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Orthopedics in Massachusetts

Discharges and market share

NEBH leads the market with 5,638 discharges—an 11% market share that continues to increase.

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<thead>
<tr>
<th>Hospital</th>
<th>Discharges</th>
<th>Market Share</th>
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<tr>
<td>Mass. General</td>
<td>3,689</td>
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<tr>
<td>Brigham and Women’s</td>
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<td>Baystate Medical Center</td>
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<tr>
<td>Beth Israel Deaconess</td>
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<tr>
<td>Newton-Wellesley Hospital</td>
<td>1,950</td>
<td>3.8%</td>
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Case mix index

NEBH vs. Medicare benchmark—major joint replacement of the lower extremity*

Case mix reflects the level of complexity and acuity of patients.

*Source: Medicare
Dear Colleague,

I am pleased to present the inaugural issue of *Orthopedic Update*, a twice-yearly publication highlighting innovations in orthopedic care at New England Baptist Hospital.

In this issue we discuss a new model for shorter-stay hip replacement, complicated hip and knee revision, the Baptist’s joint registry, total ankle replacement, a paradigm for nonoperative treatment of low back pain, a preemptive pain management protocol, and diagnostic radiology to support these novel therapies.

But besides our focus on clinical excellence, you will see that we also are focused on better, more cost-effective ways to deliver health care. We, like you, are concerned about delivering the same good outcomes, but with greater efficiency.

In pursuit of this goal, we have embarked on a hospital-wide examination of every aspect of our practice to see where we can achieve greater efficiencies without compromising our excellent outcomes, our superior patient safety record, or our patients’ satisfaction. Hip replacement was the first care pathway we tackled, looking at evidence-based medicine and best practices to craft the new care pathway described on page 6.

Since the inception of the program, average length of stay for hip replacement has decreased. Rates of complications including infection, pulmonary embolus and deep vein thrombosis, and readmission, remain extremely low, and our patients continue to express high levels of satisfaction with their hospitalization experiences. Our next effort, redesigning care for knee replacement, is underway, and we are scrutinizing every step of our process from the initial appointment with the surgeon to the end of rehabilitation.

New England Baptist Hospital has long had a reputation as a premier hospital for orthopedic care, based on our high volume, case mix, experience, expertise, and most of all, our single focus on orthopedics—what we call “the Baptist Difference.” Today, we also are considered by major insurers to be a Tier 1 hospital, a good value in health care. I encourage you to read on and to watch future issues of *Orthopedic Update* for the latest on clinical and cost-effective innovations from New England Baptist Hospital. Please also feel free to use our physician access line if we can offer any service to you or your patients.

Sincerely,

John C. Richmond, MD
Chair, Department of Orthopedic Surgery
Total hip replacement is perhaps one of the most successful procedures in medicine, with patient satisfaction rates reported to be between 95 and 98 percent. Total knee replacement also is very effective in relieving pain and restoring function, and patient satisfaction rates also are high. Nevertheless, some of these implants can fail—usually due to wear, instability, or trauma—and patients are left with pain and disability and a decision as to whether to undergo revision surgery.

James Bono, MD, vice chair of orthopedic surgery, clinical professor of orthopedic surgery at Tufts University School of Medicine, and editor of the textbook *Revision Total Hip Arthroplasty*, notes, “Whenever and for whatever reasons it happens, joint replacement failure is a disappointment to patients, and they may understandably be hesitant to consider a revision. However, advances in implants and surgical approaches, and the skill and experience of New England

Baptist Hospital surgeons, as well as the hospital’s rigorous protocols and practices for patient safety, all combine to make joint revision a very good choice for patients suffering pain and loss of function due to a failed replacement.

Implant design and materials have evolved dramatically over the last ten years, so most revision patients will get a better, longer-lasting implant than what was available when they had their primary replacements. Current-generation implants offer more modularity, which is particularly beneficial in revisions where there may be bone loss and soft tissue deficit. Plastic bearings have been improved by a cross-linking process that extends wear, and new porous metals have been developed that can improve ingrowth and enhance fixation.

**The Baptist advantage**

New England Baptist Hospital was one of the first in the country to undertake revision surgery and has earned a reputation for expertise and experience in these complex operations for many years. “In fact,” says David Mattingly, MD, chief of joint reconstruction and associate clinical professor of orthopedic surgery at Tufts University School of Medicine, “our surgeons developed many of the techniques for implant removal and reducing complications that still are applied today. All of our surgeons are fellowship-trained and are very confident in accepting and capable of managing difficult revisions, including cases other surgeons decline to accept.” (See page 5.)

Because of the Baptist’s high volume of revision cases—302 hip revisions in 2011—there is a large inventory of implants, instrumentation, and other supplies that may be necessary to remove the old prosthesis and fit the new one. Orthopedic surgeon James Nairus, MD, explains, “With a revision, despite careful planning, you can sometimes start surgery and find the bone or soft tissue quality is not what you expected and you need to change your plan. We have all the implants and equipment we might need in-house, and we know we can customize the revision to accommodate patient needs.”

“**Our surgeons developed many of the techniques for implant removal and reducing complications that still are applied today.”**

David Mattingly, MD

Most revision cases are done in one of the Baptist’s new state-of-the-art operating rooms. All are large, positive-pressure rooms with high-volume HEPA-filtered air exchange and real-time radiology support. Dr. Nairus adds, “The new, bigger operating rooms are better for complex revisions because these cases require significantly more equipment than less complicated surgeries, and standard ORs cannot always accommodate them.”

Revision surgery is more complicated and associated with more risk than primary replacement, according to Dr. Mattingly. “Surgeries are generally longer and there is potentially more blood loss. We use cell saver technology to minimize the need for transfusion. Infection also is a greater concern, but our institutional protocols for infection control have resulted in extremely low rates of infection for all patients, and our revision patients can be confident that their surgeries, and recoveries, will be as safe as possible.”

**Specialty care for complex patients**

Joint revision patients tend to be older and are therefore at increased risk for medical complications. They, like all patients who come to the Baptist for elective surgery, go through the hospital’s intensive presurgical screening program to identify (continued on page 4)
Revision patients also are at risk for pulmonary embolus and deep vein thrombosis (PE/DVT). According to Murray Bern, MD, chief of hematology and assistant clinical professor of medicine at Harvard Medical School, PE and DVT are significant risks for anyone undergoing joint surgery, particularly revision surgery in the lower extremities. However, the Baptist's aggressive detection and prevention program has resulted in a very low rate of these conditions—better than rates for the nation's top decile performers.

Anticoagulation, either with dose-adjusted warfarin or injectables, has long been standard prevention therapy for arthroplasty patients. Although this regimen is very effective in preventing clot formation, the treatment itself is not without risks, chiefly excess bleeding or adverse drug reactions. In an effort to reduce these risks, Dr. Bern has conducted a randomized clinical trial of 350 patients to determine whether a lower dose of warfarin, started preoperatively, is at least as effective as standard therapy as prophylaxis against PE/DVT. “Our final results are very impressive, and we hope they will help us to design safer and more cost-effective anticoagulation strategies for all our patients,” says Dr. Bern.

More replacements, more revisions

As the population ages and baby boomers want to remain active longer, more patients will likely require joint replacement surgery, and as they live longer, more may subsequently choose revision surgery. Dr. Mattingly says, “Revision surgery used to be considered an inferior operation compared with primary replacement; today, in the right circumstances and the right hands, it is considered to be equivalent, and patients can be confident that revision is a good option to relieve their pain and restore function.”

Dr. Basilico notes that most consultations are in cardiology. “Because of their joint issues, patients with heart disease often have a poor exercise level, and it is not always clear whether the stress of surgery will evoke a medical issue. We follow the guidelines of the American Heart Association and the American College of Cardiology to manage screening. We assess each patient on a case-by-case basis, and our cardiologists, who have a special focus on perioperative management, develop customized plans to safely manage each patient’s risk.”
Case Study: Complex hip revision

James Nairus, MD, orthopedic surgeon, New England Baptist Hospital

An 82-year-old female was referred from an outside hospital with severe right hip pain and inability to walk. Her clinical history included a right hip replacement at another hospital eighteen years previously. X-rays of her right hip showed that the acetabular component of her hip replacement had broken into her pelvis, that she had severe bone loss around her acetabulum, and that she had little bone to put another hip replacement component on. (See pre-op X-rays, above left.)

I first examined her in early June of 2010. I obtained a CT scan of her hip that confirmed she had pelvic discontinuity; that is, the top part of her pelvis was no longer connected to the bottom part. This condition in the revision hip replacement setting is very difficult to deal with and has a high failure rate in the literature. It requires placement of a reconstruction cage attached to both the top and bottom part of the pelvis to fix the discontinuity, as well as placement of a large amount of bone graft to promote fixation and encourage ingrowth into native bone over time.

In late June of 2010, I performed a revision of the acetabular component of her right total hip replacement using special implants that included a cup made of trabecular metal—a newer technology metal with better bone incorporation properties—and a reconstruction cage that fit into the cup. The reconstruction cage was attached to both the top and bottom parts of her pelvis to stabilize the pelvic discontinuity while the trabecular metal cup and bone graft incorporate over time into her own bone. (See post-op X-rays, above right.)

The patient was made non-weightbearing for eight weeks following the surgery and has done very well. She was pain-free within a few months and was able to walk with a walker comfortably by three months after the surgery. I saw her in December of 2011, and she is still doing well with no pain and walks with a cane. Her X-rays show that her bone graft has incorporated and her hip replacement construct is stable.

This case is a good example of specialty revision joint replacement surgery routinely done at New England Baptist Hospital that makes a great improvement in our patients’ lives.
New England Baptist Hospital, long a national leader in joint replacement, has inaugurated a program of customized care for hip replacement that allows patients to safely go home one, two, or three days after surgery. In some cases, patients go home the day of surgery. Driven by evidence that a shorter hospital stay is safer and more satisfying for patients, a multidisciplinary team led by Diane Gulczynski, RN, MS, CNOR, vice president for care redesign and perioperative services, and David Mattingly, MD, chief of joint reconstruction and associate clinical professor of orthopedic surgery at Tufts University School of Medicine, examined every aspect of hip replacement at the Baptist. The result is an innovative care pathway for hip replacement that includes some new and more efficient ways of delivering care and reaffirms the value of some existing practices.

Stephen Murphy, MD, orthopedic surgeon and associate professor of orthopedic surgery at Tufts University School of Medicine, was the surgeon leader in designing short-stay hip replacement at the Baptist. In 2003, he created a new method...
of performing minimally invasive hip replacement surgery that leaves the major muscle groups intact. "The more sparing we are of a patient’s soft tissues, the less pain they have, and the easier it is for them to recover," says Dr. Murphy.

In 2008, Dr. Murphy and Gulczynski started working together to identify opportunities to minimize delays and streamline the postoperative course for hip replacement patients. This led, in 2010, to the region's first "24-hour hip," when a Baptist patient was discharged directly home 24 hours after surgery. The components of the new care pathway have since been adopted for all hip replacement patients.

Preoperative screening

Intensive preoperative screening allows physicians to identify and address medical issues that may result in postoperative problems, delay mobilization, and keep patients in the hospital longer. Two of the most significant medical risks for hip replacement patients are infection and pulmonary embolus/deep vein thrombosis (PE/DVT).

John Richmond, MD, chair of the department of orthopedic surgery and professor of orthopedic surgery at Tufts University School of Medicine, says, “We have a sophisticated program, structured from the preoperative visit, for reducing infection risk that includes screening for MRSA and staph infection. MRSA screening is done by PCR, so we know before patients walk out of the hospital whether they are carriers. Any evidence that the patient has MRSA on the skin is treated aggressively before surgery.”

This program cut MRSA rates by more than 50 percent in the first year (Journal of Bone and Joint Surgery, 2010, 1820-1826), and these and other aggressive infection control measures continue to contribute to the Baptist’s very low infection rate. (See inside back cover.)

Surgery, particularly joint replacement surgery, puts patients at elevated risk for PE/DVT. The preoperative visit includes screening for evidence of hypercoagulation, as well as any personal or family history or risk factors. The Baptist’s aggressive detection and prevention program has resulted in a very low rate of these conditions—better than rates for the nation’s top decile performers.

Preemptive pain management protocol

The new care pathway includes an innovative pain management protocol featuring preemptive analgesia and minimal amounts of narcotic that enables joint replacement patients to begin rehabilitation and go home sooner. Under the new protocol, patients receive a preoperative “cocktail” of medications that work on different pain pathways. This reduces the amount of narcotics required during surgery and has virtually eliminated the need for patient controlled analgesia, which can cause more side effects and tether patients to the hospital bed.

“As a result,” says Robert Bode, MD, chairman of anesthesia and associate professor of anesthesiology at Boston University School of Medicine, “our patients arrive in their rooms after surgery comfortable, alert, able to read the newspaper and talk with their families, and most of all, ready to begin rehabilitation, which itself has a beneficial effect on pain.” (See page 13.)

Less invasive surgical techniques

Less invasive surgical techniques are a keystone of shorter-stay hip replacement. According to James Bono, MD, vice chair of orthopedic surgery and clinical professor of orthopedic surgery at Tufts University School of Medicine, “All less invasive approaches aim to preserve more muscle; cut fewer tendons, even if they are subsequently repaired; and maintain the integrity of the capsule.”

Within that definition, there are many variations in technique and approach that surgeons can adopt to meet the needs of different patients and still offer a less invasive procedure. In the end, the goal is to leave as many structures as possible undisturbed and give the patient a durable hip replacement that relieves pain and restores function.

“The challenge,” says Dr. Bono, “is to preserve structures without sacrificing surgical exposure—you need to be able to see what you’re doing. The incision should be as long as it needs to be and no longer. One of the benefits of our high volume practice and long experience is that our surgeons know the landmarks and are expert at operating within small exposures.”

(continued on page 8)
Well designed implants

Implant design has evolved dramatically over the last forty years and plays an important role in shorter-stay hip replacement. Dr. Mattingly notes, “Today’s implants are stronger, fixation is better, bearing surfaces last longer, and biomechanics are improved. In addition, implants are stable at the time of insertion, allowing for safe movement and weightbearing earlier. The growing-in process still takes six weeks—we can’t change that—but we find that with proper precautions, patients can safely move and participate in rehabilitation during this period.”

Early mobilization

Early mobilization includes not only the traditional concept in musculoskeletal care of getting the joints and muscles moving, but also early mobilization of every system in the body, says Gulczynski. “For example, many of our hip replacement patients don’t receive urinary catheters. This means less risk of urinary infection, and patients arrive in their rooms ‘unplugged’ and able to move around.”

To reinforce the importance of early movement, hip replacement patients now are transported to their rooms on stretchers, and they walk from the stretcher to the bed. Frail patients may simply stand and pivot by the bed.

“In addition,” says Gulczynski, “we have added a late shift of physical therapists to accommodate patients who have their surgeries later in the day and arrive in their rooms in the evening. Therapists may be on the floor until 10 pm. Now every patient has the opportunity to walk on the day of surgery, which we believe is important in order to build the patient’s confidence and meet clinical goals.”

Goals for discharge are simple. Patients must be able to get in and out of bed, walk the hallways, climb stairs, and use the toilet. “When you can accomplish these tasks unassisted,” says Dr. Bono, “your ticket is punched and you can safely go home.”

Of course not every patient can meet their therapy goals and go home the day after surgery, but the principles of minimal narcotic use, less invasive surgery, and early mobilization can result in shorter stays for all patients.

Patient education

Setting clear expectations for patients and their families is an important part of successful early mobilization and assists in preparing for the transition home. Gulczynski notes, “We offer classes to teach our new approach to hip replacement and let patients know that they should be prepared for a short stay—one or two days.”

“We have learned that it is important to set expectations for everyone—physicians, therapists, and nurses, as well as patients—that an early return to home is safe,” Dr. Murphy adds.

Streamlining care for the future

“Baptist surgeons perform more than 5,000 joint replacement surgeries every year, so this is the ideal place to re-think and streamline care,” concludes Gulczynski.

Dr. Murphy adds, “Our goal is to care for our patients in a way that allows them to feel well enough to return home sooner—never to push them beyond their capabilities. And in fact, since the program began in March of 2010, not one of the 192 patients who went home the day of or the day after surgery has been readmitted.”
Recently there have been concerning reports about rare but serious side effects of metal-on-metal hip implants. This issue is of particular concern at the Baptist, since we perform more joint replacement surgeries than any other hospital in New England and our commitment to patient safety is paramount.

Large studies and our own experience as a national orthopedic center of excellence indicate that metal implants perform well in the vast majority of patients. Still, some patients have experienced adverse reactions to metal wear debris from metal implants, or from metal ions released by the implants.

One implant model, the DePuy ASR™ Hip System, was voluntarily recalled in 2010. This implant was used in a small fraction of the hip replacements performed in the United States before 2009. At New England Baptist, it was used in 0.5% of the cases we performed between 2006 and 2009.

Definitive clinical evidence on metal-on-metal hip implants is still being collected. New research suggests these problems may be associated with implants that include a large (greater than 38 mm) femoral head—used to provide stability and improved motion.

Until more information is available, we have suspended the use of metal-on-metal implants except in a few selected cases where clinical criteria indicate it is the best alternative.

We believe it is important for all metal-on-metal hip implant patients to receive thorough follow-up care.

New England Baptist Hospital Care Guidelines for Patients with Metal-on-Metal Hip Implants

Patients with metal-on-metal implants should follow the recommendations of their surgeons for monitoring—usually a history, physical exam, and routine X-rays. Testing for serum cobalt and chrome levels or MRI scanning of the hip also may be indicated for symptomatic patients.

Symptomatic patients
- If new symptoms or significantly worsening problems develop with the hip, including pain, swelling, numbness, or a limp or change in ability to walk, the patient should contact the surgeon immediately. It also is important to note changes in general health and any new conditions that have arisen since the hip replacement.
- New symptoms or medical conditions other than at the hip should be reported to the primary care physician for assessment, with a reminder that the patient has a metal-on-metal hip implant.

Symptom-free patients
- If the patient is not experiencing any symptoms and the surgeon believes the metal-on-metal hip implant is functioning appropriately, there are no data to support the need for additional tests.
- Patients should continue to follow up with their orthopedic surgeons for periodic examinations. We recommend that patients without symptoms see their surgeons at one year, two years, and five years following surgery, and then every two to three years, or as determined by the surgeon.

Patients who have a recalled implant

If a patient has the recalled implant, it does not necessarily need to be removed and replaced. In most cases, the recall simply means different or more frequent monitoring is warranted. It is important for patients to discuss the reason for the recall with their surgeons to determine the most appropriate course of action.

Additional information regarding metal-on-metal hip systems
http://www.fda.gov/MedicalDevices/ProductsandMedicalProcedures/ImplantsandProsthetics/MetalonMetalHipImplants/ucm241771.htm
http://orthoinfo.aaos.org/topic.cfm?topic=A00625
http://www.aahks.org/patients/patients.asp

For a second opinion

Surgeons at New England Baptist regularly evaluate patients who have received hip implants (metal-on-metal and other types) at other hospitals. To make an appointment with one of our specialists, contact our physician access line at 1-855-851-DOCS.
Low back pain is a constant topic in American life. Eighty percent of us experience it at one time or another, and about a quarter of Americans with back pain report that their work and/or personal lives are severely limited. Low back pain is the second most common reason for doctor visits, and a robust health care industry promoting a dizzying variety of remedies for this problem has emerged.

Over the last two decades, physiatrists at New England Baptist Hospital’s Spine Center have pioneered a science-based approach to low back pain that is resulting in dramatic reductions in pain and disability for sufferers of this pervasive public health scourge. The approach includes customized education that often is combined with exercises designed to get patients back on their feet, back to work, and back to the activities they want to pursue.
Both anticipated and induced pain were lessened after an exercise-based physical therapy program. In addition, pain threshold altered as strength and flexibility increased and disability decreased. These findings may help explain how exercise exerts a positive influence on chronic pain and disability. (The Spine Journal. 2004;4:176-183.)

Kinesiophobia (fear of movement) decreased following quota-based exercise. Reduced fear of injury and the experience of successful resumption of avoided activities may have a positive influence on disability. (Journal of Orthopaedic & Sports Physical Therapy. 2007;37:679-687.)

Patients have fear-avoidance beliefs that play a significant role in the development of disability, and patients with stronger beliefs have increased likelihood of disability. Understanding these beliefs may help doctors customize an education, reassurance, and reinforcement strategy that is most likely to benefit that patient. (The Spine Journal. 2011;11:895-903.)

Science of back pain

For the last thirty years, chronic low back pain has been viewed as the result of pressures on the intervertebral discs. This so-called "cumulative injury model" of low back pain proposes that we literally wear out the discs and joints of our backs through strenuous daily activities. It is a short step from there to the widely held perception that chronic low back pain sufferers must accept some limitation on their physical activities in order to avoid further pain and damage to their spines.

However, epidemiology, pathophysiology, occupational, sports, and ergonomic studies have not validated the cumulative injury model of back pain. As it turns out, exposures to stress and strains during work and daily activities contribute very little to degeneration of the spine or development of chronic low back pain.

Other studies suggest that spinal degeneration occurs in accordance with a genetically predetermined pattern and timetable that results in a gradual loss of function of the cells that maintain the discs. This inadequate maintenance is manifested as disc degeneration.

At the same time, scientific study of pain has produced evidence that most chronic low back pain actually represents a malfunction of the nervous system, in which the neurons that monitor the spine become overly sensitized and produce pain signals from stimulation that is not harmful and under normal circumstances not painful, such as bending over or light pressure on the back. Apparently, resolution of back pain episodes results from recalibration of the pain neurons that monitor the spine to accept (and therefore ignore) the degeneration that is present. Failure of adaptation of pain neurons results in persistence of pain.

Also, functional MRI has revealed that cognitive factors such as fear and depression may directly affect pain centers, offering a scientific explanation for the observation that beliefs and emotions can directly affect pain.

Uncoupling exposure and pain

New England Baptist physiatrists James Rainville, MD, chief of physical medicine and rehabilitation, and Carol Hartigan, MD, both assistant clinical professors of physical medicine and rehabilitation at Harvard Medical School, focus their research not on back injury, but on how to incorporate science into the treatment of chronic low back pain. Among their findings are:

- An aggressive exercise program does not increase risk for back injury or disability. (The Spine Journal. 2004;4:106-115.)

“Boot camp . . . is an effective and inexpensive solution to a vexing and over-medicalized public health problem.”

James Rainville, MD

Revolutionary model

Although the Spine Center treats patients with all types of spinal disorders, many patients fit the pattern of having experienced back pain for a year or more. “They have stopped doing things they believe will hurt their backs—wearing high heels, carrying groceries, or playing golf. They have lost strength, flexibility, and cardiovascular capacity and have become fearful of exercise. Unfortunately, none of these changes have resulted in any improvement in their back pain,” says Dr. Rainville.

“We found that the most compelling predictor of good outcomes is a patient’s beliefs about the meaning of pain,” says Dr. Rainville, “and our approach is designed to change those beliefs with education that replaces fear-producing misinformation with liberating science. This education couples with an aggressive exercise program that affords the opportunity to experience success.”

Of equal importance, according to Dr. Hartigan, is the cognitive component of the program. “We deliver a message that it is safe to exercise and get moving despite pain. That may seem counterintuitive to patients who have been told to ‘listen to their pain’ and stop the activity when it hurts.”

(continued on page 12)
Customized plan

Treatment at the Spine Center begins with a thorough assessment including history, physical examination, and imaging, as well as an evaluation of the patient’s functional status and goals for therapy.

If appropriate, the physiatrists recommend an exercise program—fondly referred to by former patients as “boot camp”—customized to each patient’s age, gender, size, and personal goals. The exercises include cardiovascular work, stretching, and strengthening. The physical challenge is methodically and sequentially increased, using a quota-based approach. Dr. Hartigan says, “We encourage patients to perform the planned exercise in spite of expected daily fluctuations in reported pain, as long as the pain is tolerable.”

Dr. Rainville adds, “We help patients understand that their spines are not injured by exercise and that it is safe to work through tolerable pain and resume activities they have abandoned, fearing that their pain indicated further harm.”

Some patients come to the Spine Center using prescription narcotics to control their pain. “We work with their doctors,” says Dr. Hartigan, “to taper, or if possible, eliminate narcotic use. For patients who need a little pain relief to help them feel better while they get better, or to get them started in therapy, we enlist New England Baptist Hospital pain specialists who offer image-guided injections for temporary pain relief as appropriate.”

An effective and cost-effective solution

After boot camp, patients are stronger and have improved cardiovascular function (documented by physical performance tests), less back pain (by visual analog scale), increased function (by Oswestry Disability Index), and more confidence. “And we know that exercise benefits their general health as well,” says Dr. Rainville. “Boot camp, it seems, is an effective and inexpensive solution to a vexing and over-medicalized public health problem.”

Spine Center physiatrists see around 3,000 new patients every year at three locations in Boston, Chestnut Hill, and Waltham. “From the first day in treatment,” says Dr. Hartigan, “we are moving toward overcoming barriers to exercise and transitioning our patients to a health club or gym. We teach people how to care for their backs for the rest of their lives.”

The Five-Minute Low Back Examination: A tool for primary care physicians

This five-minute examination will provide information to help clinicians make appropriate referrals for patients presenting with low back pain. If the patient has a history of back pain, it will guide the examination.

The clinician should evaluate:

- Gait
- Strength of major muscle groups in back and hips
- Sensation
- Reflexes
- Range of motion
- Circulation

Red flags include:

- Significant muscle weakness
- Diffuse sensory deficit
- Rash
- Exquisite tenderness
- Asymmetric reflexes, hyperreflexia, up-going toes
- Absent pulses, vascular disturbance

To view a demonstration of physiatrist Carol Hartigan, MD, performing a five-minute low back examination, please go to www.nebh.org/SpineExam.
An innovative pain management protocol featuring preemptive analgesia and minimal amounts of narcotic is one of the reasons joint replacement patients at New England Baptist Hospital are able to begin rehabilitation earlier, meet their in-hospital therapy goals, and go home sooner.

Robert Bode, MD, chairman of anesthesia and associate professor of anesthesiology at Boston University School of Medicine, says, “The goal of pain management in joint surgery is to minimize postoperative pain without interfering with other body functions. Our protocol uses much less narcotic than had been conventional practice in the past, so our patients are largely spared the grogginess, nausea, and vomiting that often accompany narcotic use, and they can start their rehabilitation earlier. As a result, they usually leave the hospital sooner, and they are happier with their hospitalization experience.”

Eliminating PCA
Abdel Mehio, MD, director of the pain and regional anesthesia program and assistant professor of anesthesiology at Boston University School of Medicine, and orthopedic surgeon Daniel Ward, MD, led development of the Baptist’s advanced pain management protocol. “The goal was to eliminate the use of patient controlled analgesia (PCA) in joint replacement surgery to reduce the risk of complications including respiratory depression, respiratory arrest, and intubation,” says Dr. Mehio.

Drs. Mehio and Ward and their colleagues reviewed science and best practices and designed a multimodal pain management protocol that includes:

- a preoperative pain management "cocktail" of medications that act on different pain pathways, customized for every patient
- nerve blocks for knee replacement and other joint procedures
- intraoperative injections
- postoperative oral medication
- postoperative pain consultation if needed

“Our pain control protocol has been very successful in keeping our patients comfortable and safe from the complications of excessive narcotics and in getting them home sooner,” says Dr. Bode. “Since its inception, there have been no episodes of respiratory arrest and intubation due to narcotics. In addition, the average length of stay for all hip and knee replacement patients has dropped, and our patient satisfaction rates remain among the highest in the country.”

Abdel Mehio, MD
As Orthopedic Update was on press, Dr. Abdel Mehio passed away on May 28, 2012. Dr. Mehio leaves a distinguished legacy of innovation in the treatment of pain for orthopedic surgery patients. His contributions transformed the way pain is managed at New England Baptist Hospital and elsewhere and have improved the surgical experience for countless patients. We will miss him deeply.

Robert Bode, MD
Chair, Anesthesia
Orthopedic surgeons at New England Baptist Hospital offer the full spectrum of treatment options for ankle arthritis, including total ankle replacement (TAR). According to Mark Slovenkai, MD, chief of foot and ankle surgery, ankle replacement is a relative newcomer to the joint replacement scene. “The ankle is a complex joint with complex kinematics. It bears the entire body load over a relatively small area, yet it does not seem to be as vulnerable to primary osteoarthritis as are hips and knees. It’s just the nature of the disease. Thus the demand for TAR has not approached that for hip and knee replacement.”

Nevertheless, surgeons have been working for years to identify the best therapy for ankle arthritis. Conservative treatment—anti-inflammatory medications, activity modification, bracing, and cortisone injections—is always the first-line choice. When these measures fail to provide sufficient relief, patients may consider surgical solutions, but the optimal surgical cure for ankle arthritis has been elusive.

Innovations in implant design and advances in surgical expertise make total ankle replacement a good option for selected ankle arthritis patients.

Total ankle replacement is valuable as a sole therapy or as part of a total treatment strategy for complex ankle problems. The images above show the ankle of a woman with rheumatoid arthritis. X-ray on the left shows a triple arthrodesis performed to obtain a plantigrade foot. X-ray on the right shows the total ankle replacement performed three months later.
Ankle fusion has been the gold standard for treating ankle arthritis for the last century and can provide effective pain relief and reasonable function. Patients can continue with most of their daily activities, although the limited dorsiflexion and plantar flexion of the fused ankle do have an effect on gait.

**Early TAR**

Total ankle replacement began to be offered in the United States about thirty years ago in a setting of satisfying results for hip replacement. Outcomes for early ankle replacement, however, were far less promising, and TAR was temporarily abandoned.

Dr. Slovenkai believes design flaws in the first-generation implants of the 1970s and 1980s compromised ankle anatomy, kinematics, alignment, and stability. They required excessive resection of bone and altered the ankle axis. There was poor alignment, instability, poor fixation, and the polyethylene insert was insufficient.

**Second-generation implants**

These issues have been resolved in the design of second-generation implants. They require minimal bone resection and have press-fit ingrowth fixation, thicker polyethylene inserts, and a semi-constrained design that provides more natural motion and attention to proper ankle axis. The newer implants—there are four approved for use in the U.S.—make TAR once again a viable option for selected patients with ankle arthritis.

Besides well designed implants, appropriate patient selection and the skill and experience of the surgeon also are critical to successful total ankle replacement. “The goals of ankle replacement are to relieve pain; preserve normal anatomy, motion, and gait; and shield adjacent joints from excessive stress,” says Dr. Slovenkai. “In order to meet these goals we need to be certain we are giving the right operation to the right patient for the right reason.”

**Patient selection**

Indications for ankle replacement include:

- Post-traumatic arthritis
- Osteoarthritis
- Rheumatoid arthritis
- Bilateral ankle arthritis
- Ipsilateral hindfoot arthritis

Candidates for ankle replacement typically are age 55 or older. “For much younger patients, ankle fusion is still the best surgical option,” says Dr. Slovenkai. “That may change as we acquire more data about the longevity of modern implants.”

Candidates also must:

- Have a plantigrade foot
- Have good bone stock
- Have excellent skin quality to allow proper wound healing
- Have reasonable expectations

“Following ankle replacement, patients can walk, swim, bicycle, climb stairs, play golf, and even do gentle downhill skiing,” says Dr. Slovenkai, “but the implant is not designed to withstand the stresses that activities like running or playing tennis would place on it.”

Contraindications to TAR include:

- Severe uncorrected deformity. Surgical correction of unbalanced ligaments and bony deformities may be staged before the TAR.
- Active infection
- Diabetes
- Charcot joints
- Extensive avascular necrosis that would inhibit bone ingrowth
- Significant trauma including multiple surgical excisions and post-traumatic lacerations

**Surgical expertise**

TAR surgery is complicated and the learning curve for surgeons is significant. “You really have to know your way around the ankle,” says Dr. Slovenkai. “It may take years and perhaps 40 to 50 TARs before a surgeon can perform this operation with predictable results and minimal complications.” Dr. Slovenkai has performed more than 110 second-generation total ankle replacements since 2007, and his series at the Baptist is one of the ten largest in the country.

*(continued on page 16)*
In his hands, the operation takes about an hour. Patients walk—with partial weightbearing—on the day of surgery, wear a boot or cast for a short period, and are completely healed and back to their normal activities in about six months.

**TAR as part of total ankle therapy**

TAR is valuable as a sole therapy, or it also may be part of a total treatment strategy for complex ankle problems. The images on page 14 show the ankle of a woman with rheumatoid arthritis. Dr. Slovenkai performed a triple arthrodesis, fusing all three joints of the hindfoot, in order to obtain a plantigrade foot. Three months later, he replaced the ankle. “This staged combination of fusion and TAR has allowed this woman to walk again. Her only other alternative would have been a pantalar fusion that would have left her with significant disability.”

**On the horizon**

Total ankle replacement is here to stay, according to Dr. Slovenkai. Third-generation implants look very promising, and surgical approaches and materials will continue to evolve and improve, as well. Follow-up will continue to be important to determine longevity of the implants—currently anticipated to be ten to fifteen years—and to identify late complications.

“Also,” says Dr. Slovenkai, “we expect to be able to safely liberalize our patient selection criteria. Right now, for example, we are considering offering TAR for diabetic patients who are well controlled and have good circulation. In the future, we may be able to offer TAR after previous ankle fusion for patients with good ligaments and good bone stock. And, when we begin to see implant longevity of 20 or 25 years as we now see with hip replacement, we hope to be able to offer total ankle replacement for younger patients.”

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**Joint Registry Improves Care, Research**

The New England Baptist Hospital Joint Registry provides the hospital and surgeons with longitudinal information about hip and knee replacement that helps maintain high quality patient care and facilitate research that can improve joint replacement.

The registry began as a pilot project four years ago and has steadily grown to include more surgeons and more patients. Baptist orthopedic surgeon Carl Talmo, MD, assistant professor of orthopedic surgery at Tufts University School of Medicine and also one of the first surgeons to participate in the registry, says, “We capture a wide scope of data. In addition to collecting data on devices and techniques and clinical information from examination reports, we use an Internet-based system to collect demographic, outcomes, and quality-of-life data that allow us to accurately track how our patients are doing.”

Information from the joint registry helps the hospital maintain a high level of quality. Baptist surgeons perform over 5,000 joint replacement surgeries every year using a wide range of devices, surgical approaches, and methods of fixation. These variables, as well as patient demographics—indications for replacement, underlying disease, obesity, etc.—may contribute to different outcomes.

Having all variables, as well as outcomes over time, available in the database will help users focus on which elements or combinations of elements are critical to the success or failure of an implant in a particular patient population. It can help surgeons maintain high quality patient care and provide them with prognostic information to give patients reasonable expectations for their own replacement surgeries.

The joint registry has great potential to facilitate research, both internal and collaborative. “We are looking at opportunities to enhance the registry system to facilitate accessibility and ease of physician interaction as well as increase patient and physician participation,” says Gary Schneider, PhD, chief of research.

“Joint replacement is very successful,” says Dr. Talmo. “The wide scope of information we collect provides the power necessary to examine rare phenomena occurring in a small percentage of patients—in this case the infrequent circumstances in which devices or techniques under-perform.”

He and Erik Manoloules, orthopedic registry manager, have been working with the International Consortium of Orthopedic Registries to standardize the data set to be collected so that in the future, anonymous information can be shared seamlessly across registries to promote research that can benefit all patients and allow for continued improvements in the already highly successful area of joint replacement surgery.
Joel Newman, MD, chair of radiology

As well as technological expertise, Baptist radiologists bring a wealth of judgment, based on long experience in a focused orthopedic setting, to the interpretation of equivocal findings. They are experts at detecting subtle changes that might be missed or misinterpreted.

In the joints, extensive experience is particularly useful in diagnosing incidental findings and making recommendations for appropriate follow-up; in evaluation of the hyaline cartilage; and in imaging small parts. Joel Newman, MD, chair of radiology and clinical professor of radiology at Tufts University School of Medicine, says, “It is not uncommon to see a study with an obvious problem, say a meniscal tear, but also an unexpected lesion on the tibia or fibula. Because of our experience, we have a good idea of whether the finding is clinically significant and can confidently recommend the appropriate follow-up.”

In orthopedics as in other specialties, expert treatment begins with expert diagnosis, and radiologists at New England Baptist Hospital bring subspecialty expertise and years of experience to the diagnosis of orthopedic problems in the joints, extremities, and spine.

Five fellowship-trained musculoskeletal radiologists and three fellowship-trained neuroradiologists, along with a staff experienced in and focused on orthopedic radiology, performed 102,000 imaging studies for diagnosis and/or treatment guidance last year.

The hospital offers the full spectrum of imaging modalities, including X-ray, MRI, CT, ultrasound, and nuclear medicine, as well as orthopedic-specific imaging protocols designed to elucidate the detailed information clinicians need to provide their patients with the best and most appropriate therapy.

As well as technological expertise, Baptist radiologists bring a wealth of judgment, based on long experience in a focused orthopedic setting, to the interpretation of equivocal findings. They are experts at detecting subtle changes that might be missed or misinterpreted.

Dr. Newman concludes, “What is unique about our practice is radiologists who read spine read a lot of spine; radiologists who read musculoskeletal images read a lot of them. When you have the opportunity to focus on one area, you get very good at it.”
25 Years as the Official Hospital of the Boston Celtics

New England Baptist and the Boston Celtics celebrated their 25th year of partnership with a multi-year renewal of the relationship.

As the official and exclusive hospital of the Boston Celtics, the Baptist will continue to offer comprehensive medical services to the team under the direction of Baptist orthopedic surgeon Brian McKeon, MD, Celtics chief medical officer and head team physician; Frederick C. Basilico, MD, chair of the department of medicine; and other Baptist physicians. The Baptist and Celtics partner on initiatives focused on childhood obesity, physical fitness, and health and wellness.

Payor Contracts

New England Baptist earned a spot on the best provider tier of each major health plan—recognition of our value leadership position for highest clinical quality, successful outcomes, and best cost in orthopedic services.

New Operating Rooms

New England Baptist received a $2 million gift from the Yawkey Foundation to support construction of a suite of three new state-of-the-art operating rooms named in honor of Russell S. Boles, Jr., MD, a gastroenterologist who had a long and distinguished career at the hospital. More orthopedic surgery is performed at New England Baptist than at any other Massachusetts hospital, and more joint replacement surgery than at all other Boston hospitals combined.

Joint Commission “Top Performer”

New England Baptist was one of an elite group of hospitals named in the first Top Performers in Key Quality Measures™ report by the Joint Commission. The Baptist was specifically recognized for outstanding performance in surgical infection prevention.

U.S. News & World Report

New England Baptist was again recognized in the U.S. News & World Report annual best hospital rankings. The Baptist was named in two categories: orthopedic surgery and neurology/neurosurgery. The magazine evaluated approximately 5,000 U.S. hospitals in order to rank the best in 16 adult specialties.

Harvard Pilgrim Honor Roll

NEBH appears on the 2011 Honor Roll, which recognizes hospitals with performance in the top 25 percent of those measured nationally on a set of composite quality and patient experience measures. Honor roll hospitals are vigilant in measuring clinical quality, patient experience, and patient safety.

Summit Award

For an unprecedented fourth year in a row, NEBH won the Summit Award, a prestigious national award for exceptional patient satisfaction. The Baptist has ranked in the 99th percentile nationally for patient satisfaction since 2008. The Baptist is the only Massachusetts hospital to receive the award four times and the only hospital in the state to earn the award for inpatient medical and surgical care this year.
New England Baptist Research

“Complications of femoral nerve blockade in total knee arthroplasty and strategies to reduce patient risk” by Lareau JM, Robbins CE, Talmo CT, Mehio AK, Puri L, Bono JV. *Journal of Arthroplasty.* 2012 Apr; 27(4):564-8. The authors looked at the use of femoral nerve catheters which are widely used for analgesia in total knee arthroplasty. The authors support femoral nerve catheter use with appropriate precautions taken to reduce risk of patient falls, vascular injury, and wrong-site surgery.


“Allograft closure of lateral release after revision total knee arthroplasty” by Sahai V, Bono JV, Talmo CT. *Journal of Arthroplasty.* 2012 Mar;27(3):494.e9-494.e12. This study examined arthroscopic knee surgery and lateral release, a common technique for resolving patellar tracking issues.

“Improving cup positioning using a mechanical navigation instrument” by Steppacher SD, Kowal JH, Murphy SB. *Clinical Orthopaedics and Related Research.* 2011 Feb;469(2):423-8. The study assessed mechanical navigation in total hip arthroplasty. Researchers found that with the use of a mechanical navigation device, surgery can be performed in less time and with fewer errors.

“An injectable thiol-acrylate poly(ethylene glycol) hydrogel for sustained release of methylprednisolone sodium succinate” in *Biomaterials.* 2011 Jan;32(2):587-97. Authored by Pritchard CD, O’Shea TM, Siegwart DJ, Calo E, Anderson DG, Reynolds FM, Thomas JA, Slotkin JR, Woodard EJ, Langer R. Injectable hydrogels that are clinically available face technical challenges associated with swelling after injection. The authors developed their own system using a combination of materials. They determined that the physical, chemical, and biological properties of the new hydrogel make for a good alternative to the current injections available.


In March Gary B. Schneider, PhD, joined New England Baptist as Chief of Research. Formerly Associate Vice Provost for Research and Professor of Molecular Medicine at the University of Massachusetts Medical School, Schneider earned a Bachelor of Science degree in Zoology from the University of Wisconsin-Madison and his PhD in Biochemistry from the cooperative five-college program (Amherst, Hampshire, Mt. Holyoke, Smith College, and UMass-Amherst). He has published more than 58 peer-reviewed articles and is a consultant reviewer for *Journal of Bone and Mineral Research* and *Bone.* He has given many scientific presentations both nationally and internationally and is a member of several professional societies, including the American Association for the Advancement of Science, American Society for Bone and Mineral Research, American Society for Cell Biology, and International Bone and Mineral Society.
Andrew Jawa, MD, received his medical degree from the University of Pennsylvania School of Medicine and completed his orthopedic residency in the Harvard orthopedic program and two fellowships (one in hand and microsurgery and another in shoulder and elbow) at Massachusetts General Hospital. Dr. Jawa’s clinical interests include shoulder, elbow, and hand surgery. He has conducted research in traumatic and reconstructive challenges of the upper extremity. Dr. Jawa also has studied current treatments for shoulder fractures and ways to improve management of these injuries. He practices at Boston Sports and Shoulder Center in Waltham, MA.

Nicolas Marcotte, MD, earned his medical degree from McGill University Faculty of Medicine. He completed his residency in neurosurgery at Enfant-Jesus Hospital followed by a fellowship at New England Baptist Hospital. Dr. Marcotte’s clinical interests include complex neurosurgies of the cervical, lumbar, and thoracic spine. He has contributed to several peer-reviewed journal articles and textbook chapters and regularly lectures at neurosurgery meetings. His research interests include spinal cord trauma, integrating nanotechnologies into clinical use in patients with spinal cord injury, and degenerative pathologies of the spine. He received a fellowship grant from the AO North America foundation. Dr. Marcotte practices at New England Baptist Hospital in Boston.

Sumon Nandi, MD, received his medical degree with honors from New York University School of Medicine, where he was named a National Institutes of Health Research Scholar. He completed his orthopedic surgery residency at the Cleveland Clinic and a fellowship in adult hip and knee replacement at New England Baptist Hospital. Dr. Nandi specializes in primary and revision hip and knee replacements, and arthroscopic treatments for hip and knee conditions. Dr. Nandi is an active clinician-educator and researcher who has authored more than 55 publications and made presentations at both regional and national conferences. He practices at New England Baptist Hospital in Boston.

Harvey Smith, MD, earned his medical degree from Pennsylvania State University College of Medicine, and completed both an orthopedic surgery residency and a spine surgery fellowship at The Rothman Institute at Thomas Jefferson University Hospital in Philadelphia. Dr. Smith’s clinical interests include the cervical, thoracic, and lumbar spine. He earned the AO Spine North America fellowship research award, a Cervical Spine Research Society basic science award, and a research grant from the Cervical Spine Research Society. The author of over 30 peer-reviewed journal articles, more than 20 textbook chapters, and over 60 presentations, Dr. Smith has lectured extensively at national and international orthopedic meetings. He serves as a reviewer for several orthopedic surgery journals and was editor of the Jefferson Orthopaedic Journal. Dr. Smith practices at New England Orthopedic and Spine Surgery in Chestnut Hill, MA.

Jeffery Zarin, MD, graduated from Stanford University School of Medicine and completed his orthopedic residency in the Harvard orthopedic program at Massachusetts General Hospital and a fellowship at Brigham and Women’s Hospital in Joint Replacement and Reconstruction. His surgical practice focuses on complex hip and knee revision surgery, including less-invasive procedures. He is board-certified in orthopedics. Dr. Zarin is a member of several professional societies including the American Academy of Orthopaedic Surgeons, the Massachusetts Orthopedic Association, the New England Orthopedic Society, and the Massachusetts Medical Society. He practices at Harvard Vanguard Medical Associates in Boston and Somerville, MA.

M. Kathryn Steiner, MD, earned her medical degree from St. Bartholomew and the Royal London Medical College at the University of London, England. She completed her residency at Yale University School of Medicine and a fellowship through the combined Pulmonary, Critical Care, and Sleep Fellowship Program at Tufts Medical Center. She joined New England Baptist as a hospitalist and pulmonary specialist and has experience in treating pulmonary and ICU-related disorders as well as in managing patients with pulmonary arterial hypertension. Her research interests include pulmonary vascular medicine, and she is the author of several papers and book chapters. She is an Instructor of Medicine at Harvard Medical School.
Infection rates:

**Hip prosthesis**

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<th>Predicted infections:</th>
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**Infection rate (SIR):** .42

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**Infection rate (SIR):** .20

**Knee prosthesis**

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<td>Infections:</td>
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**Infection rate (SIR):** .81

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**Infection rate (SIR):** .90

NEBH was recognized as one of two hospitals in the state with a significantly lower than expected incidence of infection for hip replacements.

NEBH’s ratio is better than expected, but even the slight statistical increase from ’09 to ’10 prompted careful scrutiny and standardization of preoperative skin preparations and dressings.


*Standardized Infection Ratio (SIR) is the fundamental infection measure used by DPH. SIR = Actual number of infections/predicted number of infections. SIRs above 1.0 indicate more infections than predicted, SIRs below 1.0 indicate fewer infections than predicted.

Unplanned readmissions for 30 days rate per 100 admissions

**New England Baptist Hospital**

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<td>Unplanned readmissions for 30 days</td>
<td>0.5</td>
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**Massachusetts 30 Day Surgical**

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<td>Unplanned readmissions for 30 days</td>
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*Source: http://dartmouthatlas.org

Length of stay in days

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<tr>
<td>FY 2009</td>
<td>3.8 Year-to-Date*</td>
<td>3.9 Year-to-Date*</td>
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<td>3.6 Year-to-Date*</td>
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<td>FY 2011</td>
<td>3.0 Year-to-Date*</td>
<td>3.5 Year-to-Date*</td>
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<tr>
<td>FY 2012</td>
<td>2.8 Year-to-Date*</td>
<td>3.4 Year-to-Date*</td>
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*10/1/11 to 4/30/12
Resources for Physicians

To Refer a Patient
To refer a patient or to contact a physician featured in Orthopedic Update contact New England Baptist’s physician access line at 1-855-851-DOCS.

Physician Directory
Find a New England Baptist physician online at www.nebh.org, email nebhrinfo@nebh.org, or call 617-754-5400 to request a copy of the physician referral guide.

Quality Information
Call 617-754-5400 or email nebhrinfo@nebh.org to request a copy of New England Baptist’s 2011 Annual Report on Quality and Performance.

CME Opportunities
New England Baptist and our physicians offer CME programs for orthopedists, internists, anesthesiologists, and other clinicians throughout the year. Visit www.nebh.org/cme.