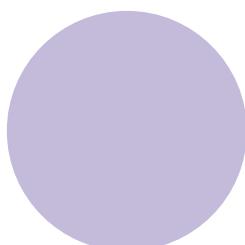
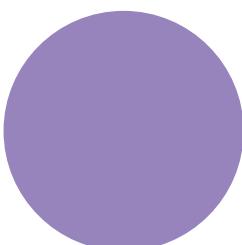
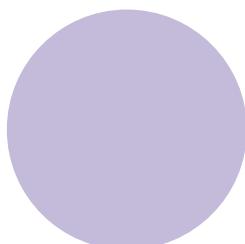
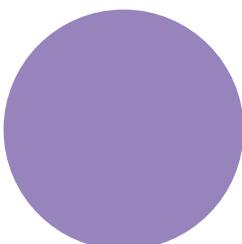
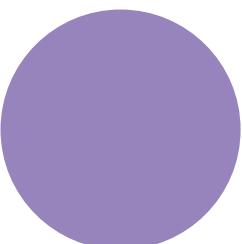
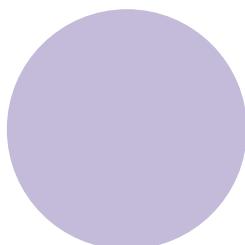
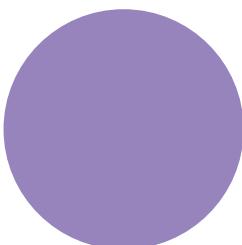
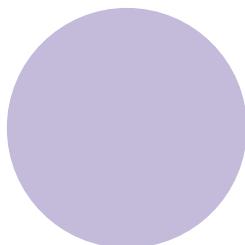
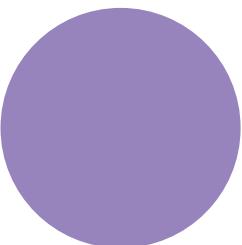
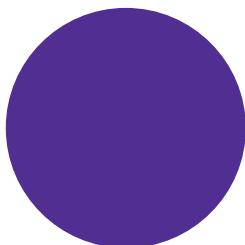
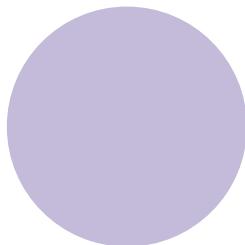
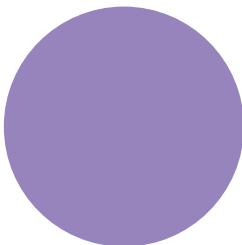
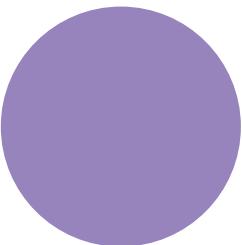


DEPARTMENT OF ORTHOPAEDIC SURGERY 2012 Quality & Outcomes Report



Welcome to the Department of Orthopaedic Surgery at NYU Langone Medical Center

The Department of Orthopaedic Surgery at NYU Langone Medical Center is one of the largest and most accomplished orthopaedic programs in the country. Our department is recognized both nationally and internationally as a leader and center of excellence in orthopaedic clinical care, education, research and quality. We consistently rank among the nation's top 10 in the *U.S. News & World Report* annual survey of "Best Hospitals" in America.

Under the leadership of Joseph D. Zuckerman, MD, the Walter A.L. Thompson Professor of Orthopaedic Surgery and Chairman of the Department of Orthopaedic Surgery, our world-class faculty provides care in all orthopaedic subspecialty areas, including: adult reconstructive surgery; orthopaedic trauma; surgery of the spine; sports medicine; hand surgery; musculoskeletal oncology; shoulder and elbow surgery; pediatric orthopaedics; and foot and ankle surgery. With our consistently growing and dedicated faculty (presently over 180 members), our department is dedicated to its pursuit of excellence, especially maintaining a leadership role in the development and implementation of quality initiatives.

Since the publication of our inaugural Quality and Outcomes Report, there has been a national focus on quality and patient safety in medical care. We are at the forefront of this movement and understand the importance of quality care and patient safety in controlling the cost of healthcare in the United States. The tens of thousands of patients annually who entrust their care to our physicians depend on us to provide the best opportunity to lead healthy and productive lives. We proudly present this second report, which describes our continued efforts in the area of orthopaedic quality care and our commitment to patient safety.



Table of Contents

• Message from the Dean and CEO	4
• From the Chairman and the Vice Chair of Clinical Affairs.....	5
• Key Locations: Quality Throughout the Community	6
• Quality and Safety in the Patient Journey	8
• Primer on Quality, Outcomes and Patient Safety	
• Quality Reporting and Value-Based Purchasing.....	11
• Patient Experience	12
• Guide to Evaluating Quality	16
• Quality, Outcomes and Patient Safety in the Department of Orthopaedic Surgery	
• Research in Quality, Cost-Effectiveness and Patient Safety	18
• Cost-Effectiveness Studies.....	22
• Procedure Volume.....	24
• Hospital-Acquired Conditions	25
• Surgical Site Infections.....	25
• Surgical Care Improvement Project Measures.....	27
• Length-of-Stay Reduction	29
• Quality and Outcomes Data by Subspecialty	
• Trauma and Fracture.....	31
• Shoulder and Elbow	33
• Sports Medicine.....	36
• Adult Reconstructive	39
• Orthopaedic Oncology.....	42
• Pediatric Orthopaedics.....	43
• Foot and Ankle.....	45
• Spine.....	46
• Hand.....	48
• Quality Collaboration, Learning and Leadership	
• Education: Quality and Process Improvement Course.....	50
• Nursing Collaboration.....	50
• Quality- and Patient-Safety-Focused Presentations.....	51
• Selected Publications	52
• Faculty and Leadership	56

Department of Orthopaedic Surgery Report on Quality, Outcomes and Patient Safety



Message from the Dean and Chief Executive Officer



Robert I. Grossman, MD

Quality, patient safety, patient experience. At NYU Langone Medical Center, these aren't broad-stroke initiatives—they are measurable, quantifiable, and concrete.

Part and parcel to our vision as a world-class, patient-centered, integrated academic medical center is an intense commitment to quality and safety in our clinical care, and transparency in sharing this information with our patients and colleagues. With hospital performance measures now a part of the public domain, the expectation of accountability helps push us even further in ensuring that quality and patient safety are embedded in every facet of our work, every day.

And blazing the trail in this philosophy is our Department of Orthopaedic Surgery.

Under the leadership of Chairman Joseph D. Zuckerman, MD, the Walter A.L. Thompson Professor of Orthopaedic Surgery, the Department continues to be ranked among the top 10 nationwide by *U.S. News & World Report*, backed by an ever-growing body of clinical evidence of quality orthopaedic care. The cutting-edge diagnostic techniques and treatment services provided by our orthopaedic surgeons are remarkable not only for the help and hope they bring to an ever-increasing proportion of the population we serve, but for the quality and safety with which they are provided.

We are extremely proud of our patient safety record at NYU Langone Medical Center and the great contributions made by our Department of Orthopaedic Surgery. I am happy to present you with the Department's second report on our quality- and patient-focused achievements.

A handwritten signature in black ink that reads "Robert I. Grossman". The signature is fluid and cursive, with "Robert" and "I." being more formal and "Grossman" being more stylized.

Robert I. Grossman, MD
The Saul J. Farber Dean and Chief Executive Officer
NYU Langone Medical Center

From the Chairman and the Vice Chair of Clinical Affairs



Joseph D. Zuckerman, MD

We are proud to present our second annual report describing the quality, outcomes and patient safety initiatives of the Department of Orthopaedic Surgery at NYU Langone Medical Center, including the Hospital for Joint Diseases, our premier inpatient orthopaedic hospital and the cornerstone of our orthopaedic quality program. In the pages that follow, we detail our efforts in providing outcomes-driven patient care, quality improvement, and patient safety.

As a recognized world leader in musculoskeletal care, we are committed to understanding the factors that affect patient safety, quality of care, and outcomes. We devote significant resources to making certain that our patients receive the finest, most technologically advanced and safest care possible. Our commitment to the principle of outcomes-driven, quality care has been core to the mission of our Department since its inception as the Jewish Hospital for Deformities and Joint Diseases in 1905. This commitment can only be fulfilled through repeated cycles of innovation, measurement, introspection and improvement. To paraphrase Socrates, the "examined life" is the only one worth pursuing.

Research and education are essential to achieve and maintain our role as leaders in orthopaedic care. We not only strive to provide the best clinical care for our patients, but we are continually focused on peer education through dissemination of knowledge gained through experience and research. Each of the nine individual subspecialty divisions of our department has a section that highlights its research on patient outcomes and quality of care. We have also added a primer on Value-Based Purchasing and the importance of the patient experience. Over our 107-year history, we have continued to focus on our patients' perceptions of their care as a measure that is as important as the traditional objective measures of patient outcome. It is no surprise that the vast majority of our patients would—and do—recommend us to family members or friends.

We are intensely proud of the achievements and efforts of our devoted faculty and staff towards providing the finest care for our patients. As leaders within our own institution, we realize how fortunate we are to be surrounded by a focused, aligned, and committed staff. The many initiatives described in this report would not have been possible without the sustained effort and commitment of each individual associated with the Hospital for Joint Diseases. We dedicate this report to the faculty and staff with whom we work and to all the patients for whom we have had the privilege to provide care.

We are confident that you will find this report informative, comprehensive and educational. We welcome any questions from our colleagues.

Sincerely,

A handwritten signature in black ink, appearing to read "Joseph D. Zuckerman".

Joseph D. Zuckerman, MD
The Walter A.L. Thompson Professor
of Orthopaedic Surgery
Chairman, Department of Orthopaedic Surgery

A handwritten signature in black ink, appearing to read "Joseph A. Bosco".

Joseph A. Bosco, MD
Vice Chair of Clinical Affairs

Key Locations: Quality Throughout the Community

The Department of Orthopaedic Surgery provides quality and outcomes-focused orthopaedic care throughout the NYU Langone Medical Center facilities and affiliates:

The Hospital for Joint Diseases

Located at 301 East 17th Street, the Hospital for Joint Diseases at NYU Langone Medical Center (HJD) is the premier inpatient facility of the Department of Orthopaedic Surgery. This 190-bed hospital provides primary, secondary, and tertiary levels of service in the treatment and prevention of musculoskeletal diseases and injuries.

HJD is consistently ranked among the nation's top 10 for orthopaedics and rheumatology in the *U.S. News & World Report*'s annual survey of "Best Hospitals" in America. Our institution provides world-class, patient-centered care and services for the full range of musculoskeletal diseases, spanning all the orthopaedic subspecialties. This includes hand surgery, total joint replacement, spine surgery, trauma surgery, pediatric orthopaedics, shoulder and elbow surgery, sports medicine, foot and ankle surgery, and musculoskeletal tumor surgery. Through a close collaboration with our nationally recognized Department of Rheumatology, we also offer specialized programs for rheumatoid arthritis, osteoarthritis, psoriatic arthritis, lupus, osteoporosis, pediatric rheumatology and vasculitis. Additionally, we maintain an immediate orthopaedic care center (I-Care), which accommodates patients with acute orthopaedic injuries and conditions on a walk-in basis. In order to service the needs of our patients and referring physicians, our I-Care center is open seven days a week, 365 days a year.

The Center for Musculoskeletal CareSM

Scheduled to open in the spring of 2012, The Center for Musculoskeletal Care at NYU Langone Medical Center (CMC), located at 333 East 38th Street, will be NYU Langone's premier facility for outpatient musculoskeletal care, encompassing orthopaedics, rheumatology, and rehabilitation. With 110,000 square feet of state-of-the-art space, it will be the first and largest stand-alone facility in the United States to bring clinical care and biomedical research resources for bone and joint patients together at a single point of service.

The CMC will integrate research, clinical practice, rehabilitation (provided by the world-renowned Rusk Institute of Rehabilitation Medicine at NYU Langone Medical Center) and wellness services for patients with conditions involving the spine, arthritis, autoimmune diseases, sports injuries, and total joint replacement. Radiology, infusion therapy, rehabilitation, and pain management will also be available. Among CMC's highlights are a 7,200-square-foot, state-of-the-art rehabilitation facility and the Performance Center, focused on athletes who desire to improve their level of performance.

Outpatient Surgery Center

NYU Langone Medical Center's 22,000-square-foot Outpatient Surgery Center at 333 East 38th Street focuses on ambulatory orthopaedic procedures including shoulder, elbow, wrist and hand surgeries, knee and ankle arthroscopies, ACL reconstruction, rotator cuff repair, and fracture fixation, among others. Staffed by our orthopaedic faculty, the stand-alone surgical center represents a new era in our evolution as a cutting-edge provider of orthopaedic care.

Each of the four operating rooms in the surgical center is equipped with the latest in arthroscopic technology and is designed to optimize surgical space and provide enhanced functionality. In addition to the 12-bed postanesthesia care unit (PACU), the facility boasts special air-filtration systems in the ORs that use positive pressure ventilation to prevent airborne microbes. They are also equipped with the latest in ceiling-mounted arthroscopy equipment—a necessity for minimally invasive surgery—and a modular setup with enclosed wiring and cables, to allow additional devices to be easily and quickly integrated. Each operating table is bordered by two high-definition, flat-panel color video monitors that can be positioned for viewing real-time images or X-rays during surgery.

With the opening of the CMC at the same location, patients will have even greater access to seamless, outpatient musculoskeletal care at one point of service.



Tisch Hospital

Tisch Hospital, located at 550 First Avenue, is the medical center's flagship acute care hospital. The Department of Orthopaedic Surgery provides inpatient and outpatient orthopaedic care at this 705-bed facility.

Orthopaedic services at Tisch include joint replacement, orthopaedic oncology, spine, sports medicine, general adult and pediatric orthopaedic services, and emergency orthopaedic services in collaboration with the Department of Emergency Medicine.

Affiliated Facilities

Bellevue Hospital Center

Bellevue Hospital Center is the flagship hospital of New York City's Health and Hospitals Corporation, a system of public hospitals located throughout the metropolitan area. Located just two blocks south of NYU Langone Medical Center, this 1,232-bed facility has had a long-standing affiliation with the Department of Orthopaedic Surgery. Our faculty members are responsible for all orthopaedic inpatient and outpatient care at Bellevue and conduct weekly clinics in the subspecialties of hand surgery, adult reconstructive surgery, trauma, pediatric orthopaedics, sports medicine, and spine. Bellevue's trauma program, which includes physicians in our Trauma Division, is widely recognized as the finest in New York.

Veterans Affairs Medical Center

Part of the New York Harbor Healthcare system, this 851-bed hospital located on 23rd Street and First Avenue is an affiliate of NYU Langone Medical Center

and serves a unique patient population. The faculty members who staff the VA do so with pride and are honored to provide care for those who have served our country. Our surgeons provide care at the VA for the full range of orthopaedic conditions. The VA also serves as a key teaching and research facility for the residents and faculty from the Department of Orthopaedic Surgery.

Jamaica Hospital Medical Center

Jamaica Hospital Medical Center is a 387-bed medical facility and Level 1 trauma center located in Queens, New York. Staffed by our faculty, residents and fellows, Jamaica Hospital Medical Center is the busiest trauma center in Queens and the second busiest in the New York metropolitan area. Our faculty members provide general orthopaedic and trauma care as well as specialty care in the areas of adult reconstructive surgery, sports medicine, hand and upper extremity surgery, and pediatric orthopaedics.

The Patient Journey: *Quality and Safety at Every Step*

In the Department of Orthopaedic Surgery, quality and patient safety measures are woven throughout the patient experience, as shown in this schematic of the patient journey.



Physician Office Visit

- Patient informed about surgery and hospital stay
- Enrollment in the Guided Patient Services (GPS) Program
- Patient expectations regarding length-of-stay (LOS) and discharge planning are addressed by discharge planner in physician's office



Preadmission Testing

7-14 days prior to surgery

- Patient nares cultured for *S. aureus*
- Provided with mupirocin ointment
- Assessed for VTE risk
- Provided with chlorhexidine (CHG) wipes for preoperative bathing



Preoperative Class

- Complication risk minimization strategies discussed
 - SSI prevention
 - Importance of hand hygiene
 - *S. aureus* eradication



Preoperative Holding

- Team confirms patient identification and appropriate surgical site location
- Patient identified and attending surgeon initials operative site
- Nursing confirms operative site and procedure
- Nursing confirms accuracy of case booking
- Team huddle 15 minutes prior to procedure
 - Surgical team members introduce themselves
 - Roles confirmed
 - Communication enabled
 - Proposed procedure reviewed
- Nasal culture results checked, appropriate antibiotic prophylaxis ordered and given
- VTE Risk Assessment Tool completed
- Appropriate VTE prophylaxis initiated



Surgery

- Surgical time-out procedure performed
 - Surgical site confirmed
 - Antibiotic prophylaxis confirmed
 - VTE prophylaxis confirmed
 - Proper equipment confirmed
- Patient administered antibiotics prior to incision



Hospital Stay

- Rapid Rehab: Physical therapy started in recovery room
- Antibiotics are discontinued 24 hours after surgery
- Appropriate VTE prophylaxis is started
- Hand hygiene enforced
- Discharge planning and education continues

Discharge

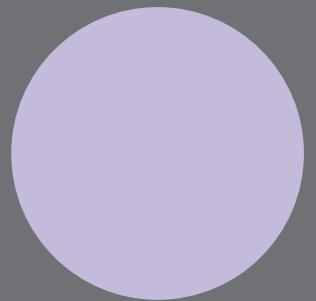
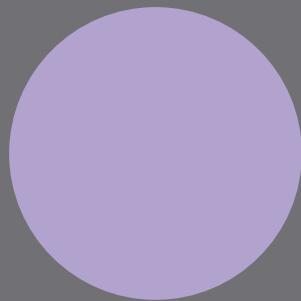
- Appropriate discharge plan identified
 - Patient educated on VTE prevention and potential signs and symptoms of infection
 - Encouraged to follow up with primary care physician within two weeks



Postoperative Follow-up

- Patient called by staff the day following discharge
- Staff addresses patient concerns via phone

Primer on Quality, Outcomes and Patient Safety



Quality Reporting and Value-Based Purchasing: Valuing the Patient Experience

The guiding principle of Value-Based Purchasing (VBP) is the notion that payers of healthcare hold providers of healthcare accountable for the cost and quality of care they provide. VBP leverages data on the quality of healthcare (patient outcomes and patient experience) in order to improve the quality of care and reduce inappropriate care through a system of financial incentives and penalties.

The program is scheduled to begin in October 2012, with full implementation to be completed by 2016. Starting in October 2012, there will be a 2% reduction in base operating diagnosis-related grouping (DRG) payments to the hospitals for each discharge. This will increase to 6% by 2016. The government will then redistribute this saved money to those hospitals that provide the best patient care or show the most improvement in the quality of patient care. The Centers for Medicare and Medicaid Services (CMS) will measure the quality of patient care based upon performance grading of 25 dimensions. Seventy percent of these measures focus on the process of care, such as Surgical Care Improvement Program (SCIP) measures, but 30 percent are based on patient experience metrics. The patient experience will be graded by Hospital Consumer Assessment of Healthcare Providers and Systems (HCAHPS) scores. CMS will then calculate a Total Performance Score by combining weighted scores on each measure, which will be translated into a value-based incentive payment. Thus, poor performers will not receive any payment, while the best performers will receive up to six percent of the Medicare payments.

Within the Department of Orthopaedic Surgery, we know that making hospital care safer and more comfortable for patients and their families begins with a culture of safety. Improving patient safety and satisfaction requires staff on all levels to have an understanding of what has been accomplished and what must still be done. To accomplish this we distribute a **quarterly department dashboard** to our physicians, including Process of Care Measures and Patient Experience data* as well as **monthly divisional updates** featuring the number of readmissions, discharges, infections and venous thromboembolisms (VTEs). At our monthly Spine and Total Joint Committee meetings, we review our patient satisfaction scores (HCAHPS) as well as the process measures.

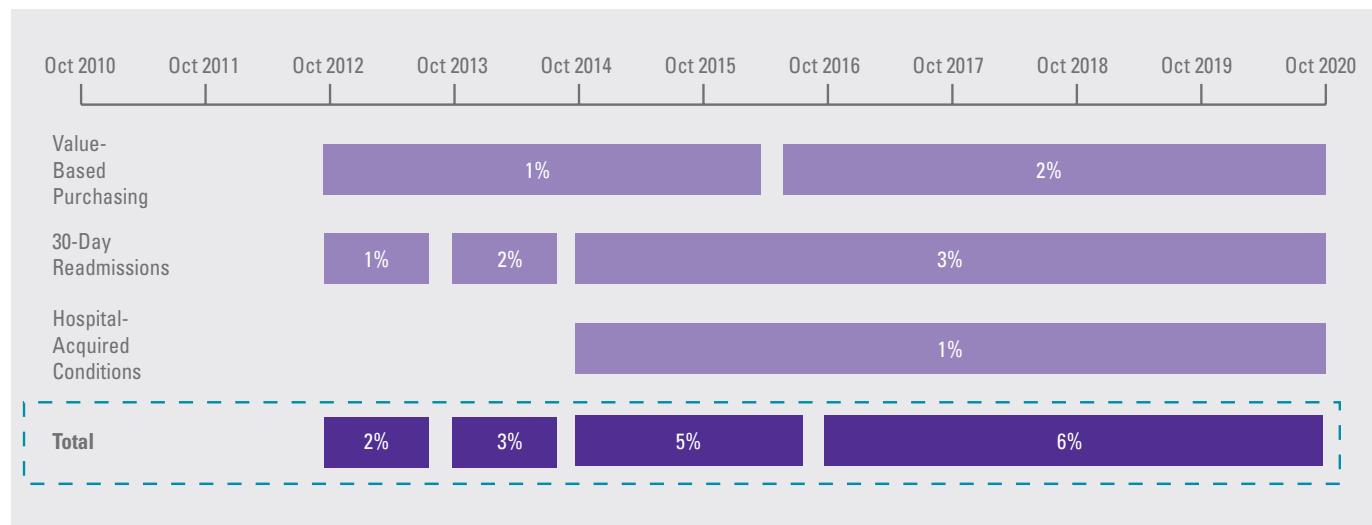
* Process of Care Measures

- Prophylactic antibiotics received within one hour of incision
- Proper antibiotic selection
- Discontinuation of antibiotics at 24 hours
- Recommended VTE prophylaxis
- VTE Prophylaxis begins within 24 hours postoperatively

Patient Experience

- Communication with doctors

Medicare Payment at Risk, Year by Year



Patient Experience at HJD: HCAHPS

The HCAHPS (Hospital Consumer Assessment of Healthcare Providers and Systems) survey is the first national, standardized, publicly reported survey of patients' perspectives of hospital care. While many hospitals have collected information on patient satisfaction for their own internal use, until HCAHPS there was no national standard for collecting and publicly reporting information about patient experience of care that allowed valid comparisons to be made across hospitals locally, regionally and nationally.

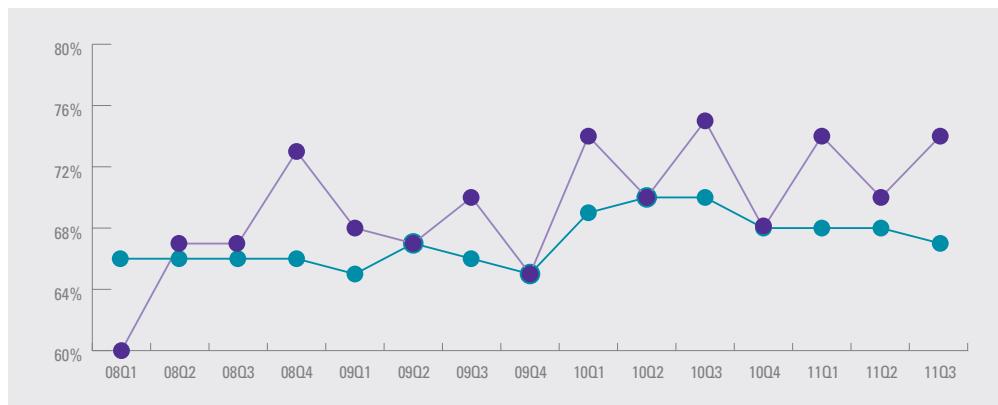
Three broad goals have shaped HCAHPS:

1. The survey is designed to produce data about patients' perspectives of care that allow objective and meaningful comparisons of hospitals on topics that are important to consumers.
2. Public reporting of the survey results creates new incentives for hospitals to improve quality of care.
3. Public reporting serves to enhance accountability in healthcare by increasing transparency of the quality of hospital care provided in return for the public investment.

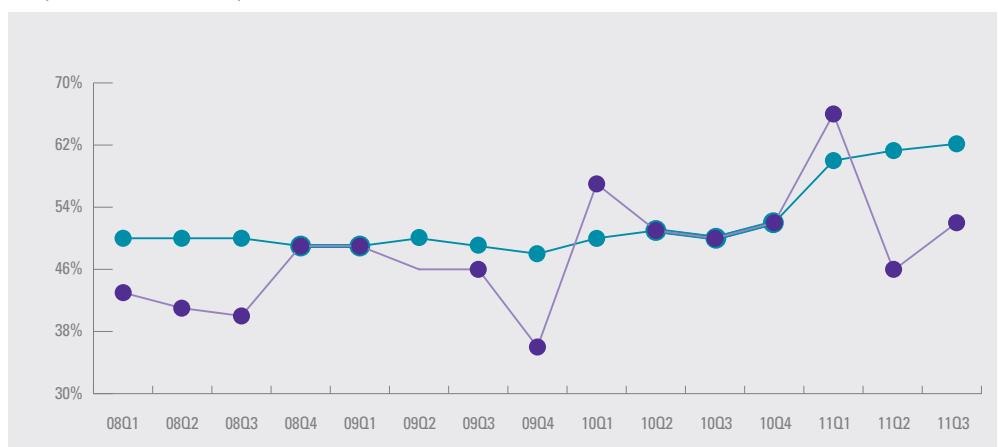
With these goals in mind, the Centers for Medicare and Medicaid (CMS) and the HCAHPS Project Team have taken substantial steps to assure the survey is credible, useful, and practical.

We are proud of the fact that our scores for: **willing to recommend the hospital; responsiveness of hospital staff to patients; and completeness of discharge information**, surpass the national average.

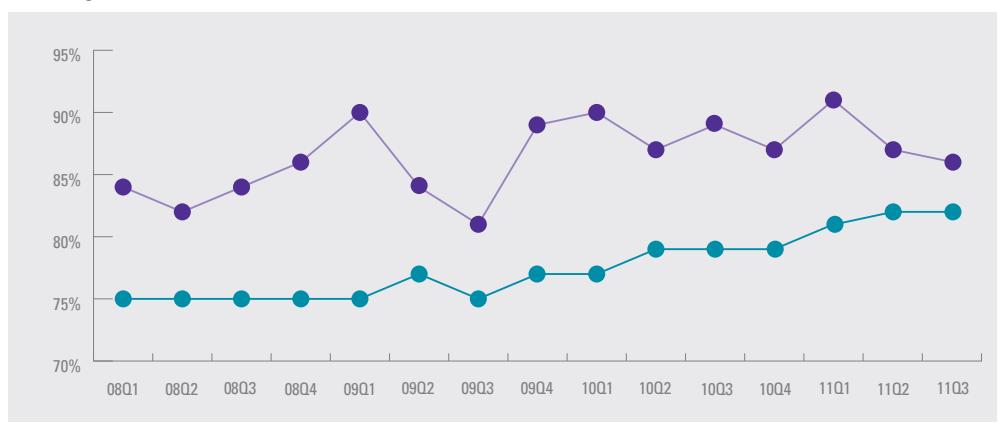
Recommend the Hospital



Responsiveness of Hospital Staff



Discharge Information



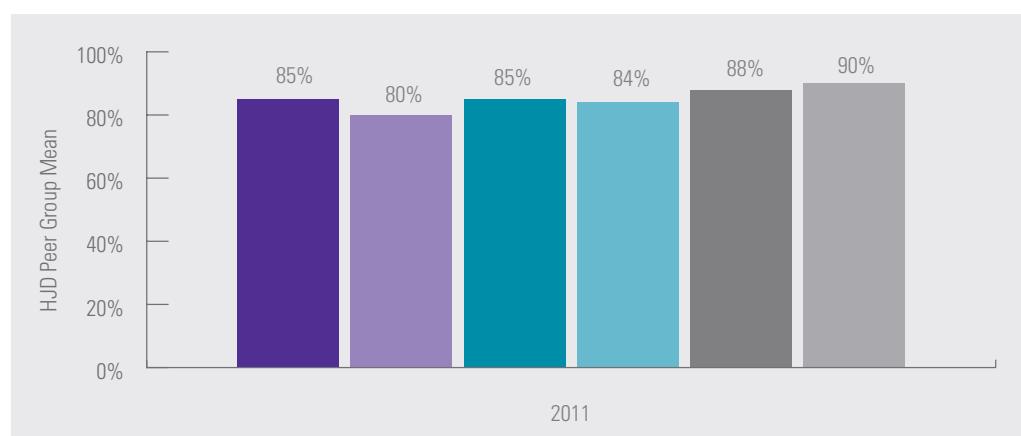
● Percent of HJD Patients Who Answered "Always" ● HCAHPS Benchmark

Patient Experience at HJD: Press Ganey

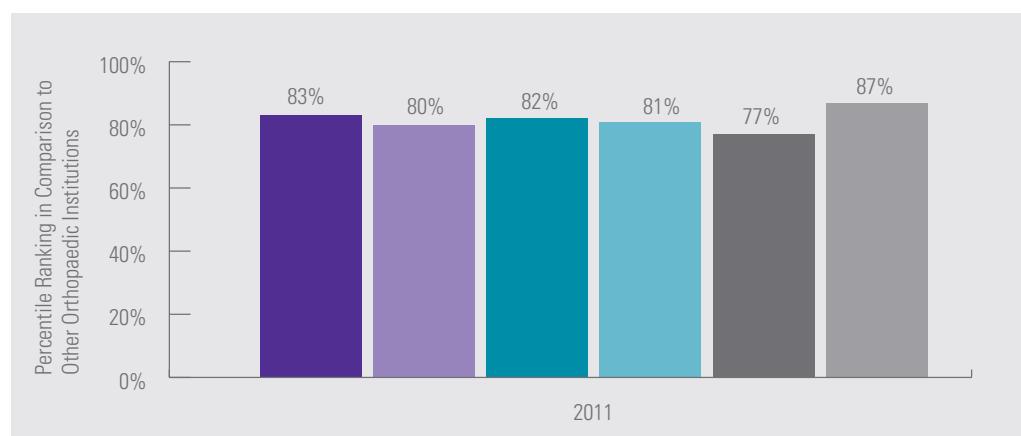
Press Ganey is a survey that uses patient discharge information to select a sample of patients who receive mailed satisfaction surveys. The company currently offers 35 surveys designed for various healthcare contexts, including general inpatient, pediatrics, emergency department, outpatient medical practice, ambulatory care, behavioral care, long-term care and home healthcare.

The majority of surveys use a five-point scale of responses ranging from “very poor” to “very good.” Surveys can be customized to match the specific services offered by a hospital. Press Ganey allows hospitals to compare their satisfaction score to other hospitals with similar patient populations or bed volume to benchmark their scores. Below we share with you our **overall physician ranking** and our **physician percentile ranking in comparison to other orthopaedic institutions**.

Percentile Physician Ranking Overall



Percentile Physician Ranking in Comparison to Other Orthopaedic Institutions



- Overall physician
- Physician concern questions/worries
- Friendliness/courtesy of physician
- Time physician spent with you
- Physician kept you informed
- Skill of physician

Patient Experience: The Outpatient Surgery Center

The NYU Langone Medical Center Outpatient Surgery Center specializes in ambulatory orthopaedic surgery and is committed to providing the highest quality care to its surgical patients in a comfortable and pleasing environment. Housed in a new state-of-the-art patient-friendly facility, the center consistently provides a wonderful and safe patient experience. This is reflected in high grades for likelihood to recommend and physician care.

*"100% professional and quality of care is highly recommended.
THANK YOU NYU [Langone]."*

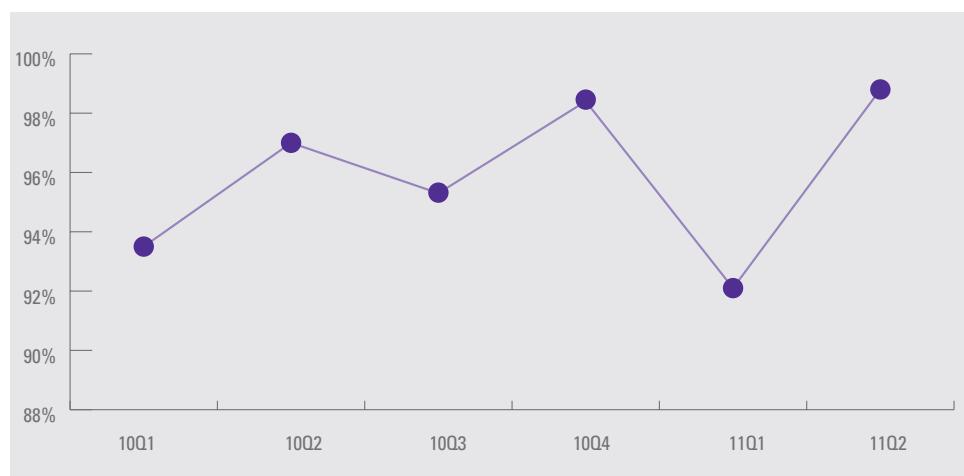
*"The best experience I ever had at a healthcare facility; very well run,
very clean, and wonderful employees."*

"The staff members were very caring, full of joy and I can't complain about anything."

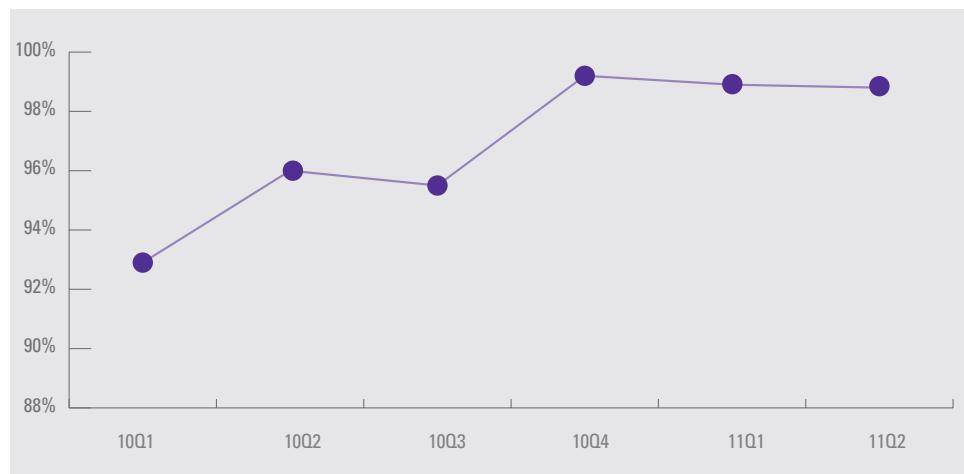
"Everybody was so polite and patient. I felt very comfortable. No jitters at all!"

"Excellent staff, well-organized, informative, helpful, keep up the good work."

Likelihood of Recommending



Rating of Physician Care



Guide to Evaluating Quality

It is important to research hospitals and physicians before deciding where to seek medical care, examining a hospital's surgical outcomes and case volumes as well as patient satisfaction measures. Among the many available resources to compare hospitals and physician rankings are two reliable ones: the U.S. Department of Health and Human Services (HHS) "Hospital Compare" tool (www.hospitalcompare.hhs.gov) and a similar hospital comparison tool through The Leapfrog Group (www.leapfroggroup.org/cp). Below is a set of criteria for consideration when evaluating hospital and physician quality.

What are the surgeon's credentials?

A good sign of a surgeon's competence is whether they are board-certified and recertified in their specialty. Board certification means they have trained in their specialty and passed specialty-specific examinations; recertification means they have continued to fulfill the requirements of periodic examinations. *All of our surgeons are board-certified, board recertified or board-eligible and the vast majority have completed additional fellowship training in a subspecialty of orthopaedic surgery.*

What is the surgeon's experience with the procedure?

The more experience a surgeon has with the procedure the better the outcome for patients. Numerous studies have found that physicians and hospitals that perform a *high volume of surgery for a specific procedure have lower mortality and complication rates* than procedures with lower volumes.

What services does the hospital offer?

Hospitals with a range of services (such as large academic medical centers) are better equipped to handle complex medical conditions or complications that may arise during treatment. If the physician overseeing the case needs

a consultation from another physician at NYU Langone Medical Center, it is always available and easily accessible.

What are the surgeon's and hospital's outcomes and do they follow process measures?

Outcomes and process measures are very important indicators of the quality and safety of care provided at a hospital. There are *several important publicly reportable process measures* that one should be aware of, including *antibiotics given prior to and post-surgery, as well as appropriate treatments utilized to prevent VTEs*. You can compare this data across several hospitals by viewing the HHS Hospital Compare website.

Are other patients satisfied with the hospital?

Large hospitals ask their patients to rate their hospital stay or office visit. These surveys ask the patient a multitude of questions, including if they would recommend the hospital, how they were treated by the staff and if their pain was managed appropriately. Patient satisfaction measures are often based on the patient's hospital experience and the quality of the care they receive. *Over 74% of our patients would recommend our orthopaedic services, which is significantly above the national average.*

PROCESS MEASURES	NYU LANGONE MEDICAL CENTER	NATIONAL AVERAGE
Surgery patients who were taking heart drugs called beta blockers before coming to the hospital, who were kept on the beta blockers during the time period just before and after their surgery	98%	93%
Surgery patients who were given an antibiotic at the right time (within one hour before surgery) to help prevent infection	98%	97%
Surgery patients who were given the right kind of antibiotic to help prevent infection	98%	97%
Surgery patients whose preventive antibiotics were stopped at the right time (within 24 hours after surgery)	98%	94%
Surgery patients needing hair removed from the surgical area before surgery, who had hair removed using a safer method (electric clippers or hair removal cream—not a razor)	100%	99%
Surgery patients whose urinary catheters were removed on the first or second day after surgery	93%	90%
Surgery patients whose doctors ordered treatments to prevent blood clots after certain types of surgeries	100%	94%
Patients who got treatment at the right time (within 24 hours before or after their surgery) to help prevent blood clots after certain types of surgery	98%	92%

Quality, Outcomes and Patient Safety in the Department of Orthopaedic Surgery





Research in Quality, Cost-Effectiveness and Patient Safety

Research and education on quality and patient safety is at the core of our department's mission. We continue to focus our efforts on these issues and have assumed a leadership role both within our institution and on a national scale. Research and dissemination of information through peer education are central to maintaining our leadership role among healthcare institutions. This allows other clinicians to benefit from the programs and knowledge that we have developed.

Thus, it is a priority for our department to publish and disseminate the work put forth by our Quality Division. The emphasis of our research focus is centered on decreasing surgical site infections (SSIs) and hospital-acquired infections through staphylococcus aureus decolonization and reduction

of readmissions. The following abstracts are an overview of several of the quality-specific outcomes we have published and/or presented. A more complete list of our presentations at national and international meetings can be found in the final section of this report.

A Hospital-Wide Initiative to Decrease Flash Sterilization

Lorraine Hutzler; Joseph Bosco, MD; James Slover, MD, MS; Kandy Kraemer, RN, MSN

Summary: We recorded all surgical procedures requiring implants which were flashed, over a 40-month time period (1/2008–4/2011). In 1/2010 we implemented a hospital-wide initiative consisting of multiple education programs, enhanced operating room equipment and supplies, and improved case scheduling procedures, to decrease the use of flash sterilization of implants in orthopaedic procedures. The percentage of cases requiring flash sterilization decreased 32% after implementation of the program from 10.22% to 6.93% ($p<0.0001$).

Introduction: Patients receiving flashed implants are at an increased risk of having a surgical site infection (SSI). We investigated the causes of implant flashing at our institution and implemented a variety of initiatives to decrease the rates of implant flashing, including multiple education programs, enhanced operating room equipment and supply purchasing, improved case scheduling procedures and monitored the rate of flash sterilization.

Methods: Throughout all of our operating rooms, each time a flashed implant was used, the nursing staff generated an incident report, which was analyzed to determine the reason for flashing and to classify them as preventable (add-on sent unsterile, incorrect booking, issue with vendor, wet tray, tray carried over, amount in tray not sufficient, scheduled case sent unsterile, sent unsterile from central sterile) or unpreventable (contaminated on field, humidity issues, add-on, case-tray not ordered on time, fell during case, mislabeled, opened in error). We then implemented policy changes designed to address the preventable causes of flashing and analyzed their cost and effectiveness.

Results: In 2008 and 2009, 10.22% (141/1379) and 10.23% (135/1320) of studied cases required flashed implants. The rate of flashing decreased 32% to 6.93% over the study period after the hospital-wide initiative was undertaken ($p<0.0001$). The rate of preventable causes of flashing decreased (49.88%), while those on nonpreventable causes decreased (15.15%). Major causes of flashing were holes discovered in steriley wrapped containers. We addressed this issue by purchasing 500 reusable containers which cost \$400 each (200K total). The cost of these containers was recouped within nine months because the cost of sterile wrapping at \$10 per case was eliminated.

Conclusion: Our institution-wide initiative to decrease flashing proved to be highly effective in reducing the incidence of flash sterilization requirements in the operating room.

Experience with *Staphylococcus aureus* Decolonization Protocol and Surgical Site Infection after Total Hip and Knee Replacement

Lorraine Hutzler; James Slover, MD, MS; Igor Immerman, MD; Scott Hadley, MD; Joseph Bosco, MD

Summary: Our institution implemented a hospital-wide screening and decolonization protocol for inpatients undergoing primary knee and hip arthroplasties. Surgical site infection (SSI) rates were monitored in patients who participated and did not participate in the program.

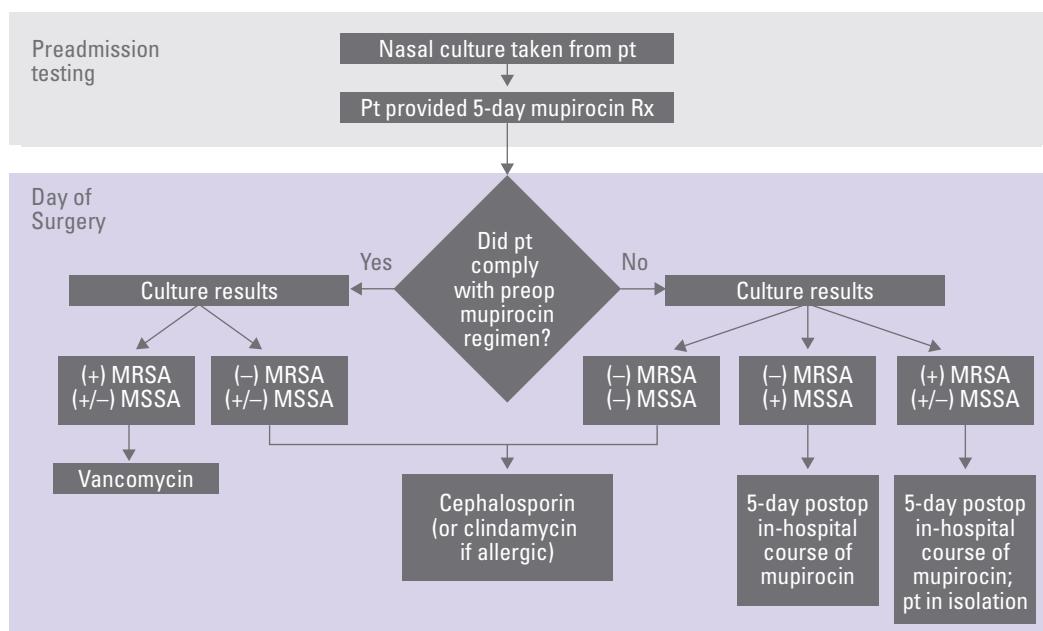
Introduction: Patients colonized with MRSA and MSSA are at an increased risk of SSIs. We investigated the effects of implementation of an institution-wide screening and decolonization protocol on the rates of SSIs in patients undergoing primary knee and hip arthroplasties from 2007 to 2009.

Methods: The treatment group consisted of patients screened for MSSA and MRSA colonization, and provided a 5-day course of nasal mupirocin and a single preoperative chlorhexidine shower prior to hip and knee replacement. Patients colonized with MRSA received vancomycin perioperative prophylaxis. Patients not screened did not receive a decolonization protocol and constituted a concurrent control group with all other infection control measures used in the operating room and facility equal to the screened group. All patients were followed for one year for postoperative infection. SSIs were classified using the Centers for Disease Control criteria. Statistical analysis was performed using Fisher's exact test.

Results: Of the 2058 patients in this study, 1644 patients were in the treatment group and 414 were in the control group. There were a total of 6 deep infections in the control group (1.45%) and 21 in the treatment group (1.28%); this represented a decrease of 13% in the treatment versus control group. This decrease represented a positive trend, but did not reach statistical significance due to control group sample size limitations. We performed a power analysis and determined that a sample size of 57,604 patients in each group would be required for statistical significance given the low rate of infection.

Conclusion: Our screening and decolonization program demonstrated a positive trend towards decreased infection in patient's decolonization of MSSA and MRSA. However, due to the low rate of infections in primary total knee and hip surgery, it is not possible for any single institution to enroll the required number of patients for these trends to reach statistical significance. Therefore, although we cannot definitively conclude that preoperative decolonization of MSSA or MRSA reduces infection rates, we believe the positive trend we have observed and the cost analysis supports MRSA and MSSA screening and decolonization prior to primary hip and knee arthroplasty.

MRSA/MSSA screening and treatment protocol for patients scheduled for TJR or spine surgery



Ninety-eight Cases of Venous Thromboembolism (VTE): Analysis of Adherence to Accepted Methods of Prophylaxis

Lorraine Hutzler; Joseph Bosco, MD; James Slover, MD, MS

Summary: We reviewed 98 consecutive cases of postoperative VTEs occurring during an 18-month time period for adherence to either the American Academy of Orthopedic Surgeons (AAOS) or American College of Chest Physicians (ACCP) evidence-based VTE prophylaxis recommendations. All cases (98/98) followed the AAOS guidelines and 89.8% (88/98) followed the ACCP guidelines.

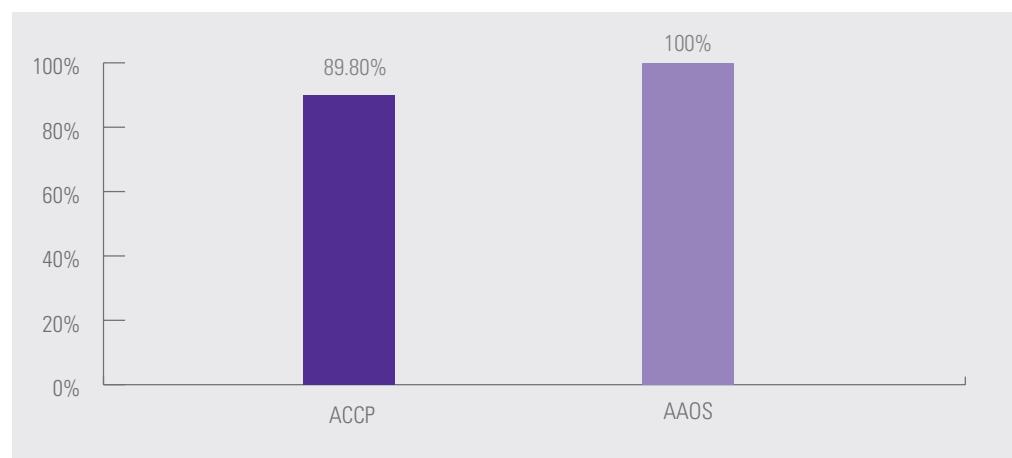
Introduction: Major orthopaedic surgeries involving the lower extremity and spine are associated with a high risk of VTE. The AAOS and ACCP have each established separate evidence-based guidelines for VTE prophylaxis in these patients. Despite rigid adherence to these guidelines VTE does still occur. We reviewed our experience in 98 patients who developed VTEs following spine or lower extremity joint replacements with respect to adherence to ACCP and/or AAOS guidelines.

Methods: We reviewed all total knee and hip arthroplasties as well as spine surgery cases presenting with a postoperative VTE during their initial hospitalization over an 18-month time period. We did not routinely screen postoperative patients for the presence of VTE.

Results: A total of 98 patients experienced a postoperative VTE. Seven were deep vein thrombosis and 91 were pulmonary embolisms. Of the 98 patients who had a VTE: 19 underwent total hip replacement, 63 underwent total knee replacement and 16 had spine surgeries. During this time period the overall VTE rate for all total joint and spine surgery patients was 2.1%. Of the patients who underwent total hip replacement: 79% (15/19) received Enoxaparin and foot pumps, 11% (2/19) received foot pumps alone, 5.26% (1/19) received Warfarin alone and 5.26% (1/19) received both Warfarin and foot pumps. Of the patients who underwent total knee replacement: 3.17% (2/63) received Enoxaparin alone, 71.4% (45/63) received both Enoxaparin and foot pumps, 9.52% (6/63) received only foot pumps, 6.35% (4/63) received Warfarin, 4.76% (3/63) received Warfarin and foot pumps, 1.59% (1/63) received Fondaparinux and foot pumps and 3.17% (2/63) received aspirin and foot pumps. Lastly, in patients undergoing spine surgeries: 12.5% (2/16) received Enoxaparin, 6.25% (1/16) received both Enoxaparin and foot pumps and 8.13% (13/16) received foot pumps alone. **In all cases of VTEs, 98/98 (100%) AAOS guidelines for VTE prophylaxis were followed. ACCP guidelines were followed in 88/98 (89.8%) of cases.**

Conclusion: Despite following accepted evidence-based guidelines for VTE prophylaxis, VTEs still occur in this high-risk population.

Percent of Cases Receiving Appropriate VTE Prophylaxis by Guideline Type



The Impact of Rapid Mobilization on Length-of-Stay for Postoperative Joint Replacement Patients

Gregory Tayrose, MD; Debbie Newman; Lorraine Hutzler; James Slover, MD, MS; Joseph A. Bosco, MD; Frederick Jaffe, MD

Summary: Postoperative joint replacement patients undergoing early mobilization demonstrated overall shorter hospital length-of-stays as compared to patients undergoing routine physical therapy starting postoperative day one.

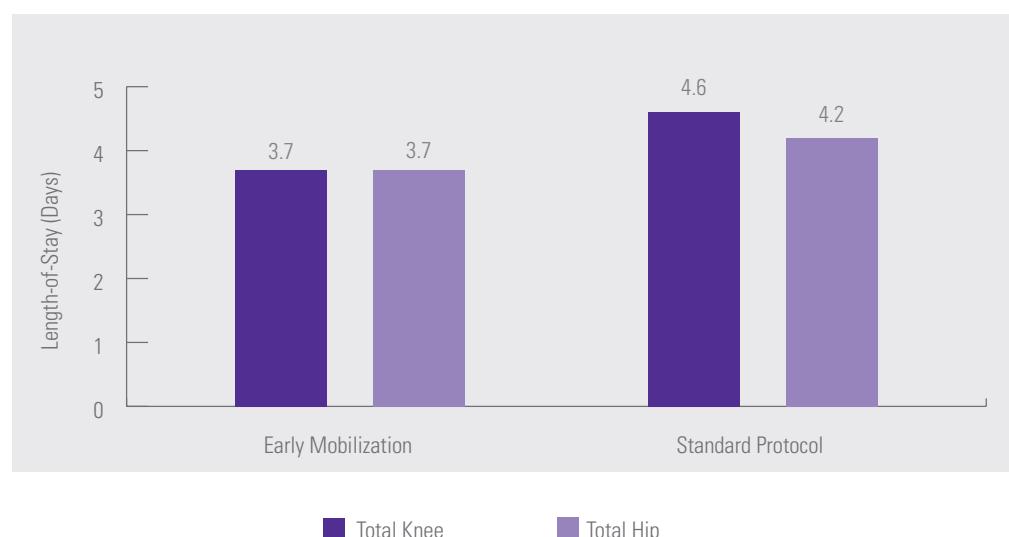
Introduction: Physiotherapy after total joint replacement enhances postoperative recovery by promoting faster rehabilitation and improving functional outcomes. Implementing a pathway to include earlier postoperative mobilization can reduce the hospital length-of-stay as well as cost. This study investigated the benefits of starting physical therapy in the recovery room following a total knee or hip replacement.

Methods: We prospectively followed 900 total hip and total knee arthroplasty patients. On the day of surgery, 235 patients, who were the first or second cases of the day, participated in a hospital physical therapy program that began with early mobilization with physical therapists in the recovery room. The second group of 665 patients, who were the third, fourth, or fifth cases of the day, received a standard physical therapy protocol, where the first therapy session occurred on postoperative day one. Progression with rehabilitation was followed, and length of hospital stay was compared.

Results: Total length-of-stay for the rapid rehabilitation group was statistically significantly less than patients who began therapy on postoperative day one, for both hip and knee replacement patients. In the early mobilization group, the average length-of-stay was 3.7 days for total hip patients and 3.7 days for total knee patients. In the standard protocol group, the average length of stay for total hip patients was 4.6 days ($p<0.00001$) and 4.2 days ($p<0.01$) for the total knee patients. Rapid rehabilitation resulted in a direct savings, considering fewer hospital resources were used due to the reduced length-of-stay. Further financial gains could be realized if unfilled hospital beds are utilized to care for additional patients who are able to undergo surgery due to the resulting increased bed availability.

Conclusion: Rapid mobilization of total joint replacement patients in the recovery room reduces the overall length of hospital stay resulting in significant cost savings.

Effect of Early Mobilization on Length-of-Stay





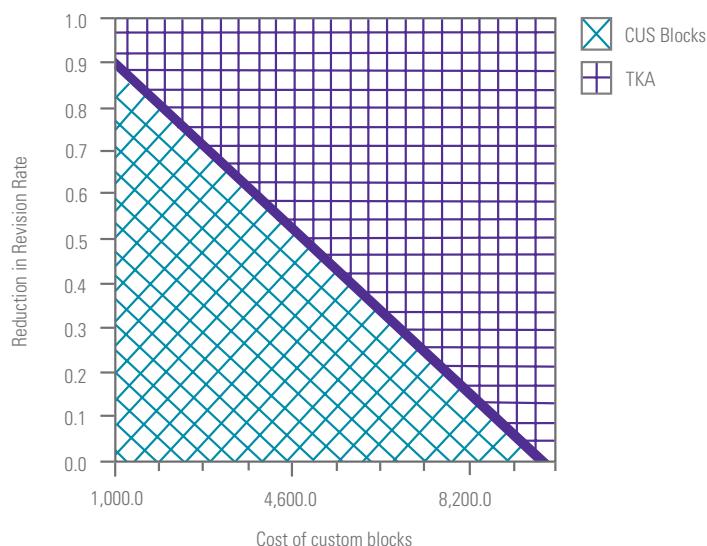
Cost-Effectiveness Studies

The increasing burden of the cost of medical care for the population is a critical issue both nationally and on the local level. Cost-effectiveness analysis will play an increasingly important role in determining the use of any medical technology. The Department of Orthopaedic Surgery has a robust cost-effectiveness program; below we share with you three of our studies.

Cost-Effectiveness of Custom Total Knee Cutting Blocks

Slover J, Rubash H, Malchau H, Bosco J

Total knee arthroplasty is one of the most common and successful procedures in orthopedics. However, complications persist, and numerous technological advances, including computer navigation and robotic assistance, have been developed in an attempt to improve the survival of these implants. The introduction of custom total knee cutting blocks may have benefits to the individual center performing TKA. However, the cost of any new technology must be evaluated against the potential benefits. This study evaluated the cost-effectiveness of custom block knee replacements. The graph below displays the results of a sensitivity analysis demonstrating the relationship between the cost of the advanced imaging study and the reduction in revision rate with custom total knee cutting blocks (CUS). Areas indicated in turquoise hatches demonstrate the profiles where the custom blocks are cost-effective.



Cost Benefit Analysis of Same-Day Pregnancy Tests in Elective Orthopaedic Surgery

Hutzler L, Bosco J, Kraemer K, Palmer N, Albert D

Performing elective surgery on pregnant women can harm the mother and fetus. In order to minimize the likelihood of this happening we administer a urine pregnancy test to each woman of childbearing age on the date of surgery. From November 2009 to September 2011, we performed 4,723 urine human chorionic gonadotropin (hCG) pregnancy tests on the day of surgery. We reviewed the results and cost of each pregnancy test. We then used these results to calculate the percentage of positive tests and the cost of diagnosing each pregnant female on the date of their surgery. Over the 23-month time period we were notified of one false negative result (0.02%).

The Positive Predictive Value (PPV) was 100% and the Negative Predictive Value (NPV) was 99.9%. The cost of a single urine hCG test was \$1.49; the total cost for all 4,723 tests was \$7,037.27. The cost of diagnosing 7 positive tests was \$1,005.32 each. Routinely performing urine hCG pregnancy tests on the day of surgery is a cost-effective method of preventing elective orthopaedic surgery on pregnant women. Of 4,723 women tested, 7 had a positive result and 1 had a false negative result. The cost of \$1,005.32 for each positive test must be compared with the benefit of not performing elective surgery on a pregnant female.

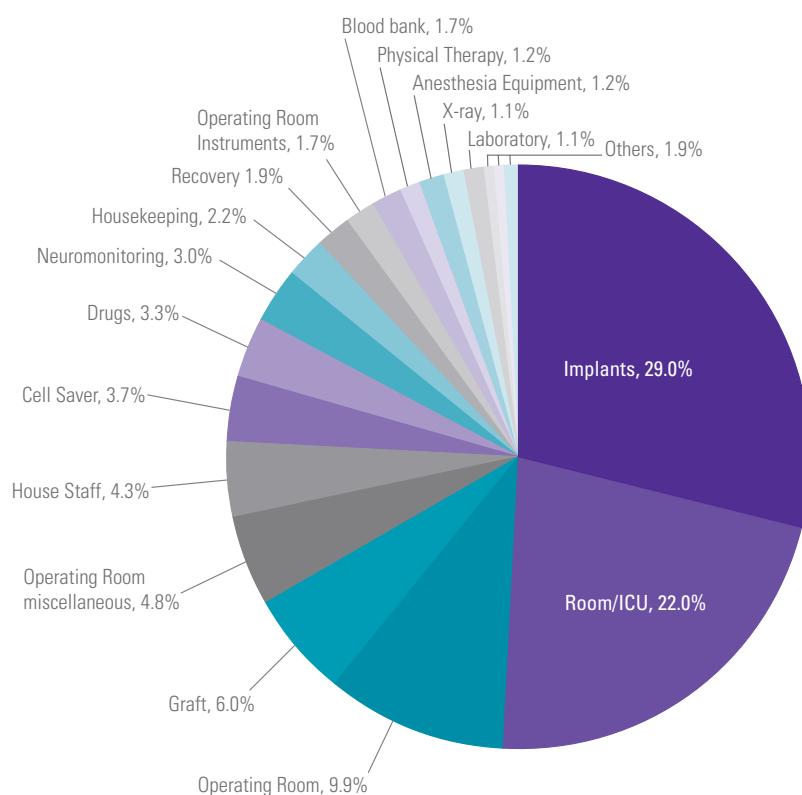
Hospital Cost Analysis of Adolescent Idiopathic Scoliosis Correction Surgery

Kamerlink JR, Quirno M, Auerbach JD, Milby AH, Windsor L, Dean L, Dryer JW, Errico TJ, Lonner BS

Although achieving clinical success is the main goal in the surgical treatment of adolescent idiopathic scoliosis, it is becoming increasingly important to do so in a cost-effective manner. We performed a retrospective review of 16,536 individual costs and charges, including overall reimbursements, for 125 consecutive patients who were managed surgically for the treatment of adolescent idiopathic scoliosis by three different surgeons. The mean age of the patients was 15.2 years. The mean main thoracic curve measured 50°, and the thoracolumbar curve measured 41°. The cost varied with Lenke curve type: \$29,955 for type 1, \$31,414 for type 2, \$31,975 for type 3, \$60,754 for type 4, \$32,652 for type 5, and \$33,416 for type 6. Independently significant increases for total cost were found in association with the number of pedicle screws placed, the total number

of vertebral levels fused, and the type of surgical approach ($R^2 = 0.35$, $p = 0.03$). Independently significant increases for reimbursement were found in association with the number of pedicle screws placed and the type of surgical approach ($R^2 = 0.12$, $p = 0.02$). The hospital was reimbursed 53% of total charges and 120% of total costs. Reimbursement was highly correlated with charge ($r = 0.45$, $p < 0.001$). For rehospitalizations, the hospital was reimbursed 65% of charges and 93% of costs. The largest contributors to overall cost were implants (29%), intensive care unit and inpatient room costs (22%), operating room time (9.9%), and bone grafts (6%). There were three significant independent predictors of increased total cost: the surgical approach used, the number of pedicle screws placed, and the number of vertebral levels fused.

Percentage of Total Cost

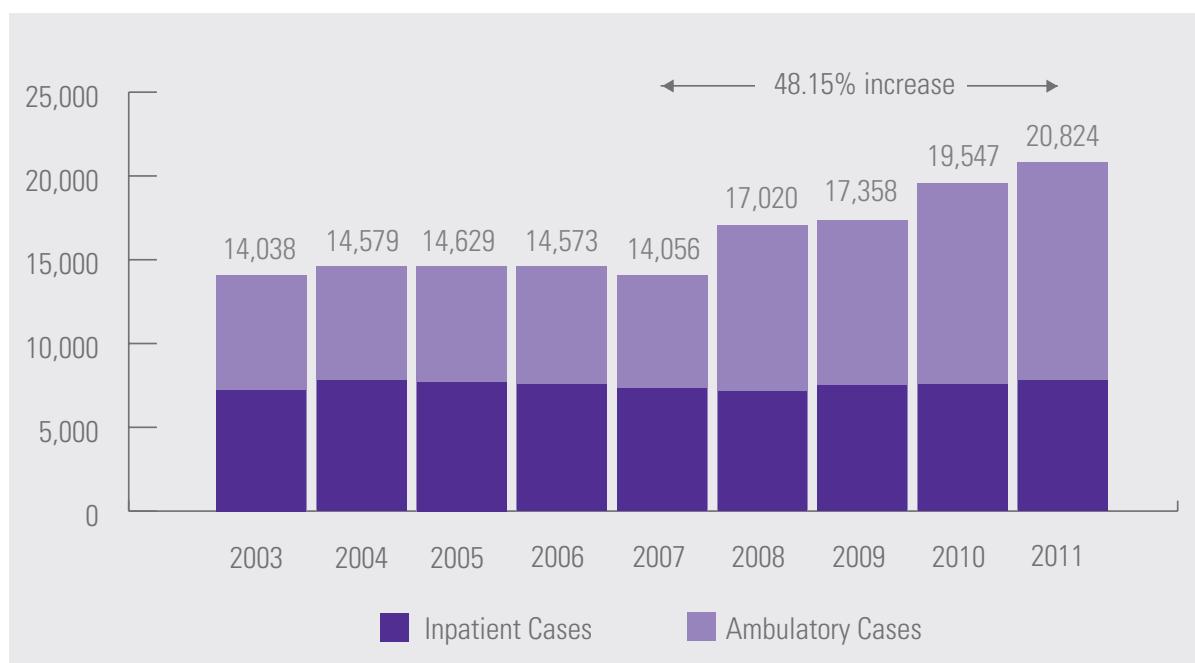




Department Procedure Volumes

Excellence of clinical outcomes is closely associated with surgical volume. In 2011, the Department of Orthopaedic Surgery at NYU Langone Medical Center performed more than 20,000 orthopaedic musculoskeletal procedures. Our growing procedural volume is included in the table below with a 48.15% increase since 2007. The 3- and 4-year volume data on commonly performed orthopaedic procedures can be found in each subspecialty section of this report.

Orthopaedic Surgery Procedures



Hospital-Acquired Conditions

As of October 1, 2008, the Centers for Medicare and Medicaid Services (CMS) changed how it reimburses hospitals for complications acquired during hospital treatment of Medicare beneficiaries. CMS published a list of 10 events that it considers to be “reasonably preventable” during a hospital stay. If it is determined the complication was the result of hospital error, the cost of care related to the complication will not be reimbursed. These conditions represent the opportunity to improve the quality and safety of patient care.

10 Hospital-Acquired Conditions

- Object inadvertently left in after surgery
- Air embolism
- Blood incompatibility
- Catheter-associated urinary tract infection
- Pressure ulcer
- Vascular catheter-associated infection
- Surgical site infection
- Certain types of falls and traumas
- Venous thromboembolism after hip and knee replacement
- Poor glycemic control

The following describes the institutional-wide initiatives we developed and implemented to reduce HACs.

Surgical Site Infections

Recently, CMS elevated prevention of SSIs to a national priority status. SSIs are considered “Never Events”—tolerance for “Never Events” in healthcare settings is 0%. Our consistent priority within the Department of Orthopaedic Surgery is to proactively prevent SSIs and seek new means of avoiding these complications. Below, we share some of our data regarding the results of our efforts to reduce SSIs.

Surgical Site Infections for Primary Knee

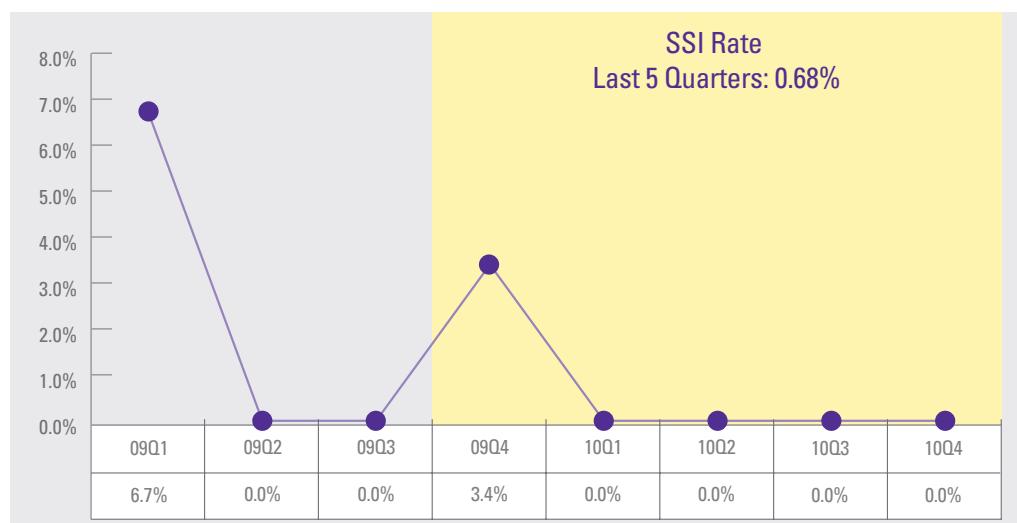


Surgical Site Infections (*continued*)

Surgical Site Infections for Spine Procedures



Surgical Site Infections for Shoulder Arthroplasty Including Reverse Shoulder



Surgical Site Infections for Primary Hip



—●— SSI Cases

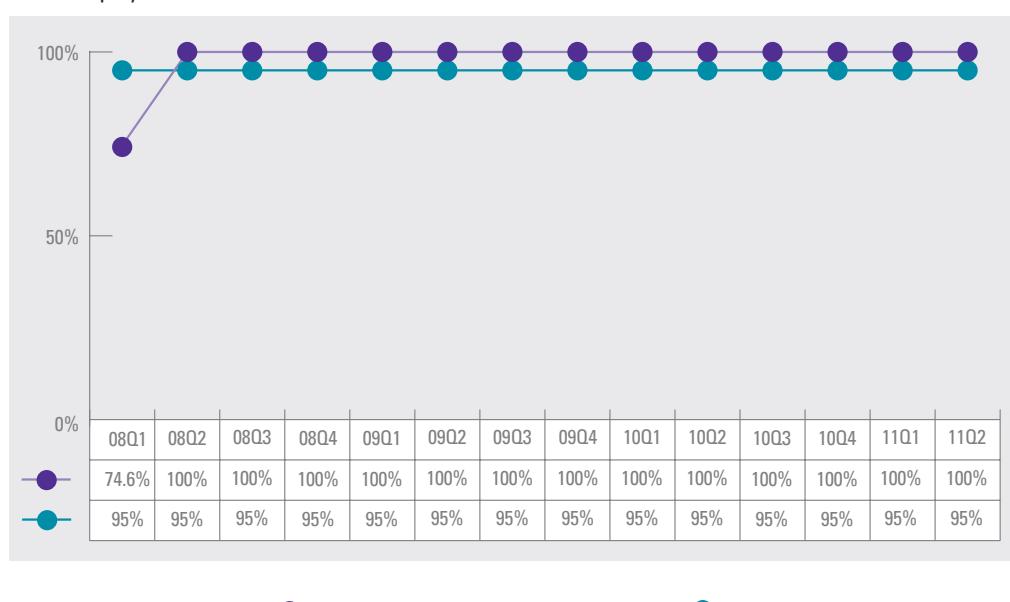
Surgical Care Improvement Project (SCIP) Measures

The Surgical Care Improvement Project (SCIP) is a national quality partnership of 10 steering organizations (including the Joint Commission and the Centers for Medicare and Medicaid Services) dedicated to improving surgical care through the reduction of complications. It is estimated that SCIP protocols will save many lives nationally by reducing the incidence of surgical complications. Two important SCIP protocols of interest in orthopaedics are the prevention/reduction of venous thromboembolism (VTE), and prevention/reduction of surgical site infections (SSIs). Both have been a major focus of our quality initiatives.

Venous Thromboembolism (VTE): A Unique Challenge in Orthopaedic Surgery

VTE is the collective term for deep vein thrombosis (DVT) and pulmonary embolism (PE). At HJD, surgical care and patient outcomes are the highest priority: long before SCIP was instituted, VTE prophylaxis process and outcomes were an essential component of the care provided. We remain dedicated to making certain every patient receives the appropriate VTE prophylaxis in a timely manner.

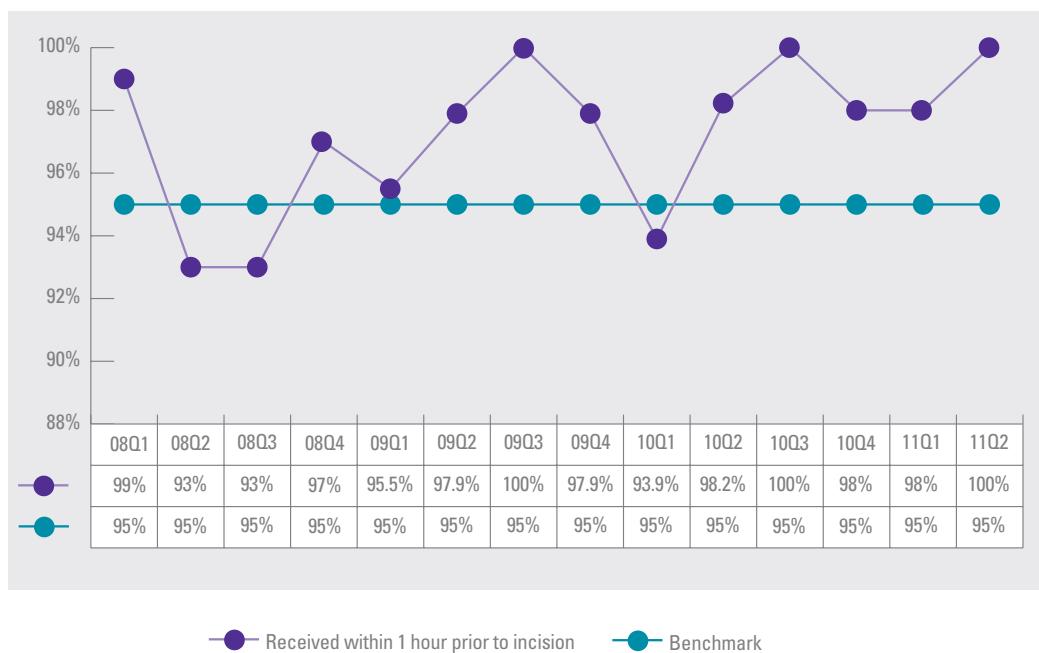
VTE Prophylaxis Guideline Adherence



Antibiotic Start and Stop: Prevention of Surgical Infections

Prior to surgery, patients are carefully evaluated and should receive antibiotics just before the start of the procedure. Equally important is for the antibiotics to be discontinued 24 hours after surgery to avoid the development of resistant strains of bacteria.

Antibiotic Start Guideline Adherence (Hip & Knee)



Antibiotic Discontinuation Guideline Adherence (Hip & Knee)



Length-of-Stay Reduction

The Department of Orthopaedic Surgery has committed significant resources to ensure that patients are discharged as expediently and safely as possible. Reducing length-of-stay helps patients recover faster, decreases the likelihood of many HACs, including infections, and may help reduce healthcare costs. Most importantly, patients prefer recovering in the comfort of their own home as compared to the hospital setting. In order to facilitate a shorter, safer length-of-stay we developed two innovative programs: Guided Patient Services (GPS) and Rapid Rehab.

The **GPS** program is a result of collaboration with our Department of Social Services. Designed to accommodate discharge planning in those patients undergoing total joint replacements, this innovative program educates and sets patient expectations regarding the hospital experience and discharge plans **before** they are hospitalized. When the decision to proceed with surgery is made, a social worker contacts the patient. Any issues regarding discharge planning are addressed prior to admission, including those pertaining to discharge disposition. We have found that addressing these issues prior to hospitalization leads to a smoother, more efficient discharge process.

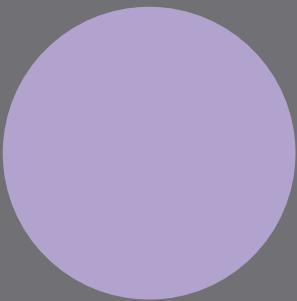
The **Rapid Rehab Program** provides hip or knee replacement patients the opportunity to begin their rehabilitation immediately after the surgery while they are in the postoperative recovery area. To date this program has been highly effective in improving the rate of patient recovery and reducing length-of-stay. We have observed a one-day decrease in length-of-stay for those patients receiving rapid rehab as well as an increased level of patient satisfaction. We are currently expanding this program to include patients undergoing advanced spine surgery.

Below we share with you our length-of-stay for primary hip and knee procedures for 2008–2011.

Average Length-of-Stay (ALOS) for Primary Hip and Knee Procedures



Quality and Outcomes Data by Subspecialty





Division of Trauma and Fracture Surgery

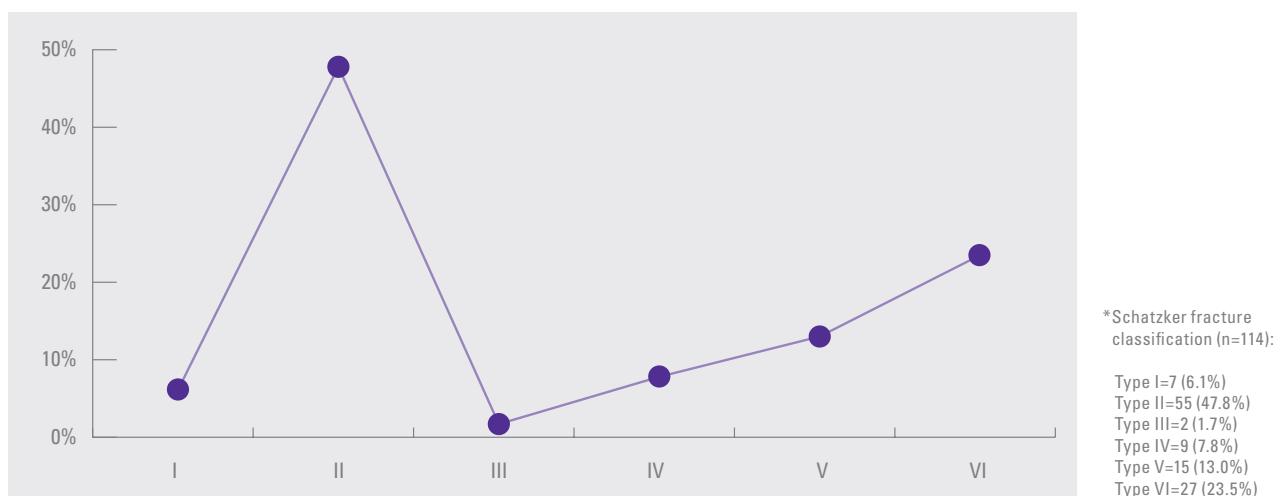
The Division of Trauma and Fracture Surgery treats a spectrum of cases ranging from patients with a single fracture to those suffering from multiple life-and-limb-threatening musculoskeletal injuries. Under the leadership of Dr. Kenneth Egol, the division has developed multiple databases that allow the division to track clinical outcomes. Every patient treated by the Division of Trauma and Fracture Surgery faculty is enrolled in at least one clinical outcomes database.

Clinical Outcome Tibial Plateau Fracture Database

There are currently 117 patients (120 fractures) in the tibial plateau fracture database. Age at time of fracture ranged from 19–88 years (51.3% under 50, 48.7% over 50). 54.3% of patients are male and 45.7% are female. Almost half the patient population presented with a Schatzker Type II fracture (47.8%), and Type VI fractures comprised about a quarter (23.5%)*.

- Ninety-three of the 117 patients were treated operatively (79.5%)
- 98% of surgically treated patients with at least 6 months follow-up healed at an average of 4.0 months (range: 1.25 mo.–10 mo.).
- Patients treated nonoperatively healed at an average of 3.2 months (range: 2.5 mo.–4 mo.).
- Average postop ROM at last follow-up for all patients (with a minimum of 6 months follow-up) was 2°–119°.

Schatzker Classification



Division of Trauma and Fracture Surgery (*continued*)

Symptomatic Venous Thromboembolism in Low Energy Isolated Fractures in Hospitalized Patients

Orthopaedic surgery of the lower extremity has long been associated with high rates of VTE; however, contradictory guidelines for managing these risks exist. Physicians often rely on anecdotal evidence and clinical judgment when managing post-fracture patients. As a result, adherence to guidelines and prophylactic protocols vary between individual institutions.

Between the years 2007 and 2009 a total of 1701 adult patients were admitted to our medical center with isolated extremity or pelvic ring fractures. The mean age of all fracture patients was 64.27 (18–101). 1096 (64.4%) of the patients were female and 605 (35.6%) were male. The average BMI was 26 kg/m². 1222 (71.8%) involved the lower extremity and 479 (28.2%) involved the upper extremity. The most common site of fracture was reciprocal femur (femoral neck, intertrochanteric and subtrochanteric), accounting for 518 (30.5%) of the total fractures. The most common location for upper extremity fracture was the humerus (237 or 13.9%).

Overall, 24 patients were diagnosed with 25 clinically significant VTEs. Thus the incidence for

symptomatic VTE was 1.47%. There were 13 DVTs and 12 PEs. Among upper extremity fractures, there were 5 VTEs, for an incidence of 0.8%. The 19 VTEs among lower extremity fractures accounted for an incidence of 1.75%. Seventeen VTEs occurred in association with hip and pelvic fractures for an incidence of 2.6%. The incidence of VTE among all other fractures was 0.7%. Two patients (0.012%) expired following PE, while the all-cause mortality rate was 0.81%. PE was associated with 14.3% of all inpatient deaths in our population (see table below). Among the patients who developed VTE, 75% were women. The average age was 69.5 years. The average BMI was found to be 28 kg/m². The average time from initial injury to diagnosis of VTE was 10.26 days (range 0–77 days). Three patients were diagnosed on admission to the hospital and prior to being placed on prophylactic therapy.

Logistical regression analysis identified two statistically significant predictors of development of symptomatic VTE. Female sex ($p=0.05$) was a slight predictor with an odds ratio of 1.01, and BMI ($p=0.01$) with an odds ratio of 1.11. There was no difference in development of VTE between upper and lower extremity fractures.

Complications Following Surgery

	Total n (%)	Upper Extremity n (%)	Lower Extremity n (%)
DVT*	13 (0.076%)	3 (0.63%)	10 (0.82%)
Non-fatal PE**	10 (0.059%)	2 (0.42%)	8 (0.65%)
Fatal PE**	2 (0.012%)	1 (0.21%)	1 (0.082%)
Total VTE***	25 (1.47%)	6 (1.25%)	19 (1.55%)
All-cause mortality	14 (0.82%)	1 (0.21%)	13 (1.06%)

*DVT, deep vein thrombosis

**PE, pulmonary embolism

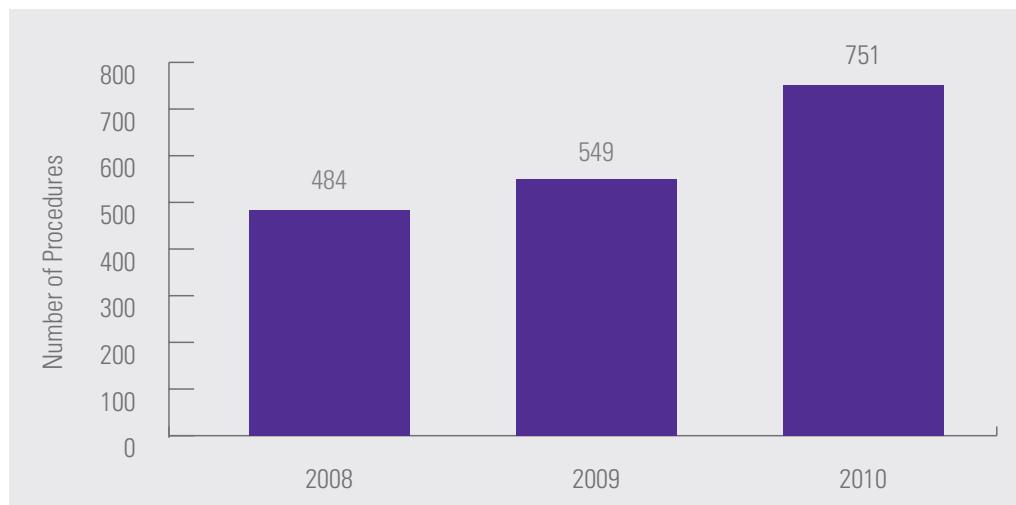
***VTE, venous thromboembolism



Division of Shoulder and Elbow Surgery

The Division of Shoulder and Elbow Surgery provides operative and nonoperative treatment of the upper extremity. The spectrum of diseases spans athletic, traumatic, developmental and degenerative problems pertaining to the shoulder and elbow. The Shoulder and Elbow Research Group was founded in 1989 to focus on clinical, basic science and translational research, as a means to better understand disease processes and advance orthopaedic care of both shoulder and elbow problems.

Reconstructive Shoulder Including Arthroplasty Procedure Volumes



Shoulder and Elbow Database

An ever-growing surgical database is continuously maintained to date, tracking over 1,000 patients undergoing surgery of the shoulder and elbow each year. Several validated scoring systems are used to assess the results of surgery for the various procedures performed, including but not limited to rotator cuff repair, instability surgery, arthroplasty, and fracture care.

More recently an annex to the current database was developed to enable *de novo* data collection of all patients with shoulder and elbow problems. This database documents patients' presurgical encounter and postoperative outcomes using validated scoring systems. In addition, data is being collected on patients who undergo nonoperative treatments such as injections, physical therapy and other nonsurgical modalities.

Division of Shoulder and Elbow Surgery (*continued*)

Frozen Shoulder: A consensus definition for classification and diagnostic purposes

Two-hundred-and-eleven clinician members of the American Shoulder and Elbow Surgeons were asked to review a proposed classification algorithm for frozen shoulder (FS). Primary FS was defined as idiopathic, with no known etiology, and secondary FS was divided into intrinsic, extrinsic, and systemic subtypes. The survey questions were: 1) Do you agree with the proposed definition of frozen shoulder?; 2) Do you agree that frozen shoulder should be divided into

primary and secondary types?; 3) Is the division of secondary types into intrinsic, extrinsic, and systemic appropriate?; 4) Do you feel there is truly a primary or idiopathic frozen shoulder?; and 5) Do you feel that obtaining a consensus definition and classification of frozen shoulder is a worthwhile endeavor? Responses were weighed by strength of agreement with the proposed classification system, using a 5-level analog scale (1=strongly disagree to 5=strongly agree). Out of 190 responses, 82% agreed with the proposed classification of FS.

SUMMARY OF RESPONSES TO QUESTIONNAIRE										
Question	Response							Percent 1 or 2	Percent 4 or 5	Mean score
	1: Strongly disagree	2: Disagree	3: No opinion	4: Agree	5: Strongly agree	No response				
1 (n = 184)	3	21	9	77	74	6	13%	82%	4.08	
2 (n = 187)	5	16	7	29	130	3	11%	85%	4.38	
3 (n = 187)	7	22	34	63	61	3	15%	66%	3.80	
4 (n = 188)	5	7	18	29	129	2	6%	84%	4.44	
5 (n = 188)	7	4	18	72	87	2	6%	85%	4.21	

Management of Humeral and Glenoid Bone Loss Associated with Glenohumeral Instability

Anterior glenohumeral instability complicated by bone loss is a challenging problem and, when severe, may require a bone grafting procedure. We reviewed our experience with humeral head and glenoid bone grafting for large defects. Eleven patients were identified who had articular reconstruction for glenohumeral instability. Six of the 11 patients had iliac crest bone autograft, and five patients had humeral head allograft reconstruction. Mean follow-up was 39 months (7 to 63 months) and 28 months (11 to 40 months), respectively. Glenoid graft patients had mean

ASES and UCLA scores of 91 and 33, and humeral bone graft patients had scores of 85.3 and 28.4, respectively. No episodes of recurrent subluxation or dislocations were reported. Radiographs showed no evidence of graft resorption or hardware prominence. The results show that bone grafting procedures around the shoulder for the treatment of instability provided relief from recurrent instability with good functional results. Furthermore, patients with glenoid reconstruction appeared to have better function than humeral reconstruction when compared with the uninvolved shoulder.

Reverse total shoulder arthroplasty for revision shoulder arthroplasty

Reverse total shoulder arthroplasty (rTSA) is a relatively new implant system that can provide a reliable treatment option for failed shoulder arthroplasty. From our database, 31 patients who underwent rTSA for revision arthroplasty were identified. Twenty-eight of the 31 patients (90%) were available for an average follow-up of 36.5 months. Modes of failure were infection ($n=7$), bony abnormality ($n=4$) and rotator cuff insufficiency ($n=20$). Previous failed arthroplasties included hemiarthroplasty ($n=15$), total shoulder arthroplasty ($n=8$) and rTSA ($n=5$). Pre- and postoperative outcome measures were compared,

and significant improvements ($p<0.001$) were seen in all outcome measures: ASES (24.0 to 66.2), UCLA (7.4 to 23.5), SST (1.5 to 7.6), VAS (7.0 to 2.6), and active forward elevation (44.3° to 108.2°). Nineteen patients (67.9%) rated their result as good or excellent, four patients (14.3%) rated it as satisfactory, and five patients (17.9%) rated it as unsatisfactory. Greatest improvements were seen in patients whose failed implant was a total shoulder arthroplasty. The data suggest that patients can expect improved functional outcome and decreased pain following revision rTSA, and that rTSA provides a reliable treatment option for failed shoulder arthroplasty.

Comparison of Pre- and Postoperative Outcome Measurements

Outcome Measures	Preop	Postop	Change	P value*
ASES	24.0±15.7 (0 to 58)	66.2±21.3 (33 to 98)	42.3±26.4 (-7 to 85)	<.001
SST	1.5±2.5 (0 to 9)	7.6±3.1 (2 to 12)	6.0±4.3 (-5 to 12)	<.001
VAS	7.0±2.6 (2 to 10)	2.6±2.7 (0 to 9)	4.3±4.4 (-6 to 10)	<.001
UCLA	7.4±3.0 (3 to 13)	23.4±7.4 (8 to 34)	16.1±8.5 (-4 to 28)	<.001
FE°	44.3±28.9 (0 to 120)	108.2±36.4 (20 to 165)	63.9±39.7 (10 to 145)	<.001

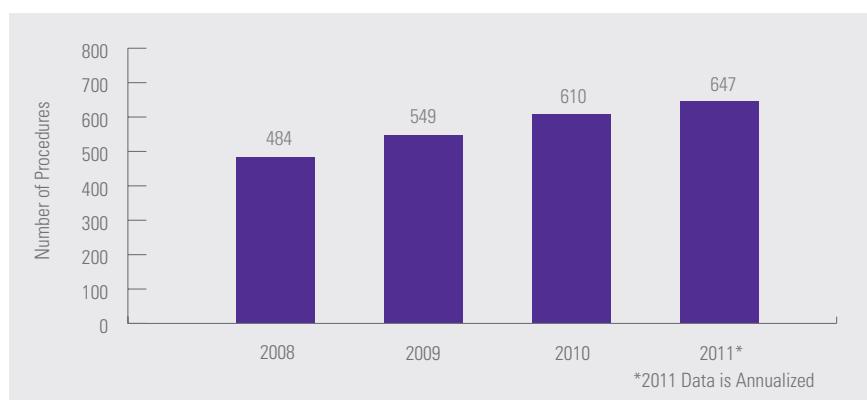
Paired Student's t-Test with Mean values, (±) Standard deviation and Range; p values are reported at 95% confidence interval, significance* = $p < 0.05$



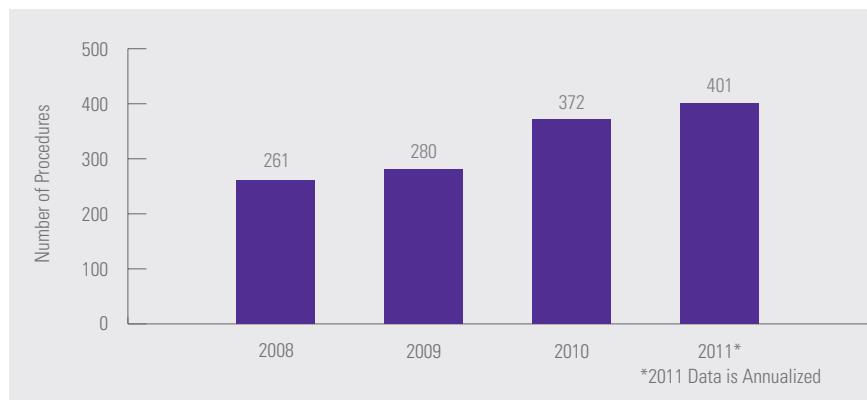
Division of Sports Medicine

The Division of Sports Medicine incorporates the clinical, educational, and investigational aspects of athletic injuries in order to provide the highest quality care for athletes competing at the high school, college and professional levels, as well as recreational athletes in every age group. More than 3,000 procedures are performed annually by the division, including arthroscopic procedures on the knee, shoulder, elbow, and ankle.

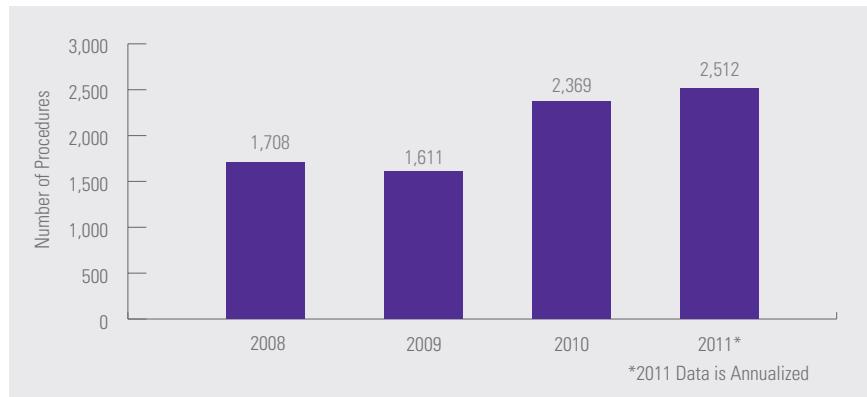
Arthroscopic Rotator Cuff Repair Procedure Volumes



Anterior Cruciate Ligament Reconstruction Procedure Volumes



Arthroscopic Meniscectomy Procedure Volumes



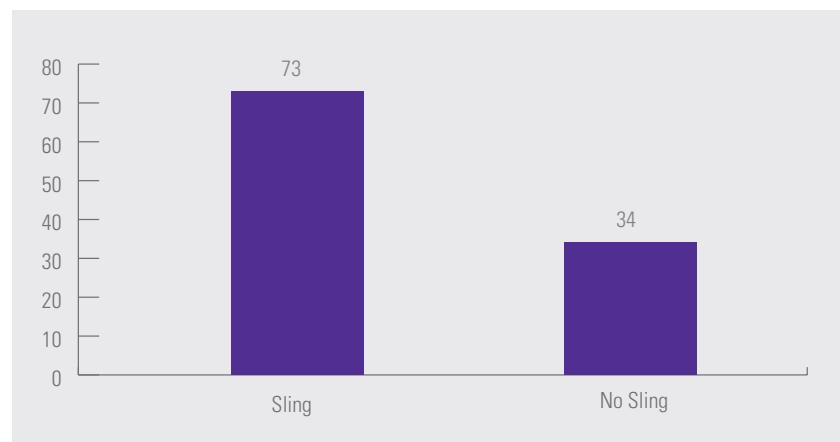
The Effect of Shoulder Immobilization on Driving Performance

Advances in minimally invasive surgical techniques and improved rehabilitation protocols have resulted in a quicker return to activities of daily living, however, the appropriate length of time before returning to safe operation of an automobile remains largely unknown and without scientific basis. The purpose of the study was to evaluate the effect of upper extremity immobilization using a sling on driving performance using a driving simulator. Healthy volunteers were tested in a variety of driving conditions using a computerized driving simulator to reproduce certain driving conditions, including various hazardous conditions that necessitated evasive maneuvers and turns at varying angles.

Trial 1 consisted of healthy volunteers with complete use of both upper extremities to serve as the control

group. Trial 2 consisted of the same volunteers driving with the dominant driving arm immobilized using a shoulder sling. Participants were randomized with respect to the temporal order of each trial and each course was customized to the driver's reaction time to limit variability between course output measures. The total number of collisions for non-sling driving was 34, compared to 73 collisions for volunteers driving in a sling. Seventy percent of participants with upper-extremity immobilization were involved in 3 collisions, seventy percent of non-sling participants were involved in 2 collisions. Based on the result, we concluded that sling immobilization of the dominant driving arm results in a decrease in driving performance and safety with respect to the number of collisions in a simulated driving circuit ($p<0.01$). The decrease in driving performance is likely to be related to the effect the immobilized arm has on performing evasive maneuvers during hazardous driving.

Total Number of Collisions



Division of Sports Medicine (*continued*)

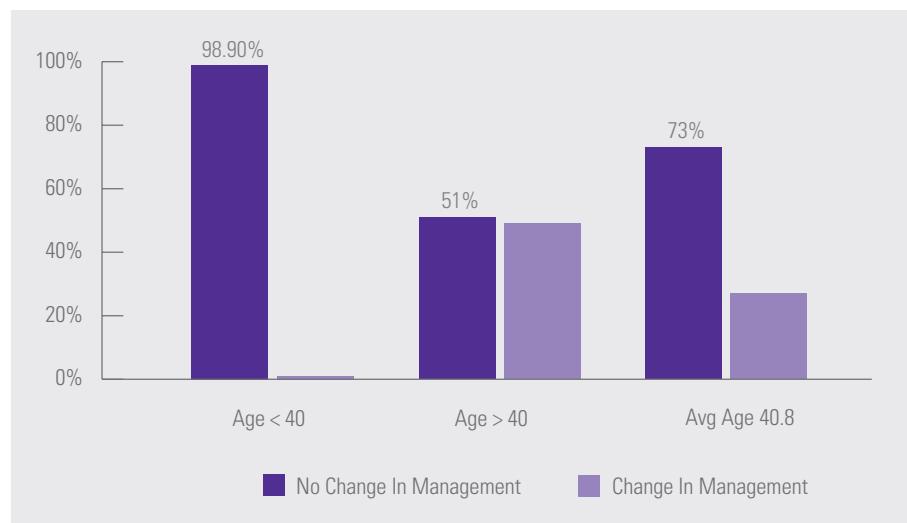
The Utility of Standard Radiographs in the Initial Evaluation of Knee Pain in Sports Medicine Patients

Standard radiographs are commonly ordered as part of the initial evaluation of knee pain in a sports medicine practice. The quintessential questions are: 1) Do these radiographs impact clinical decision-making?; and 2) Are they an effective use of healthcare dollars? A routine radiograph series of the knee includes anteroposterior (AP), lateral and sunrise views.

Patients presenting for an initial consultation for knee pain were recruited for this study. The study included findings from 188 consecutive new patients present-

ing with a chief complaint of knee pain. Standard radiographs had no impact on clinical decision-making in 98.9% of patients younger than 40, and in 49% of patients older than 40. In patients older than 40 years of age with knee pain, standard radiographs were useful for those whose complaints were present for more than 6 months and whose pain localized to the medial or anteromedial aspect of their knee. Overall, standard radiographs changed management in only 27.1% of evaluated patients. Based on this data we believe that the use of standard radiographs in the evaluation of knee pain in a sports medicine practice is of little value in patients less than 40 years of age.

Usefulness of Standard Radiographs by Age

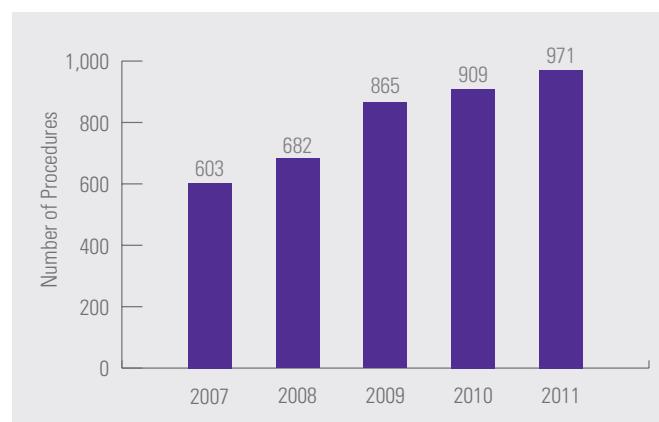




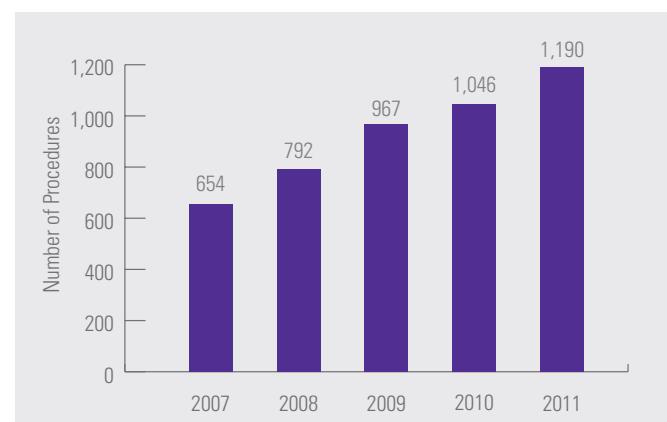
Division of Adult Reconstructive Surgery

The Division of Adult Reconstructive Surgery is an important subspecialty of the Department of Orthopaedic Surgery. The division is composed of 29 surgeons with wide-ranging areas of expertise and interests. The size of the division allows us to address the entire spectrum of adult reconstructive problems and offer innovative solutions to complex issues. Our surgeons performed over 3,000 joint replacement procedures in 2011, including primary hip, knee, shoulder, elbow, wrist and ankle procedures, and complex revision and joint reconstructions. The following graphs illustrate our 5-year volume growth in both primary and revision hip and knee arthroplasty.

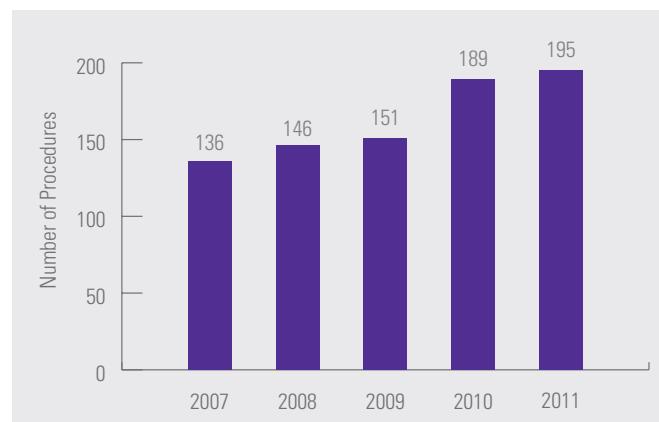
Total Hip Replacement Volumes



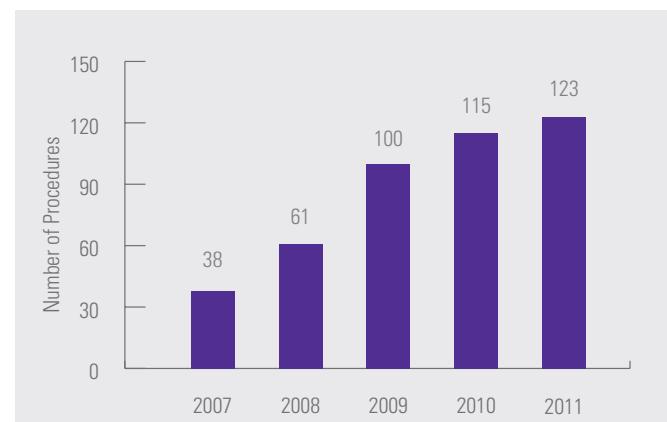
Total Knee Replacement Volumes



Total Hip Revision Volumes



Total Knee Revision Volumes



Division of Adult Reconstructive Surgery (*continued*)

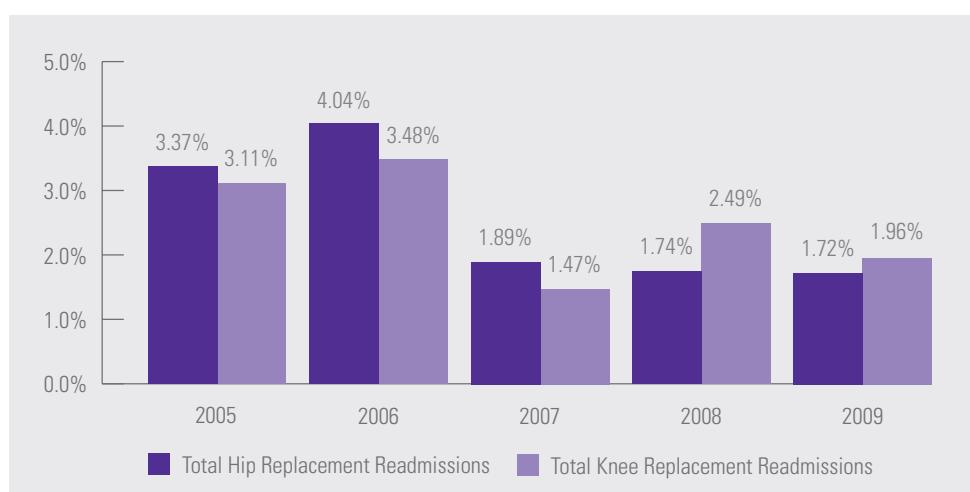
Our robust clinical volume enables us to perform many outcome studies, which help address key issues facing adult reconstructive surgeons. A representative description of our major research and outcomes efforts is listed below:

Reduction of Readmissions in Total Joint Procedures

Reducing readmissions following elective orthopaedic procedures is considered an inpatient indicator of quality of care. Beginning in 2007, our department created an initiative to decrease readmissions following total joint procedures. Our interventions included: increasing physician awareness through presentations at grand rounds and e-mails, creating an infrastructure for the outpatient workup of possible VTEs, as well as improved discharge planning. The readmission rates for the two years preceding our

intervention (2005 and 2006) were 3.37% and 3.11% for Total Hip Replacement (THR) and Total Knee Replacement (TKR), respectively. In the three years following our intervention these rates fell to 1.96% and 1.72% for THR and TKR, respectively. This represents a 42% reduction of readmission for THR and 45% for TKR in our study. Both these results were statistically significant $p<0.05$. This program resulted in a sufficiently lower 30-day readmission rate for total joint replacements at our institution.

THR & TKR Readmissions for 2005-2009



American Joint Replacement Registry

Towards the end of 2010, the Hospital for Joint Diseases was selected as **one of 15 nationwide sites** to participate in the newly formed American Joint Replacement Registry (AJRR). The AJRR optimizes patient outcomes through collection of data on all primary and revision total joint procedures in the United States. The goal of the registry is to improve patient safety, improve quality of care and reduce cost

of care. This was an extremely competitive process and we were very fortunate to be selected for this important national quality improvement project. The main purpose of the pilot project was to begin actively collecting implant data on all primary and revision hip and knee replacement patients and enter the information into an online database. Over the last several months of the program we have enrolled 99% of our patients.

	Feb-11	Mar-11	Apr-11	May-11	Jun-11	Jul-11	Aug-11	TOTAL
Males	31	64	55	66	61	64	52	393
Females	60	137	95	105	134	122	84	737
TOTAL	91	201	150	171	195	186	136	1,130

Repetitive Intraoperative Splash Basin Use

SSIs are a devastating complication following total joint replacement, which often leads to suboptimal patient outcomes and increased hospital costs. Maintaining optimal sterile conditions in the operating room and improving infection control is important to any orthopaedic surgeon. Splash basins are used in arthroplasty cases to wash instruments, yet they may present a source of infection. We looked at a total of 46 clean primary arthroplasty cases by taking

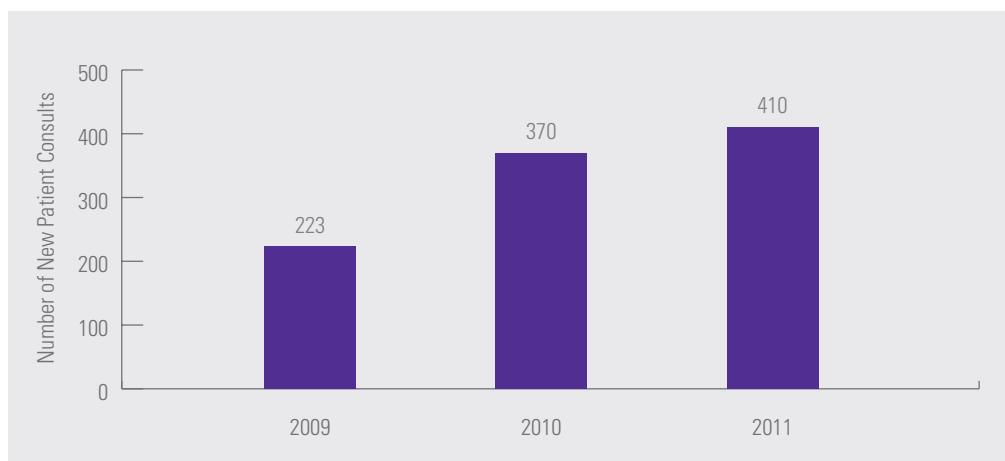
cultures of sterile splash basins as soon as they are opened in the operating room and again at wound closure (average total time 180 min. \pm 45). Only one case was found to have a positive culture (2.17%) growing coagulase negative *Staphylococcus*. All controls were negative except one sample that was contaminated with *Streptococcus viridans*. Splash basins are a potential source of infection, but the risk does not seem to be as high as previously cited in the orthopaedic literature.



Division of Orthopaedic Oncology

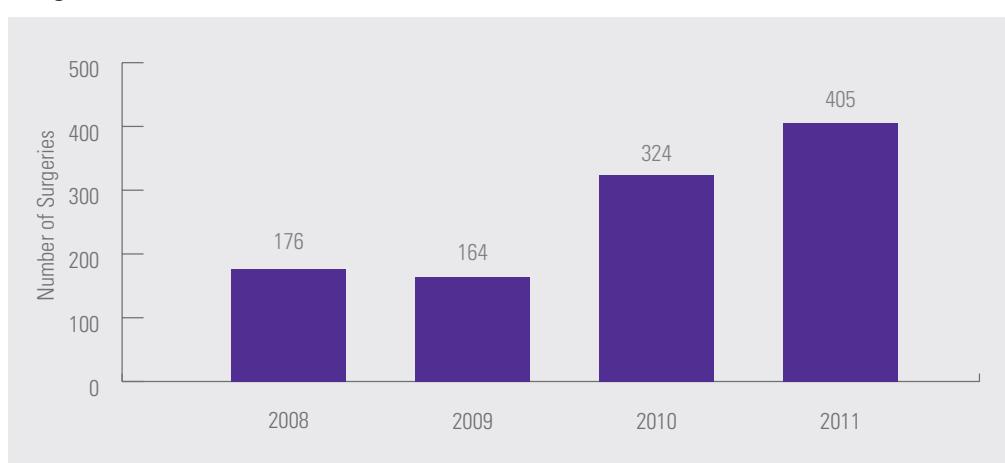
The Division of Orthopaedic Oncology and the NYU Clinical Cancer Center care for patients with a broad spectrum of neoplastic processes involving the musculoskeletal system. Benign and malignant tumors of bone and soft tissue are evaluated in a multidisciplinary setting. Utilizing the expertise of our orthopaedic surgeons and our colleagues in medical oncology, pediatric oncology, radiation oncology, pathology, and radiology, patients and their complex disease states are diagnosed and cared for using the best available treatments.

New Patient Referrals



Through close collaboration with the NYU Clinical Cancer Center, the Division of Orthopaedic Oncology continues to grow its clinical and surgical volume. Additions of new faculty members in the Divisions of Pediatric and Medical Oncology have further developed our ability to conduct multidisciplinary care in an expeditious and integrated manner.

Surgical Volume





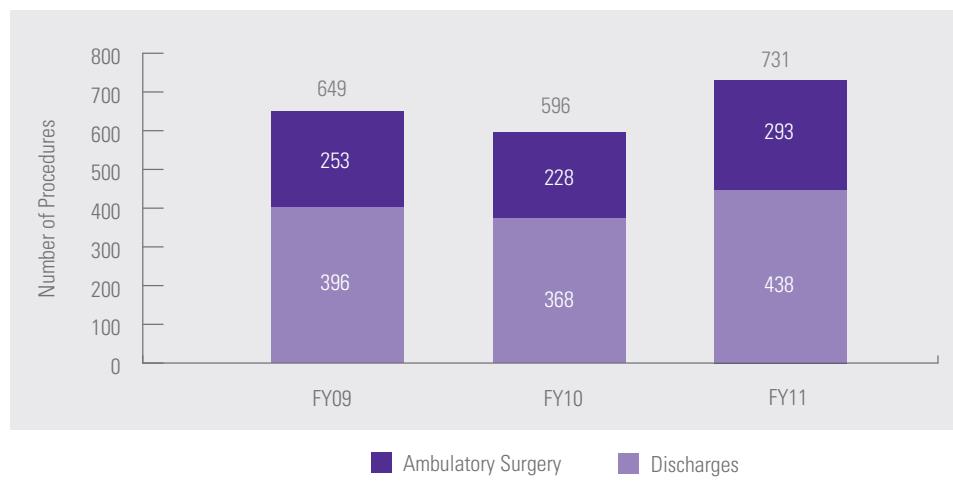
Division of Pediatric Orthopaedic Surgery

The Division of Pediatric Orthopaedic Surgery* treats children with a variety of diagnoses, including but not limited to hip dysplasia, limb deformity and shortening, clubfeet, scoliosis and cerebral palsy. The measurement of objective as well as subjective functional outcomes for both nonsurgical and surgical interventions plays an important role in the thorough assessment of children and adolescents. The Center for Children* at HJD provides for the care of children with musculoskeletal conditions by offering a multidisciplinary approach to the most complex cases. The volume of patients treated at the center is steadily growing as the reputation of the center expands. This year over 10,000 patient visits to the Center for Children are anticipated. Additionally, surgical volume continues to grow as we add new faculty.

Center for Children Volume



Division of Pediatric Orthopaedic Surgery



*Part of NYU Langone Medical Center's Hassenfeld Pediatric Center

Division of Pediatric Orthopaedic Surgery (*continued*)

Acquisition and Banking of Biospecimens with Applicable Clinical Data for the Pediatric Musculoskeletal Tissue Bank

Tissue that is removed as part of orthopaedic surgery and would typically be discarded is collected and prospectively banked. This includes bone, cartilage, fascia, ligament, muscle, tendon, joint fluid, cyst fluid, tumor and/or skin of children, adolescents and adults (with conditions that originated in childhood). The clinical information for the patients from whom the samples are acquired will be followed to establish follow-up information regarding their clinical status.

Shoulder Arthrodesis for Treatment of Flail Shoulder in Children with Polio

Poliomyelitis in children can cause paralysis of shoulder girdle muscles leading to a flail shoulder. Shoulder arthrodesis is indicated as a possible treatment for these children in order to stabilize the shoulder. Over a five-year period a review of

medical records identified 11 patients undergoing 13 shoulder arthrodesis procedures, with a mean age of 14.7 years at the time of the procedure. Internal fixation was achieved with large cancellous screws in eight patients and a Dynamic Compression Plate (DCP) in five procedures. Average follow-up period was 41 months. Eight patients were placed into a spica cast and five used a sling postoperatively. Shoulder arthrodesis surgery in this cohort resulted in an average position of fusion of 42 degrees of abduction, 23 degrees of flexion, and 26 degrees of internal rotation. Twelve of the 13 procedures achieved radiographic fusion. The most common complications were malrotation and nonunion. Of the 13 procedures, two underwent humeral osteotomies for malrotation, and one with 6.5-mm cancellous screws required revision with a DCP secondary to nonunion. At final follow-up, no patient reported pain and all expressed satisfaction with their results and improved shoulder function after repair.

Time to Follow-up and Functional Outcomes

Case	Sex	Age	Complications	Hardware Follow-up	Follow-up (mo)	Functional Outcome
1	M	17.8	None	None	3	No pain
2	F	13.3	None	Removal	90	Hand to mouth
3	F	16.66	None	None	17	Hand to mouth
4	M	15.6	None	None	24	Hand to mouth and behind head
5	M	7.4	Internal rotation deformity	Removal	84	Hand to mouth and behind head
6	F	13	None	Removal	44	Hand to mouth
7	F	13.6	Nonunion	Removal	60	Hand to mouth
8	F	14.75	None	Removal	60	Hand to mouth and forehead
9	M	16.5	None	None	3	Hand to mouth
10	M	17.75	None	None	5	Hand to mouth
11	F	15.25	External rotation deformity	Removal	58	Hand to mouth
12	M	16.8	None	None	50	Hand to mouth and behind head
13	M	13	None	Removal	48	Hand to mouth and behind head



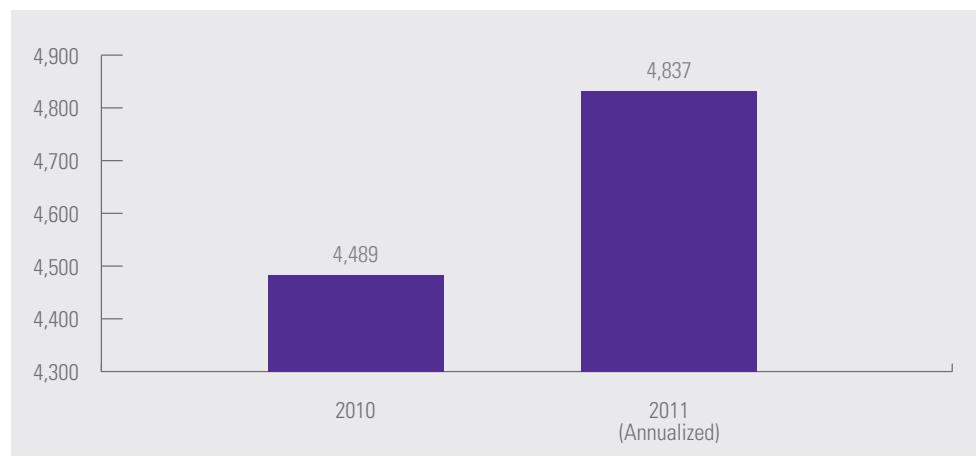
Division of Foot and Ankle Surgery

The Division of Foot and Ankle Surgery, one of the oldest in the United States, offers a complete spectrum of operative and nonoperative treatments ranging from simple to the most complex surgical procedures. The physicians have special interest in sports-related injuries and serve as consultants to several professional sports teams. The division has an active research program focusing on ankle replacement as well as complications related to diabetes.

The Center for Ankle Arthritis provides cutting-edge treatment for patients afflicted with debilitating ankle arthritis. Treatment options include bracing, injections and reconstruction. Surgical alternatives include minimally invasive arthroscopic debridement, distraction, fusion procedures and ankle replacement.

The Diabetes Foot and Ankle Center is a tertiary referral center specializing in limb salvage. The center's mission is to prevent amputations in patients with diabetes. Orthopaedic surgeons, podiatrists, plastic surgeons, physiatrists, vascular surgeons and prosthesis/orthotic specialists manage complications such as ulcers, infections and Charcot deformities. An endocrinologist and nurse practitioner provide overall diabetes management.

Diabetes Foot and Ankle Center Patient Volumes for FY 2010-2011

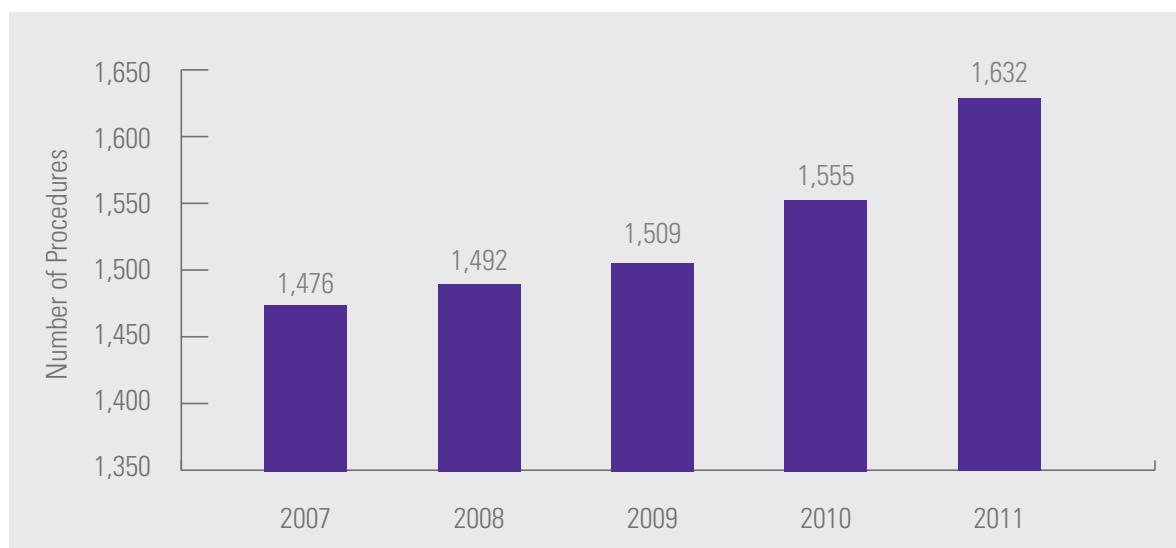




Division of Spine Surgery

The Division of Spine Surgery provides comprehensive treatment of adult and pediatric spine disorders. The division treats the full spectrum of adult and pediatric spinal problems, including degenerative problems, complex spinal growth disorders, neuromuscular disorders, traumatic and revision surgeries. Physicians in the spine program utilize the most up-to-date techniques to treat spinal conditions.

Spine Procedure Volumes

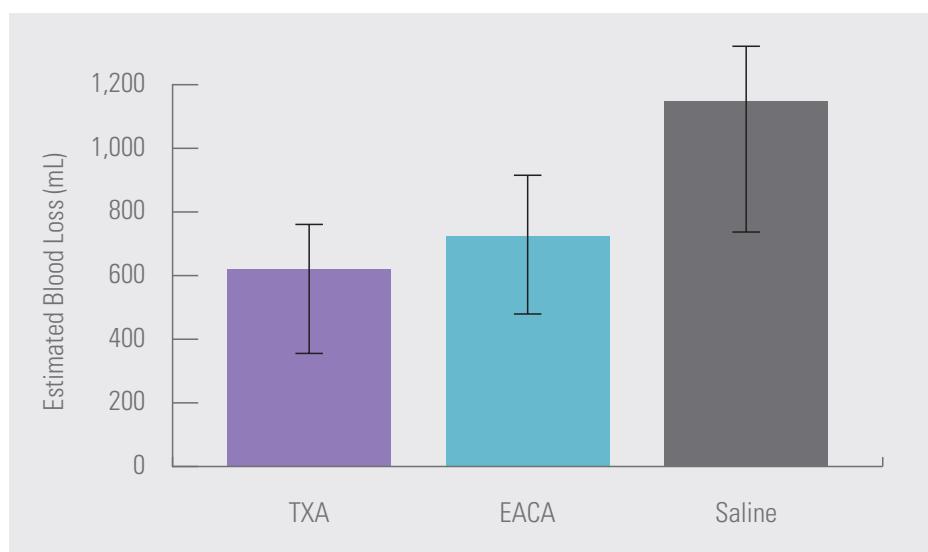


To document the outcomes of patient care provided, the spine division developed a multifaceted research program to answer critical questions.

How Effective Are Antifibrinolytics at Reducing Blood Loss in Adolescent Idiopathic Scoliosis (AIS) Surgery?

Blood loss during scoliosis surgery is still a concern for patients and their families. In order to evaluate the effectiveness of approved drugs for limiting blood loss, a prospective, randomized, double-blinded investigation was conducted comparing tranexamic acid (TXA), epsilon aminocaproic acid (EACA), and placebo to directly assess blood loss, drain output, and transfusion rate used intraoperatively in patients with AIS. Seventy-four patients with AIS were randomly assigned to one of the treatment arms or the placebo group. Results revealed a significant reduction in blood loss (but not in transfusion rate) with antifibrinolytics (TXA and EACA) compared to placebo. Total drain output and total blood loss were reduced with TXA, but not EACA, compared to placebos (saline).

Scoliosis Surgery Blood Loss: Randomization



Infection in Spinal Deformity Surgery

Surgical site infection following spinal deformity is a potentially devastating complication, impacting the patient's quality of life and often requiring multiple re-operations. It presents a huge cost burden to the healthcare system. Factors associated with increased risk of infection in a single surgeon's spinal deformity practice were evaluated.

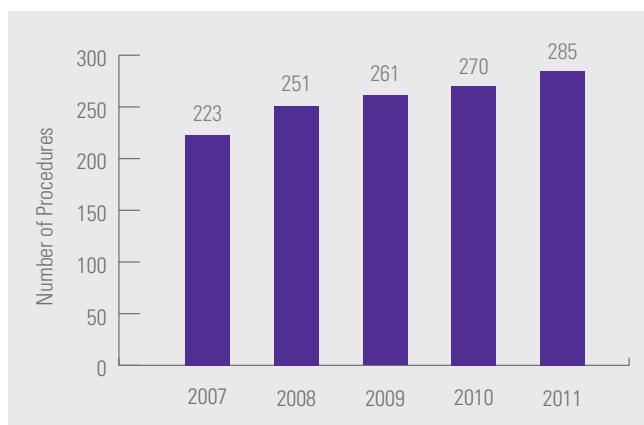
941 operative procedures in 806 patients were evaluated spanning a period of ten years from 1998 to 2008. The average age of the patients was 22 years (ranging from 1.8 years to 82 years). Overall infection rate was 3.2%, falling well within reported rates for specific pathologies and procedures. Specific risk factors for infection included diagnosis of kyphosis or neuromuscular scoliosis, double or triple scoliotic curve patterns, and performance of osteotomies. This data provides information that can be used to counsel patients on infectious risk associated with spinal deformity surgery and to develop strategies for mitigating this risk.



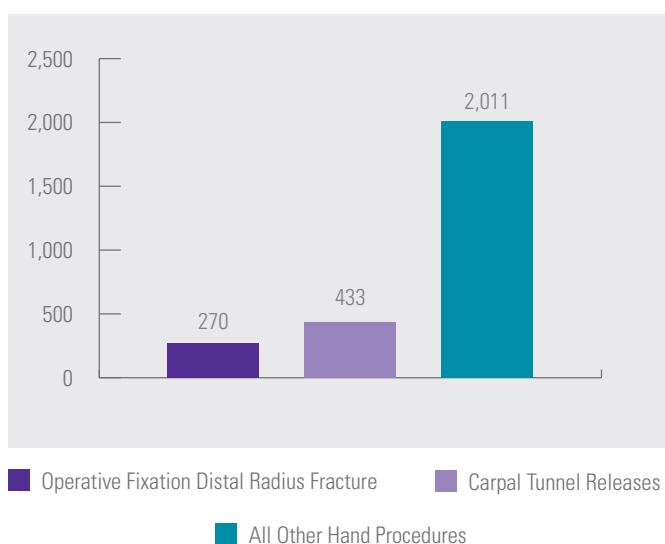
Division of Hand Surgery

The Division of Hand Surgery is one of the largest academic and clinical divisions of its type in the nation, with a rich history beginning with its founder Dr. Emmanuel Kaplan. The faculty is composed of more than 20 board-certified and fellowship-trained hand surgeons who provide comprehensive evaluation and treatment for the many and varied problems that affect the upper extremity. For the past 30 years, the division has been led by Dr. Martin Posner. Recognized as a leader in the hand surgery field, Dr. Posner has trained over 60 fellows during his time as division chief.

Surgical Repair of Fractures of the Distal Radius



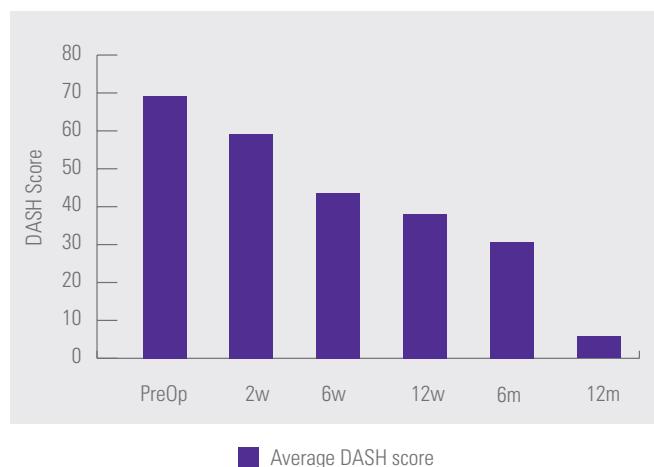
Hand and Upper Extremity Procedures for 2010



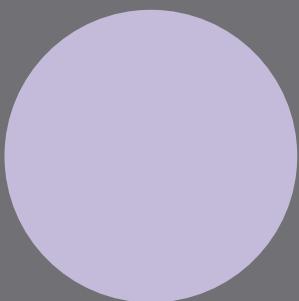
Radial Tunnel Decompression

A strict criterion for diagnosis and treatment of patients suffering from radial tunnel syndrome has led to a predictable and progressive improvement in their activities of daily living following decompression. Surgical outcomes are quantified using the DASH Score (Disabilities of Arm, Shoulder, Hand); the lower the score the better the outcome. For radial tunnel syndrome, the following DASH scores are indicative of a progressive improvement in function over time.

Radial Tunnel Decompression



Quality Collaboration, Learning and Leadership



Education: Quality and Process Improvement Course



In Fall 2010, the Department of Orthopaedic Surgery collaborated with the NYU Leonard N. Stern School of Business to further educate faculty and staff on the importance of quality and process improvement in healthcare. Eitan Zemel, the W. Edwards Deming Professor of Quality and Productivity, led the course and discussed process management, metrics and measurement, and the fundamentals of quality management. The course was widely attended by our faculty, nursing staff, administration, residents and medical students.

Nursing Collaboration



The Department of Nursing works tirelessly to increase patient satisfaction and collaborate with our physicians in our institutional-wide quality initiative. Several of our collaborative efforts include:

- Perioperative strategies to reduce surgical site infections (SSIs)
- Patient attitude and compliance with MRSA screening protocol
- Hospital-wide initiative to decrease implant flashing
- Assurance of proper VTE prophylaxis
- Performance of pregnancy tests prior to surgery
- Prevention of wrong site surgeries through the use of checklists and time-out procedures

Quality- and Patient-Safety-Focused Presentations

American Academy of Orthopaedic Surgeons Annual Meeting: New Orleans, LA: March 10, 2010: "Cost Effectiveness of Nasal Decolonization Program: A Markov Analysis." Podium Presentation.

American Academy of Orthopaedic Surgeons Annual Meeting: New Orleans, LA: March 10, 2010: "Nasal Colonization Rate of MRSA and MSSA in Orthopaedic Surgeons and their Patients." Podium Presentation.

American Academy of Orthopaedic Surgeons Annual Meeting: New Orleans, LA: March 10, 2010: "Perioperative Strategies to Reduce Surgical Site Infections: An Evidence-Based Approach." Instructional Course Lecture. Moderator and Presenter.

Infectious Disease Society of America Annual Meeting: Vancouver, BC: June 7, 2010. "Efficacy and Persistence of MRSA and MSSA Decolonization in Orthopaedic Patients." Poster Presentation.

Association for Professionals in Infection Control Annual Meeting: New Orleans, LA: July 9, 2010: "Surgical Site Infection Prevention Initiative: Patient Attitude and Compliance." Poster Presentation.

Harvard University Advances in Arthroplasty Course: Boston, MA: September 28, 2010: "Cost Analysis of Custom Total Knee Cutting Blocks."

Harvard University Advances in Arthroplasty Course: Boston, MA: September 28, 2010: "Screening and Decolonization of MRSA Prior to Joint Arthroplasty."

Infectious Diseases Symposium Prevention and Management of Infections Associated with Indwelling Devices: Neptune, NJ: September 28, 2010: "Perioperative Strategies to Reduce Surgical Site Infections: An Evidence-Based Approach."

22nd Annual National Health Forum on Quality Improvement in Health Care: Orlando, FL: December 6, 2010: "Reduction in Readmissions in Total Joint Replacement." Poster Presentation.

Nassau Surgical Society Orthopedics Annual Clinic Day: Uniondale, NY: December 8, 2010. "Perioperative Strategies to Reduce Surgical Site Infections."

American Academy of Orthopaedic Surgeons Annual Meeting: San Diego, CA: February 15, 2011: "Efficacy and Persistence of MRSA and MSSA Decolonization in Orthopedic Patients." Poster Presentation.

American Academy of Orthopaedic Surgeons Annual Meeting: San Diego, CA: February 16, 2011: "Preoperative *Staphylococcus Aureus* Decolonization Protocol Reduces MRSA Infections." Podium Presentation.

American Academy of Orthopaedic Surgeons Annual Meeting: San Diego, CA: February 16, 2011: "Readmission Following Orthopedic Surgery: Causes and Accuracy of Administrative Data." Podium Presentation.

American Academy of Orthopaedic Surgeons Annual Meeting: San Diego, CA: February 17, 2011: "Perioperative Strategies to Reduce Surgical Site Infections: An Evidence-Based Approach." Instructional Course Lecture. Moderator.

American Academy of Orthopaedic Surgeons Annual Meeting: San Diego, CA: February 17, 2011: "Perioperative Strategies to Reduce Surgical Site Infections: An Evidence-Based Approach." Instructional Course Lecture. Presenter.

American Academy of Orthopaedic Surgeons Annual Meeting: San Diego, CA: February 18, 2011: "A Comprehensive Program Can Reduce Readmission Rates Following Total Joint Arthroplasty." Podium Presentation.

University of North Carolina Raney Lecture and Alumni Day: Chapel Hill, NC: May 21, 2011: "Perioperative *Staphylococcus Aureus* Decolonization: The Hospital For Joint Diseases Experience."

American Orthopedic Association Annual Meeting: Boston, MA: June 22, 2011: "*Staphylococcus Aureus* Nasal Decolonization Reduces Hospital-Acquired MRSA Infections." Special Interest Poster Presentation.

Harvard Quality Colloquium. Cambridge, MA: August 17, 2011: "Using Information Technology to Prevent Wrong Site Surgery."

Press Ganey National Client Conference: Grapevine, TX: November 13, 2011: "Surgical Site Infection Prevention Initiative: Patient Attitude and Compliance."

For further information or for questions regarding our quality and outcomes studies, please contact Lorraine Hutzler, Quality Project Manager, at 212-598-6048.



Selected Publications

Anakwenze, Okechukwu A, Namdari, Surena, Auerbach, Joshua D, Baldwin, Keith, Weidner, Zachary D, Lonner, Baron S, Huffman, G R, Sennett, Brian J. "Athletic performance outcomes following lumbar discectomy in professional basketball players," *Spine* 2010 Apr 1;35(7):825-8.

Bedford, Ben, Yang, S Steven. "High fusion rates with circular plate fixation for four-corner arthrodesis of the wrist," *Clinical Orthopaedics & Related Research* 2010 Jan;468(1):163-8.

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Bridwell, Keith H, Baldus, Christine, Berven, Sigurd, Edwards, Charles, II, Glassman, Steven, Hamill, Christopher, Horton, William, Lenke, Lawrence G, Ondra, Stephen, Schwab, Frank, Shaffrey, Christopher, Wootten, David. "Changes in Radiographic and Clinical Outcomes With Primary Treatment Adult Spinal Deformity Surgeries From Two Years to Three- to Five-Year Follow-up," *Spine* 2010 Sep 15;35(20):1849-1854.

Chen, Tracy S, Sala, Debra A, Chu, Alice, Chorney, Gail S, Lehman, Wallace B. "Correction of clubfoot deformity associated with Weber type I tibial hemimelia using the Ponseti method," *Bulletin of the NYU Hospital for Joint Diseases* 2010;68(4):299-303.

Chin, Kingsley R, Stieber, Jonathan R, Mehta, Samir, Cohen, Jason D, Auerbach, Joshua D. "The Manubrium as an External Guide for Centralizing Anterior Cervical Plates: Technique Tips and Initial Experience," *Spine* 2010 Apr 1;35(7):E244-7.

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Cunningham, Mary R A, Hershman, Stuart, Bendo, John. "Systematic review of cohort studies comparing surgical treatments for cervical spondylotic myelopathy," *Spine* 2010 Mar 1;35(5):537-43.

Davidovitch, Roy I, Jordan, Charles J, Egol, Kenneth A, Vrahlas, Mark S. "Challenges in the treatment of femoral neck fractures in the nonelderly adult," *Journal of Trauma* 2010 Jan;68 (1):236-42.

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de Bartolomeo, Omar, Albisetti, Walter, Miyamoto, Ryan, Dhotar, Herman, Rose, Donald, Egol, Kenneth. "Letter to the editor. The treatment of tibial stress fractures in elite dancers [letter] [comment]," *American Journal of Sports Medicine* 2010 Apr;38(4):NP1; author reply NP1.

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