. Primary TKAs will be performed where the position of the CAS PSI knee guides will be generated from X-ray and their position determined using Sesamoid™ Navigation System. The surgeon will determine to either move on with the CAS PSI Knee guides generated from X-ray based on the Sesamoid Navigation system readings or use currently approved instrumentation such as MRI patient-specific guides or conventional instruments.
Academic Highlights

Partnerships with the University of Chicago
NorthShore's academic program grew exponentially over the past several years. We strengthened our relationship of eight years with the University of Chicago Medicine Department of Orthopaedic Surgery and Rehabilitative Medicine. Leon Benson, MD, serves as Vice Chair of Academic and Affiliate Affairs.

"Orthopaedic residents at the University of Chicago like their NorthShore rotation primarily because the attendings are committed," said Dr. Benson. "That means we're providing a good educational experience and adding an element of fun. We believe if you have a collegial relationship with your mentors, everything's better." Through our partnership with the University of Chicago, we train 15 residents annually.

Partnership with Rush Medical Center
Our podiatrists partner with Rush Medical Center to train podiatric residents under the supervision of NorthShore's Michael Weisman, DPM, Division Head for Podiatry, and Podiatric Physician Leader Jeffrey Alexander, DPM. There are nine residents: three residents per podiatry training year with a total of three training years.

NorthShore Orthopaedic Institute Fellowships
The NorthShore Orthopaedic Institute expanded partnerships to offer hand and upper extremity, sports medicine, primary care sports medicine, foot and ankle, and adult reconstruction fellowships.

• Sports Medicine
Our shared Sports Medicine Fellowship with the University of Chicago includes two sports medicine fellows who alternate and rotate every three months between NorthShore and the University of Chicago. Physician involvement is strong, and the sports fellows gain vast exposure to sports-related injuries by assisting with the Chicago Bears training room and the Evanston Township High School training room.

• Primary Care Sports Medicine
The Department of Family Medicine supports a Primary Care Sports Medicine Fellowship under the leadership of Carrie Jaworski, MD, Division Head of Primary Care Sports Medicine. The one-year, one-person fellowship focuses on acute musculoskeletal management. This fellowship also exposes family medicine physicians to primary care sports medicine physicians and orthopaedic surgeons, in addition to sports neurology, cardiology and nutrition.

• Hand and Upper Extremity
We share a hand and upper extremity program with the University of Chicago that includes two hand fellows who alternate and rotate every three months between NorthShore and the University of Chicago. NorthShore's involvement strengthened the University of Chicago's hand fellowship program co-directed by Craig Philips, MD, and as a result, the program attained even greater national prominence and attracts elite candidates from all over the world.

• Joint Care
In 2016, we welcomed our first NorthShore-based hip and knee fellow, under the leadership of Lalit Puri, MD, Division Head of Adult Reconstruction. Our fellow participates in more than 400 surgical cases per year, travels on our annual Operation Walk Chicago mission trip, and helps generate peer-reviewed clinically relevant research.

• Foot and Ankle
In 2017, three Illinois Bone & Joint Institute orthopaedic surgeons introduced a new Orthopaedic Foot and Ankle Fellowship. This fellowship was created to cover the gamut of foot and ankle pathology by faculty with special expertise in certain elements of this subspecialty. This balanced fellowship will provide a comprehensive experience in training the next generation of orthopaedic foot and ankle specialists.

Education and Motor Skills
The NorthShore Orthopaedic Motor Skills Lab, under the leadership of its director, Howard Sweeney, MD, is a critical educational tool that allows our surgeons to teach and reinforce motor skills. Most importantly, it creates a space for the residents and physicians to improve skills before going to the operating room. The lab includes an arthroscopic simulator specifically designed to train our students, residents and fellows in arthroscopic surgery.

NorthShore’s Physician Assistants and Interns
In addition to our fellowship programs, the NorthShore Orthopaedic Institute organizes and onboards more than 25 physician assistant (PA) students completing orthopaedic electives from PA programs across the United States. These students complete one-month rotations with orthopaedic PAs.

In 2014, we introduced our summer internship program for college students. The interns work alongside our surgeons performing data-review, clinic-based and/or biomechanics-based research. Over the course of the program, 14 interns completed the program and several enrolled in medical school.
**Annual Trauma Course**
The annual trauma course for the resident cadaveric skills training takes place at the Grainger Center for Simulation and Innovation, a state-of-the-art 14-station simulation operating and training center. The program continues to grow under the leadership of David Beigler, MD, Division Head for Trauma. The course was funded and sponsored by DePuy Synthes.

**Community Health Center**
The Orthopaedic Department increased its dedication to supporting NorthShore’s charitable mission through the Community Health Center. We hold two weekly orthopaedic clinics led by our residents. Ravi Bashyal, MD, is currently serving as director for the orthopaedic service and Anand Srinivasan, MD, and Christian Skjong, MD, serve as associate directors.

**Global Arthroscopy Foundation (GAF)**
The NorthShore Orthopaedic Institute also partners with GAF, a foundation established by Howard Sweeney, MD. The NorthShore Orthopaedic Institute welcomes approximately four surgeons from lesser-developed nations for a two-week arthroscopy program that trains international surgeons via one-on-one cadaveric training, operating room observation and hands-on motor skills training. The goal of the program is to impart new skills, where each surgeon is prepared to educate his or her colleagues back home.

**Tying Together a 60-Year Legacy**
Dr. Howard Sweeney’s career in general orthopaedics started in 1957 at NorthShore Evanston Hospital. Even though he formally retired 15 years ago, he still teaches residents at the NorthShore Orthopaedic Institute every day. “I teach them how to tie four different knots,” said Dr. Sweeney, “There are hundreds in the world, but they really only need to know four. And, those four become essential to the surgery working correctly. It is critical to me that when my residents test on knots that they are perfect every time.”

What Dr. Sweeney remembers most about his six-decade career is the 30 years he spent caring for the Northwestern University football team. “There was no such thing as sports medicine when I started, but I hope it will be part of my legacy. It’s the specialty I enjoy the most.”

Dr. Howard Sweeney
Associate Professor Emeritus
The NorthShore Orthopaedic Institute Division of Adult Reconstruction (Joint Replacement) continues to grow and thrive. Our surgeons performed more than 2,900 joint arthroplasty procedures in fiscal year 2017. The program focuses on taking care of the most complex cases and has become a referral site for the region. Our patient-focused approach and integrated care delivery ensure a seamless transition for patients.

Lalit Puri, MD, MBA, Division Head, attributes the program’s success to its robust preoperative education program for patients, best practice pre- and postoperative care pathways, and nursing care with Magnet designation throughout the system.

“Modern-day joint replacement surgery really requires, more so than ever, a multidisciplinary team effort,” explained Dr. Puri. “One of the real values we demonstrate is the pride and compassion in the patient care we deliver—from physical to emotional to social.”

The NorthShore Orthopaedic Institute’s total joint clinical outcomes continue to be among the best in the country. According to the Centers for Medicare & Medicaid Services, NorthShore’s readmission and surgical site infection rates are far lower than other hospitals across the country for both hip and knee replacement.

**Precision Reconstruction with Computer-Assisted and Robotic Surgery**

Technologies such as computer navigation and patient-specific instrumentation continue to help drive accuracy, outcomes and operating room efficiencies. The Northshore Orthopaedic Institute has expanded its robotically assisted and precision implant joint arthroplasty program, adding a second robot at the Skokie campus and adding robotically assisted total hip arthroplasty and total and partial knee arthroplasty to our services.
“Robotics in orthopaedic surgery has the potential to improve patient outcomes, speed recovery and improve the longevity of the implants,” Dr. Puri says. Dr. Raju Ghate explains that he uses 3-D printed custom guides, because they, “provide precision fit tailored to each patient’s anatomy, which may lead to improved recovery times.”

**Total Joint Replacement Center**

The Total Joint Replacement Center (TJRC) is a BCBS Blue Distinction Center. This national recognition is based on treatment expertise, number of procedures performed annually and patient outcomes. It is also recognized as United Health Care’s Chicago-Area Center of Excellence, and is ranked as “high-performing” in hip and knee replacements by U.S. News & World Report.

With an over-30-year history, the TJRC offers care coordination, including “Joint Camp,” preoperative education, standardized care pathways and rehabilitation. Rapid-recovery joint replacement incorporates minimally invasive techniques, comprehensive patient education, individualized pain management and focused physical therapy, which allow patients to start walking the same day as surgery. Patients can even be released from the hospital the same day.

**Arthritis Center**

The comprehensive, multidisciplinary Arthritis Center is a combined effort between physicians from orthopaedic surgery, rheumatology, and physical medicine and rehabilitation. The program is designed to use team-based approaches to provide the appropriate level of care necessary for each patient. This coordinated care center offers expert diagnostic and treatment options for the arthritic patient based on individualized treatment plans that include state-of-the-art research trial opportunities, and both surgical and nonsurgical options.

**Physician Specialists**

Lalit Puri, MD, MBA (Division Head)
Ravi Bashyal, MD
Arnold Cohn, MD
Raju Ghate, MD
Jeffrey Goldstein, MD
Alexander Gordon, MD
James Kudrna, MD, PhD
Charles Lettvin, MD
Robert McMillan, MD
Michael O’Rourke, MD
Nasin Rana, MD
William Robb, MD
Anand Srinivasan, MD
Van Stamos, MD
S. David Stulberg, MD
Alexander Tauchen, MD
Richard Wixson, MD

NorthShore Medical Group Physicians
Illinois Bone & Joint Institute Physicians

**Leaving Orthopaedics in Good Hands**

When James Kudrna, MD, PhD, arrived at NorthShore in the 1980s, joint replacement was still relatively new, and patients were spending 21 days in the hospital after a hip replacement. Dr. Kudrna and a small committee created a then-revolutionary plan for a five-day stay after joint replacement. Over the years, this plan has been refined, and care pathways modeled on this effort were implemented across NorthShore, resulting in improved outcomes and experience.

In addition to this work, Dr. Kudrna is most proud of recruiting and training the orthopaedic surgeons at the NorthShore Orthopaedic Institute and the surrounding area. He is extremely confident that he is “leaving the shop in good hands.” Though Dr. Kudrna is nearing retirement, he plans to stay on as a mentor and continue teaching and performing research.
Given the depth and breadth of expertise on our team, we are able to address all spinal pathology including degenerative conditions, tumor, trauma, and adult and pediatric deformity. We continue to enhance patient access and recently expanded our presence in Lake County with the opening of our new Lincolnshire outpatient facility. In 2017, we grew by 13 percent, performing more than 900 surgical cases.

The NorthShore Spine Center
In collaboration with the Departments of Neurosurgery and Physical Medicine and Rehabilitation, we successfully launched the NorthShore Spine Center for the treatment of all spinal disorders, both surgical and nonsurgical. We see new consults within seven days of referral and urgent consults the same day. Through leadership in both orthopaedic and neurological surgery, the spine surgery service at NorthShore is recognized as a Center of Excellence and a preferred provider with several insurers and third-party payors. Our focus on spine standardization allowed us to achieve this recognition. Standardization efforts involved developing and implementing quality-of-care initiatives, inpatient care protocols and pathways, cost containment strategies on implants and biologics, and strategies aimed at reducing patients’ length of stay in our hospitals. We continue to exceeded benchmark goals in reducing perioperative complications resulting in readmission and are continuously striving to improve patient care. Our physicians and nurses work together to hold regular presurgical patient educational classes, and we recently composed a comprehensive educational booklet to help our team fully prepare patients for surgery, their inpatient stay and recovery.
To meet the increasing patient volume, we also worked diligently to create two fully equipped—and more importantly, well-staffed—spine surgery services at both the NorthShore Evanston and NorthShore Skokie Hospital campuses. New technologies in the realm of computer-assisted navigation and minimally invasive spine surgery keep us on the forefront of care.

**Motion-Preserving Technologies**
The Spine Division is partnering with neurosurgery and industry to develop new motion-preserving technology, such as cervical arthroplasty. Instead of removing the cervical disc and completing a fusion, doctors use prosthetic implants to preserve motion and avoid fusion. “Especially in younger patients, this technology can improve the range of motion of the neck instead of limiting it with a fusion,” Dr. Nolden noted. “It’s an extremely promising method.”

**Academics and Research in Regenerative Medicine**
Division members work closely with residents from the University of Chicago, teaching future surgeons the latest techniques and standards of spine inpatient and clinical care. Collaborative outcomes-based and new device research projects are ongoing with our colleagues in neurosurgery; our goal this next year is to increase our research efforts and accomplishments. Our attending surgeons regularly hold outreach programs to educate residents and healthcare providers in our community on the options available for comprehensive spine care.

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**Physician Specialists**

Mark Nolden, MD (Division Head)  
Jonathan Erulkar, MD  
Purnendu Gupta, MD  
Eldin Karaikovic, MD, PhD

Mark Mikhael, MD  
Stojan Mirkovic, MD  
Gary Shapiro, MD

NorthShore Medical Group Physicians  
Illinois Bone & Joint Institute Physicians
The Division of Sports Medicine includes fellowship-trained orthopaedic surgeons and primary care specialists who treat sports injuries for professional and amateur athletes of all ages. Orthopaedic surgeons in the Sports Medicine Division provide the latest arthroscopic and minimally invasive care for many common sports injuries and conditions, including complex hip, patellofemoral and pediatric issues. Members of the Division also perform complex shoulder reconstruction and replacement. The addition of primary care sports medicine specialists allows for improved efficiency and greater access for patients via convenient walk-in clinics.

“We have a tremendous amount of experience with sports medicine, and our physicians offer the highest level of orthopaedic care across all subspecialties,” said Mark Bowen, MD, Division Head of Sports Medicine. “We also take care of some of the finest athletes in Chicago, as well as athletes at beginner levels.”

Dr. Bowen has served as Head Team Physician for the Chicago Bears for over 25 years.

The NorthShore Orthopaedic Institute offers a unique, comprehensive sports medicine program focused on keeping serious competitors and weekend warriors active both in life and in the game. Our highly skilled physicians have cared for professional athletes on teams that include the Chicago Bears, Chicago Blackhawks, Chicago Cubs, Chicago Fire, USA Hockey, USA Rugby and USA Soccer, as well as Chicago Marathon competitors. Our physicians are also actively involved in research and teaching, and train three University of Chicago sports medicine fellows a year (two in orthopaedics, one in primary care sports).
A Minimally Invasive Alternative to Traditional Anterior Cruciate Ligament (ACL) Repair

Mark Bowen, MD, is involved in the development of a new ACL repair technique that uses a patient’s own hamstring tendon to create a graft ligament. “There are many ways to reconstruct an anterior cruciate ligament, and traditional methods involved using grafts that require significant trauma to the knee,” stated Bowen. Though some trauma to the knee is unavoidable, this new method can help avoid some unnecessary pain and a longer recovery. “Using a single hamstring is less traumatic,” noted Dr. Bowen. “We take less bone, we place the graft in from the inside, and we accomplish the surgical technique while traumatizing the knee as little as possible. Postsurgical recovery is also easier, and the results have been very good.”

Regenerative Medicine

The NorthShore Orthopaedic Institute recently added Trevor Bullock, DO, to its primary care sports medicine team. He is working with Jason Koh, MD, MBA, and Adam Bennett, MD, on research related to regenerative medicine. Dr. Bullock is one of NorthShore’s experts on the use of this nonsurgical treatment in orthopaedics. With the addition of Dr. Bullock, NorthShore now offers its patients access to an innovative technology that enables patients’ own adult stem cells to repair injured tissues, reduce inflammation and help reduce pain. “We have a very active research and a biomechanics laboratory that collaborates with many members of the Division,” Dr. Bowen explained, “and it’s extremely promising work.”
Hip Arthroscopy

Drs. Beigler, Birmingham, and Koh have a combined 40 years of experience in hip arthroscopy and are experts at treating athletic injuries of the hip, including labral tears and loose bodies. Techniques used are at the cutting edge of arthroscopic management of joint injuries, including labral repair and reconstruction, use of 3-D imaging to guide impingement surgery, and new techniques for the arthroscopic repair of the gluteus medius tendon and hip abductors.

An Artificial ACL

In collaboration with researchers from the McCormick School of Engineering at Northwestern, Dr. Jason Koh has been working on biocompatible scaffolds to replace damaged tissue. The citric-acid-derived scaffold developed for bone and cartilage regeneration was featured as a cover article in Tissue Engineering.

More recently, they developed and tested an artificial ACL made completely of biocompatible materials that can serve as a scaffold for bone and soft tissue regeneration. This artificial ACL was recently the cover article for the Journal of Tissue Engineering and Regenerative Medicine and also was featured on such popular media outlets as Fox News.

Computer-Guided Surgery, 3-D Printing and Rapid Recovery After Shoulder Replacement

In shoulder replacement surgery, doctors replace or resurface the ends of the damaged humerus and the glenoid socket with artificial surfaces lined with metal or plastic. Reverse shoulder replacement is a variation for those patients with painful arthritis and severe damage to the rotator cuff muscles. These procedures are able to restore pain-free function. To enhance the precision of these surgeries, NorthShore surgeons use advanced imaging techniques to analyze the anatomy of the joint, and even use virtual reality computer simulations to test various implants prior to the actual procedure. In challenging cases, 3-D printing is used to replicate the joint and create custom guides tailored to match the patient, to ensure that the implants are an exact fit. Articles about NorthShore’s 3-D printing experience were recently featured in U.S. News & World Report. Patients typically go home the day after surgery and are able to use their hand, wrist and elbow immediately.

Recently, researchers in the Division published one of the largest studies ever on shoulder replacement showing that the rate of serious complications was 0.1 to 0.2 percent, or less than one in 500.
School Sports Physicals
At the NorthShore Medical Group Physicians, we want to make sure the kids in our communities are staying safe, which is why we work closely with local high school, junior high and grade school kids to provide sports physicals.

High School Sports Medicine
The NorthShore Orthopaedic Medical Group Physicians and the Illinois Bone & Joint Institute (IBJI) partner with local high schools to work with their football teams. Our partnerships are unique due to the comprehensive services we provide. For example, we include on-site physician coverage for football games and staffing school training rooms weekly, because we understand that students do not have time for doctor visits between classes. The following high schools are covered by our physicians:

- New Trier
- Evanston
- Loyola
- Notre Dame
- Taft
- Niles West
- Glenbrook North
- Deerfield
- Maine East
- Glenbrook South

Sports Concussion Treatment and Diagnosis
The NorthShore Orthopaedic Institute partners with the NorthShore Neurological Institute to provide comprehensive concussion management. The concussion program features nationally recognized experts in the area of brain injury and sports medicine who are experienced in assessing and treating athletes at all levels. Our neurologists, sports medicine physicians, neuropsychologists and physiatrists have worked with elite athletes from several Chicago professional teams. They work closely with a team’s athletic training and medical staff to determine when athletes are safely able to return to their sports for practice and/or competitive play after a concussion.

Dr. Bailes’ work with Dr. Bennett Omalu in the diagnosis and care of professional football players with chronic traumatic encephalopathy (CTE) was featured in the movie “Concussion” and has been the subject of multiple articles. He continues to do ground-breaking research in the area of CTE, including the first known diagnosis of this disease in a living patient.

Our sports concussion program is led by the following brain injury experts:

- Dr. Julian Bailes
  Chair, Department of Neurosurgery
  and Co-Director, NorthShore Neurological Institute

- Dr. Nicole Reams
  Associate Director
  Sports Concussion Program

- Dr. Elizabeth Pieroth
  Associate Director
  Sports Concussion Program

- Dr. Carrie Jaworski
  Division Head
  Primary Care Sports Medicine
The Hand and Upper Extremity Division cares for both complex and routine hand and upper extremity injuries and diseases. The Division offers a broad range of interventions, from complex microsurgery to the latest, innovative, minimally invasive treatments. Our physicians provide care for arthritis, congenital conditions, acquired pathology, hand and shoulder injuries, and all types of trauma. The overall size and scope of the Division of Hand and Upper Extremity at NorthShore continues to expand steadily. The growth in patient volume allows for an increase in the number of upper extremity specialists, the use of new technology, and the depth and reputation of the teaching program.

“I think it’s the commitment of the doctors in our Division that makes us good caregivers,” said Leon Benson, MD, Division Head of Hand and Upper Extremity. “I think that when you look at it, this business is mentally and physically tough unless you love doing it. And our physicians love providing top-notch care to patients with hand and upper extremity injuries.”
Focus on Advancement
The development of innovative implant designs for the treatment of various hand and upper extremity fractures allows the use of smaller, stronger and biologically more compatible hardware. Less invasive methods of managing Dupuytren’s contracture and various upper extremity tendinopathies, including tennis and golfer’s elbow, greatly reduced the need for open surgical treatment.

First-Rate Fellowship and Residency Programs
The academic involvement of the Division continues to expand due to the addition of a Hand and Upper Extremity Fellowship. The previous “apprenticeship” style fellowship, which existed at the University of Chicago until 2010, changed into a broad-based academic program due to expanding the program to two fellows per year. A fellowship candidate is at the NorthShore Orthopaedic Institute campus full-time, and many of the Division attending surgeons are key mentors.

Over the last six years, our residency rotations have received consistently high evaluation marks because we offer aspects of orthopaedics most residents do not encounter anywhere else. Because of our many locations, and the higher volume of everyday orthopaedic injuries we see as a result, NorthShore trainees are exposed to more common practice surgeries than they might on another service.

“Orthopaedic residents at the University of Chicago like their rotation with us primarily because the attendings are committed,” said Dr. Benson. “And committed usually means a couple of things in my experience as an educator—it’s not only being able to provide them a good educational experience, but there’s an element of fun. It’s got to be fun.”

Physician Specialists
Leon Benson, MD (Division Head) Charles Carroll, IV, MD Robert Gray, MD Seth Levitz, MD Craig Phillips, MD Christian Skjong, MD

Dr. Leon Benson
Division Head of Hand and Upper Extremity
Vice Chair of Academics and Affiliate Affairs

NorthShore Medical Group Physicians
Illinois Bone & Joint Institute Physicians
The Foot and Ankle Division consists of fellowship-trained surgeons who care for the most complex cases. In addition, the Division of Foot and Ankle works collaboratively with members of the Division of Podiatry. Our specialized foot and ankle surgeons are known locally, regionally and nationally for innovative and state-of-the-art techniques, including the most complex procedures, such as primary and revision total ankle replacement and complex hind foot reconstruction. In addition, new techniques and care pathways advance outpatient surgeries, streamlining therapies and expediting rehabilitation to move patients back to their prior level of function as quickly and as easily as possible.

**Complex Total Ankle Replacement**

Surgeons at NorthShore perform some of the most challenging cases in foot and ankle surgery: revision ankle replacement. Steven Haddad, MD, a past president of the American Orthopaedic Foot & Ankle Society and member of the Division, helped develop new instrumentation and implants to assist in treating those patients suffering from a failed ankle replacement. NorthShore has become a destination for the treatment of these complex problems and is a leading center in performing ankle replacement surgery.
Smaller Incisions, Faster and Easier Recoveries

The Foot and Ankle Division is focused on performing more arthroscopic procedures due to the various benefits patients experience, including smaller incision sizes, less pain and shorter recovery times. “We’re using more biologics, bone morphogenic proteins, ultrasound bone stimulators and thoughtful use of platelet-rich proteins, all of which hasten the healing process,” said Amy Jo Ptaszek, MD, Division Head of Foot and Ankle.

The surgeons also work closely with orthotists, who create precise custom or semicustom orthotics, allowing patients to avoid having to live with bulky and restrictive casts and splints.

Hydrogel Implants for Great Toe Arthritis

Foot problems can cause debilitating pain and can interfere with the capacity to live a normal life. “There’s no age restriction; it can affect anyone.” The need for treatment can stem from trauma, arthritis, heredity or even an improper gait,” noted Dr. Ptaszek. “We monitored the literature very closely for several years to examine the outcomes and durability of the Cartiva® implant. The gold standard in treating the great toe has long been fusion, but now we can provide an alternative that retains the patient’s motion safely while reducing pain.” Remarkably, patients can bear weight on their affected foot immediately and even walk the same day as surgery.

Little Feet, Big Pain

Even little feet can experience foot problems. When a child has flat feet, sometimes his or her bones and joints can handle the alternative alignment easily. Other children are not as lucky. The invention of an implant, the subtalar arthrodesis screw, provides great relief to our pediatric patients. The screw is implanted through a minimally invasive procedure that is designed to correct the alignment of severe, painful flat feet as the child grows.

“As the foot develops over time, the tendons around the implant will strengthen in the appropriate places to prevent the severe issues that can arise from a flat foot,” Dr. Ptaszek explained. The treatment can prevent the need for a painful, difficult surgery in the future and can stop pain and malformation of the foot over time.

Physician Specialists

Amy Jo Ptaszek, MD (Division Head)
Jamal Ahmad, MD
Lan Chen, MD
Steven Hadad, MD
Armen Kelekian, MD
Steven Kodros, MD
Alan League, MD
Bryan Waeman, MD

NorthShore Medical Group Physicians
Illinois Bone & Joint Institute Physicians
At the NorthShore Orthopaedic Institute, the Division of Trauma provides unparalleled quality and timely service to all patients who present to NorthShore University HealthSystem facilities with traumatic orthopaedic issues. Led by Division Head, David Beigler, MD—along with doctors Brian Weatherford, MD, and Matthew Cavallero, MD—the trauma program provides state-of-the-art care for many complex injuries.

Over the past few years, Dr. Beigler and his team have seen a high percentage of trauma issues related to the age of area residents. “In the North Shore, we have a lot of patients who have had the good fortune to live long lives,” said Dr. Beigler. “With long lives come age-related issues, such as osteoporosis, and low-energy trauma.” In response to this pattern, Dr. Beigler and the Division Heads of the NorthShore Orthopaedic Institute are developing programs and practices that expand the care provided to trauma patients.

**Holistic Approach to Care and Outstanding Outcomes**

In an effort to provide orthopaedic patients a holistic approach to their care and to combat the risks of morbidity and mortality associated with geriatric fractures, the Trauma Division established partnerships with other divisions within the NorthShore Orthopaedic Institute.

For the past five years, the Division applied a dedicated co-management program to approach the treatment of geriatric issues at both the surgical and osteoporotic levels. Through ongoing coordination with David Lovinger, MD, and the hospitalist team, orthopaedic patients receive critical, coordinated care related to their rehabilitation and overall well-being.

This program, coupled with a full armamentarium of state-of-the-art equipment and specially trained staff, provides patients a 360-degree approach to their care and has resulted in excellent outcomes, including a 0 percent risk-adjusted mortality rate for the past five years.
Orthopaedic Trauma Rapid Care

Beginning mid-2017, a multidisciplinary dedicated orthopaedic trauma rapid care pathway was implemented to ensure surgical treatment of patients within 24 hours of admission. Coordinated care protocols supported by the Emergency Department, hospitalists, anesthesia and nursing allow for streamlined evaluation and triage. Led by Drs. Beigler, Weatherford and Cavallero—all fellowship-trained orthopaedic surgeons—the dedicated trauma rooms at NorthShore Glenbrook Hospital allow the Trauma Division to expedite care for patients presenting at any of the four hospitals. Supported by the Level 1 Trauma Center designation at Evanston Hospital and Level II designation at NorthShore Glenbrook, Highland Park and Skokie Hospitals, the trauma program provides advanced care for many complex injuries.

As time is a critical factor in the morbidity and mortality of trauma, especially with hip fracture patients, a dedicated trauma operating room provides treatment to patients within 24 hours of injury. While the Division already has outstanding quality, this new approach expedites care for these patients. The rapid care pathway reduces time patients spend in bed; decreases post-surgery issues, such as pneumonia; and lessens patient need for narcotics.

Hands-On Skills Education

To ensure that all staff maintain a high standard of excellence in patient care, the Division of Trauma conducts ongoing in-service education sessions. These in-service sessions cover the various operating room tables, address commonly used internal and external fixation systems, and offer hands-on educational experiences for operating room personnel.

For the orthopaedic residents, regular workshops in the Orthopaedic Simulation Lab play a critical role in gaining the motor skills to quickly and accurately reduce and stabilize fractures. Building on these experiences, the Division also hosts an annual resident cadaver course at the Grainger Center for Simulation and Innovation, led by the expert faculty of the Division, which offers a unique opportunity to provide residents instruction in surgical approaches for orthopaedic trauma. To date, subjects such as the pelvis, acetabulum, and upper and lower extremities have been covered.

The Trauma Division is truly a center of excellence for geriatric orthopaedic care. By building on its record of success through continued cooperation with colleagues in other departments and ongoing efforts of staff from the Division Head down, the Division will continue to define and exceed the standards for patient care in the field.

Physician Specialists

David Beigler, MD (Division Head)
Matthew Cavallero, MD
Scott Cordes, MD
Rajeev Garapati, MD
Brian Weatherford, MD

NorthShore Medical Group Physicians
Illinois Bone & Joint Institute Physicians

Dr. David Beigler
Division Head of Trauma

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The Division of Podiatry offers a range of comprehensive services from expert wound care and bunion removal to treating sports injuries and saving limbs. Collaboration with podiatrists allows treatment of nonsurgical foot and ankle conditions through modalities such as medication injections and orthotic footwear to decrease pain and improve function.

While there is some overlap between the foot and ankle team and the podiatry specialists, the podiatrists offer a number of additional services. Michael Weisman, DPM, Division Head of Podiatry, describes podiatrists as “a little bit of dermatologist, neurologist, orthopaedist and palliative care provider. We treat all systems located in the foot.”

Dr. Weisman, who has been the Division Head of Podiatry for 17 years, has more than 30 years of podiatric experience. While podiatry runs in his family—his father was and his brother is a podiatrist—he will tell you the real reason he practices is because it is a great source of “satisfaction to know that I can help relieve someone’s pain and provide comfort.”

**New Techniques to Improve Patient Outcomes**

The Podiatry Division is constantly investigating ways to improve the work it has been doing for years, such as exploring new ways to correct bunions or repair hammertoes. Many of our podiatrists are active in foot and ankle research.

One area of research is to evolve the use of stem cells to treat plantar fasciitis and Achilles tendon issues. Today, to treat plantar fascitis, we draw a patient’s blood and mix it with platelet-rich plasma and inject the mix into the plantar fascia. This technique allows us to take a chronic, nonhealing injury and push it to physical repair, leaving a patient pain-free and back on his or her feet.
The team is also exploring options in the treatment of hammertoes. Typically, metallic bone plates and angled fixation devices are used to hold bones in their natural position. Recently, we started using Cartiva, a synthetic cartilage implant. Cartiva is implanted in the first metatarsophalangeal joint, and is designed to repair hammertoes and treat degenerative or post-traumatic arthritis. This treatment option helps reduce pain for patients and allows patients to maintain or improve their range of motion.

Another area of interest is ankle stabilization. Many patients who come to the NorthShore Orthopaedic Institute have a history of rolling their ankles and benefit from ankle stabilization. Paul Goodman, DPM, is taking the lead on implementing a new ankle stabilization surgical procedure that allows patients to wear shoes within two to three weeks rather than the typical six weeks. Dr. Goodman and his team—including Raymond Montoya, DPM, and Bruce Noxon, DPM—have already completed 50 successful procedures.

**Comprehensive Multidisciplinary Care for Rare Conditions**

One example of the outstanding care provided at the NorthShore Orthopaedic Institute involved a young man in his late 20s who sought out Division Head Michael Weisman, DPM, for treatment of the pain and swelling in his foot. He had been suffering more than a year despite treatment by other doctors. A careful review of radiographs demonstrated an unusual bone tumor as the source of the pain. Dr. Weisman successfully removed the tumor and grafted the site with osteogenic cells to stimulate new bone growth. Further testing revealed that the young man had extrapulmonary tuberculosis myositis, a rare infection of tuberculosis in the bone. His care was coordinated with NorthShore infectious disease specialists, who were able to eradicate his systemic tuberculosis.

**Physician Specialists**

Michael Weisman, DPM (Division Head)
Loren Adelman, DPM
Summer Bochat, DPM
Timothy Casey, DPM
Gary Friend, DPM
Carla Gamez, DPM
Paul Goodman, DPM
Michael Hollander, DPM
Raymond Montoya, DPM
Bruce Noxon, DPM
Jeffrey Rager, DPM
Gary Rogers, DPM
Douglas Solway, DPM
Howard Stone, DPM
Larry Weisman, DPM
Robert Zombolo, DPM

**NorthShore Medical Group Physicians**

**Illinois Bone & Joint Institute Physicians**

**Dr. Michael Weisman**
Division Head of Podiatry

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The NorthShore Orthopaedic Institute offers comprehensive care for patients of all ages, including those from childhood to adolescence. Our fellowship-trained pediatric orthopaedic surgeons use leading-edge nonsurgical and surgical treatments to care for a wide array of pediatric orthopaedic conditions. Our specialists work as a team and use best practices to develop a care plan that best meets the needs for each individual patient.

Pediatric orthopaedic services continue to grow. In 2017, our volume grew by 5 percent over last year. With Verena Schreiber, MD, recently joining the Division, we expect our volume to continue to grow, especially given our efforts to expand access to Glenbrook and Lincolnshire.

3-D Printing for Precise Planning
This technology allows surgeons to use a CT scan or MRI to print out an exact 3-D model for any part of the body. This ability allows the surgeon to obtain better understanding of the anatomy of congenital anomalies, scoliosis or other bone deformities than cannot be obtained with images alone. These insights enable surgeons to simulate surgery before going to the operating room, making the actual surgery more precise, efficient and safe.

David Roberts, MD, treated a 14-year-old boy who broke his elbow when he was age 6. Before he came to the NorthShore Orthopaedic Institute, a previous failed surgery left him with a significantly deformed and angled arm. His pain and deformity limited his ability to play sports and made him severely self-conscious about his appearance.
At the NorthShore Orthopaedic Institute, Dr. Roberts used advanced imagery and printing techniques to create a 3-D model of the boy’s elbow to precisely plan the surgical correction. Of this method, Dr. Roberts said, “There’s an old saying in carpentry—measure twice, cut once. With 3-D printing, we can plan on the model so we can get it just right in the operating room with the patient.” A year after a successful surgery, the boy is completely healed with no pain, and has returned to full sports and wearing short sleeves.

**Mehta Casts for the Littlest Patients**

For early-onset scoliosis, which affects children under age 2, Dr. Roberts is one of only a few Chicago-area surgeons specially trained in a nonsurgical treatment called Mehta casting. This corrective casting method can cure infantile scoliosis in most cases without surgery.

One 2-year-old girl affected by severe infantile scoliosis had a sharp curvature of the spine that measured about 60 degrees. After corrective casting, the curvature was corrected, and she is now a normal 5-year-old girl who did not have to undergo major surgery. More impressively, she did not allow the treatment to interfere with ballet dancing—in a glittery purple cast.

**Magnetic Growing Rods Are MAGEC**

Alexandra Cintron was born with scoliosis. When she was 9 and it was time for the curvature to be corrected, a friend of the family suggested that Alexandra see Dr. Roberts to learn about advanced treatment options. Dr. Roberts proposed a newly approved approach: MAGEC growing rods. These magnetic rods change length, which allows the child to avoid repeated operations.

“We were thrilled that Dr. Roberts considered Alexandra a good candidate for the MAGEC rods,” said Alexandra’s mom, Aracelis Cintron. “We really wanted to avoid multiple surgeries for her.”

In the fall of 2016, Alexandra had successful surgery to implant MAGEC rods. Since then, she comes in every few weeks for a magnetic treatment to lengthen the rod. If you ask her how much she has grown, her eyes sparkle as she says proudly, “Almost two inches!”

For her mom and dad, that is the real magic. They get to see their daughter standing proudly, growing strong and maintaining that smile. “We’re grateful that Dr. Roberts is by our side. He treats Alexandra like she’s his own and truly cares for our whole family.”

**Physician Specialists**

David Roberts, MD
Verena Schreiber, MD

Dr. David Roberts
### Active Orthopaedic Clinical Trials May 2017

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<td>J. Kudrna – EH 16-159</td>
<td>Historical Outcomes of the ASR Hip System in Total Hip Arthroplasty and Total Hip Resurfacing: A Retrospective Chart Review</td>
</tr>
<tr>
<td>J. Kudrna – EH 17-098 A. Harbin (Fellow)</td>
<td>Evaluation of Gender Differences, Time to Revision, and Metal Ion Levels in DePuy ASR THAs</td>
</tr>
<tr>
<td>M. Mikhael – EH 16-196</td>
<td>ViviGen® Cellular Bone Matrix, Anterior Cervical Disectomy and Fusion Outcomes Study</td>
</tr>
<tr>
<td>L. Puri – P. Leung (Fellow)</td>
<td>The Effects to Total Knee and Hip Arthroplasty on HgA1C in Diabetic Patients</td>
</tr>
<tr>
<td>D. Villacis</td>
<td>MRI vs. 3-D CT Scan for Assessment of Glenoid Bone Loss</td>
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<tr>
<td>L. Puri – EH 14-181</td>
<td>Evaluation of the Results of Hip and Knee Replacement</td>
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<tr>
<td>J. Koh – EH 16-010</td>
<td>Biceps Tenotomy or Tenodesis in Treating Long Head of the Biceps Pathology: A Prospective Randomized Controlled Trial</td>
</tr>
<tr>
<td>M. O’Rourke – EH 17-193</td>
<td>Compassionate Use with an Investigational Device—Modified Genesis II</td>
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<tr>
<td>R. Ghate – EH 15-279</td>
<td>Anatomic Characteristics of the Arthritic Knee</td>
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<tr>
<td>A. Gordon – EH 15-400</td>
<td>Prospective Clinical Study Evaluating Tibiofemoral Rotational Alignment Using Intraoperative Sensing During Total Knee Arthroplasty</td>
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<tr>
<td>P. Birmingham – EH 16-270</td>
<td>Pre-Existing Hip Pathology as a Predictor of Outcomes in National Football League Athletes</td>
</tr>
<tr>
<td>Principal Investigator</td>
<td>Trial</td>
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<tr>
<td>D. Villacis – EH 17-068</td>
<td>MRI vs 3-D CT Scan for Assessment of Glenoid Bone Loss</td>
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<tr>
<td>J. Koh – EH 14-264</td>
<td>Purchased Service Agreement—Rehabilitation Institute of Chicago (RIC)</td>
</tr>
<tr>
<td>J. Koh – EH 17-120</td>
<td>Research Agreement—Cleveland Clinic: Influence of Tibial Tuberosity Distalization on Patellofemoral Tracking and Contact Pressures: A Dynamic Computational Simulation Study</td>
</tr>
<tr>
<td>J. Koh – EH 16-310</td>
<td>Agreement for Research—Rehabtek Corp (Li-Qun Zhang)</td>
</tr>
<tr>
<td>S. Levin – EH 17-022</td>
<td>Stabilizing Effect of Labral Augmentation: A Cadaveric Model</td>
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<tr>
<td>S. Levin – EH 15-218</td>
<td>Stabilizing Effect of Labral Augmentation: A Cadaveric Model</td>
</tr>
<tr>
<td>A. Srinivasan, J.Koh, Puri – EH 17-050</td>
<td>Use of Dual Energy CT Scans to Evaluate Accuracy of Robotic Total Knee Arthroplasty Component Placement</td>
</tr>
</tbody>
</table>

2013


continued
Select Physician Awards and Honors

Leadership Positions
Jamal Ahmad, MD
Chair of the American Academy of Orthopaedic Surgeons
Foot and Ankle Program Committee, 2015–2017
Adam Bennett, MD
Chicago Bears NFL Football Team Consulting Physician
Leon Benson, MD
Journal of Bone and Joint Surgery, Elite Reviewer, 2016–present
Castle Connolly Top Doctor
Mark Birmingham, MD
Chicago Bears NFL Football Team Consulting Surgeon
Mark Bowen, MD
Chicago Bears NFL Football Head Team Surgeon
Charles Carroll, MD
Castle Connolly Top Doctor
Editor, The Journal of Bone & Joint Surgery
Arnold Cohn, MD
Castle Connolly Top Doctor
Jeffrey Goldstein, MD
Castle Connolly Top Doctor
Wayne Goldstein, MD
Castle Connolly Top Doctor
John Grayhack, MD
Castle Connolly Top Doctor
Purnendu Gupta, MD
Castle Connolly Top Doctor
Steven L. Haddad, MD
Orthopaedic Learning Center, Vice President of the Board of Directors, 2017–2018
American Academy of Orthopaedic Surgeons, Chairman, Foot and Ankle Content Committee, 2017
Carrie Jaworski, MD
Medical Director for Chicago performances of Hamilton
American College of Sports Medicine (ACSM)—Vice President, 2013–2015
ACSM Liaison for the Sports Medicine Advisory Committee of the National Federation of State High School Associations, 2016–present

Jason Koh, MD, MBA
American Academy of Orthopaedic Surgeons
Communications Cabinet, 2017
Board of Councilors, 2011–2017
Leadership Fellows Program, Mentor, 2016–2017
Illinois Association of Orthopaedic Surgeons, Board, Past President, 2009–present
American Orthopaedic Society for Sports Medicine
Council of Delegates, 2012–2015
Corporate Relations Committee, 2014
International Patellofemoral Study Group, Treasurer
International Society of Arthroscopy, Knee Surgery and Orthopaedic Sports Medicine
Patellofemoral Scoring Task Force Chair, 2013–2017
Scientific Committee, Deputy Chair, 2015–2019
Program Committee, 2015–2017
Patellofemoral Foundation, Secretary
Adjunct Professor, McCormick School of Engineering, Northwestern University, 2017
American Shoulder and Elbow Surgeons
Membership Committee, 2015–2018
Value Committee, 2017–2020
Tissue Engineering and Regenerative Medicine Cover Article, 2017
Northwestern University Kellogg School of Management Cohort Ambassador, 2015–2016
Castle Connolly Top Doctor

Dr. Jason Koh

Dr. Leon Benson and his therapy dog Cooper
Select Physician Awards and Honors

James Kudrna, MD, PhD
Operation Walk Chicago 2017 Honoree

Steven Levin, MD
United States National Rugby Team, Team Surgeon, 2002–present

Seth Levitz, MD
Chicago Bears NFL Football Team Consulting Surgeon

Mark Mikhael, MD
North American Spine Society (NASS)
- Section on Radiology, 2012–present
- Section on Radiology, Co-Chair, 2017–present
- Section on Allied Health, 2015–present
- Evidence-Based Guidelines Committee, 2013–present

Srdjan Mirkovic, MD
Editorial Board Member—Spine
Editorial Board Member—International Journal of Spine Surgery
Chicago Bears NFL Football Team Consulting Surgeon

Gregory Palutsis, MD
Castle Connolly Top Doctor

Pardi B, Schwartz B, Savin DS, Rodriguez J, Shah RR, Goldstein JM, Goldstein WM, Ritesh Shah, MD, Jeffrey Goldstein, MD,
Wayne Goldstein, MD
American Academy of Orthopaedic Surgeons
Best Poster in the Practice Management classification, 2016 AAOS Annual Meeting

Craig Phillips, MD
Castle Connolly Top Doctor

Amy Jo Ptaszek, MD
Castle Connolly Top Doctor

William J. Robb III, MD
American Academy of Orthopaedic Surgeons
- 2017 William W. Tipton Jr., MD, Leadership Award
- National Surgical Patient Safety Summit, Co-Chair, 2016
- Castle Connolly Top Doctor

Richard Sherman, MD
Castle Connolly Top Doctor
Over the past 10 years, Dr. Robb has spearheaded an effort to establish a new culture of safety in orthopaedics and the broader national surgical community, and helped organize the Orthopaedic Surgical Safety Summit in 2012 and the first National Surgical Patient Safety Summit. The catalyst for his involvement in patient safety issues, he said, was “recognition about 10 years ago that there was significant progress in terms of surgical technique and various implants and devices for specific diseases, but it was unclear whether this impacted outcomes for patients harmed by adverse events.”

Leon S. Benson, MD, who practices with Dr. Robb at the Illinois Bone & Joint Institute, said his colleague influenced and inspired him by demonstrating “the highest standards of ethics and commitment.” He added that Dr. Robb “is always leading, always thinking of ways to improve things, always focusing on orthopaedic surgery as a conduit to improving the human condition. Leadership, volunteerism and work ethic are three things Bill lives by, and he’s constantly giving to education, research, his colleagues, and most of all, his patients.”

Dr. Robb is a fifth-generation physician whose father was also an orthopaedic surgeon and leader as Iowa’s representative to the AAOS Board of Councilors in the 1970s.
Select Speaking Engagements

Speaking Engagements 2017


Karam JA, Pardi BM, Shah RR, Goldstein JM, Goldstein WM. The Disappearing Calf Clot: The Rate and Fate of Infra-Popliteal DVT after Total Joint Arthroplasty. AAOS 2017 Annual Meeting Poster Presentation, San Diego, CA. MAOS 2017 Annual Meeting, Amelia Island, FL. AOA 2017 Annual Meeting (Poster), Charlotte, NC.


Koh J. Meniscus Horizontal Cleavage Tears—What Happens to Knee Contact Pressure When We Operate? Herodicus Annual Meeting, Pebble Beach, CA. May 18-21, 2017.


Speaking Engagements 2016


Karam JA, Shah RR, Goldstein JM, Gordon AC, Jimenez ML, Goldstein WM. An Oldie but Goodie: Midterm Results of a Dual Offset Tapered Femoral Stem for Total Hip Arthroplasty. AAHKS 2016 Annual Meeting Poster Presentation (Poster No. 112), Dallas, TX.


Robb W, Shah RR, Goldstein JM, Blom A, Fletcher M, Branson J. Moving the Needle: Less Cost, Improved Care from a Gainsharing Supported Integrated Rehab Network. AAHKS 2016 Annual Meeting Poster Presentation (Poster No. 170), Dallas, TX.


Shah RR, Goldstein JM, Gordon AC, Jimenez ML, Goldstein WM. Alarmingly High Rate of Implant Fractures in One Modular Femoral Stem Design: A Comparison of Two Implants. AAOS 2016 Annual Meeting Poster Presentation (Poster No. P040), Orlando, FL.


Speaking Engagements 2015


Jiang JJ, Schipper ON, Chen L, Koh JL, Toolan BC. Effect of Diabetes Mellitus on Perioperative Complications and Hospitalization Outcomes after Ankle Arthrodesis and [NOTE: Insert missing information.]


Select Speaking Engagements


Speaking Engagements 2014


Our physicians are highly sought after for their opinions and expertise on regional and national orthopaedic issues, and have appeared on such national outlets as the Today Show, Good Morning America and U.S. News & World Report. This is a sample of our staff’s media appearances; for a complete list, visit northshore.org/ortho.

The elected chairs of our various divisions receive a report at the end of each year on the following areas:

- Locations
- Services List
- High-Quality Patient Care
- Outcomes
- New Physicians
- Leadership
- Outreach
- Cutting-Edge Research and Informatic Highlights
- Academic Highlights

DIVISION REPORTS

- Adult Reconstruction (Joint Replacement)
- Spine
- Sports Medicine
- Hand and Upper Extremity
- Foot and Ankle
- Trauma
- Podiatry
- Pediatric Orthopaedics

SELECT LISTS

- Select Current Research
- Select Department of Orthopaedic Surgery Publications
- Select Physician Awards and Honors
- Select Speaking Engagements

In the News

Our physicians are frequently sought after for their opinions and expertise on regional and national orthopaedic issues, and have appeared on such national outlets as the Today Show, Good Morning America and U.S. News & World Report. This is a sample of our staff’s media appearances; for a complete list, visit northshore.org/ortho.