

Kidney Transplantation

A PIONEERING PROGRAM NOW 40 YEARS STRONG

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A LETTER FROM ELLEN ZANE

Dear Physicians,

We know that when your patients need tertiary-level care, you — and they — can choose among many well-regarded academic medical centers in our area. Referring physicians like you have been aware of Tufts Medical Center and Floating Hospital for Children and our close affiliation as the principle teaching hospital for Tufts University School of Medicine (TUSM) for many years. And our branding efforts have also gained additional traction with consumers, who have greater awareness of Tufts Medical Center than ever before. For patients who are less familiar with us, below are some helpful facts about our relationship with Tufts University that you may want to provide:

- ▶ Our Medical Center has been proudly affiliated with the prestigious Tufts University School of Medicine as its principal teaching hospital since the late 1920s, and two years ago, we decided to further highlight our relationship by removing “New England” from our name to become, simply, Tufts Medical Center. We are TUSM’s principal teaching hospital for adult services, and our Floating Hospital for Children is the medical school’s principal pediatric teaching hospital. All our physicians have faculty appointments at the medical school, and I work closely together with the Dean of the medical school when recruiting new clinical department chairs and goal setting with our current medical leadership.
- ▶ TUSM is one of the most popular medical schools in the country, with one out of every four medical school applicants seeking admission to this fine institution. We are also very proud of the fact that TUSM consistently graduates more primary care physicians than the Harvard, Boston University and University of Massachusetts medical schools.
- ▶ More of TUSM’s graduates stay to practice in Massachusetts. At a time in our health care system when primary care has never been more important, we are gratified to be so closely connected with an institution that makes primary care such a core part of its mission.
- ▶ I also want to assist you in clearing up one misconception some patients have: while we are happy to accept their coverage for our patients, we are not affiliated with the Tufts Health Plan insurance company. As it happens, Jerome H. Grossman, MD, one of my predecessors, was among the founders of Tufts Health Plan, but Tufts Medical Center and Tufts University School of Medicine are not connected with the insurer.

We’ve never been the biggest teaching hospital in town, and we don’t aim to be. Our small size enables us to provide a more personalized experience for each patient than our larger competitors can. But our close affiliation with TUSM means that patients you refer here have access to everything an academic medical center can offer: access to research, to physicians who are breaking ground in their field, and to the highest level of complex care when they need it.

I hope these few quick facts have helped you and your patients get to know us even better. If you have any other questions about us, feel free to give me a call ([617-636-9589](tel:617-636-9589)) or send me an email (ezane@tuftsmedicalcenter.org); we are always here for our referring physicians.

Sincerely,

Ellen Zane
President and CEO
Tufts Medical Center



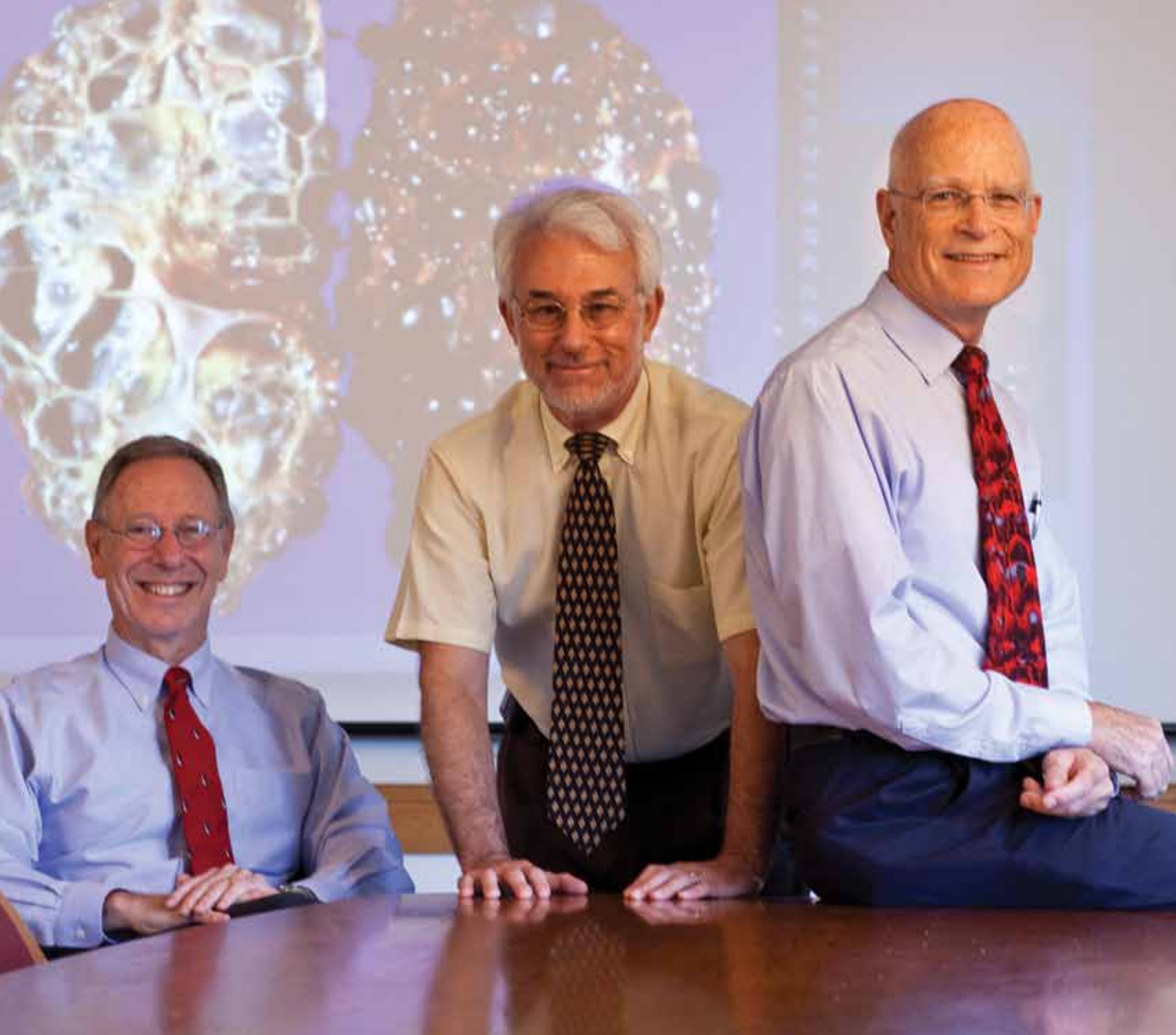
New Care Delivery Model focuses on patients and families

WHEN YOU REFER PATIENTS TO TUFTS MEDICAL CENTER, YOU WANT TO BE SURE THEY RECEIVE THE HIGHEST LEVEL OF CARE. YOU ALSO WANT THEM TO BE COMPLETELY SATISFIED WITH THEIR EXPERIENCE. THOSE ARE OUR GOALS TOO.

And while we have long embraced a patient- and family-centered approach to quality care, over the past year we have undertaken an intense examination of the patient experience and how our team works best to deliver outstanding quality care which meets or exceeds expectations. We have found important ways to innovate how care is delivered at an academic medical center, resulting in an improved Care Delivery Model.

Our new care model came about as a result of a collaborative process that engaged 80 caregivers, including Registered Nurses, Clinical Care Technicians and support staff.

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Kidney Transplantation

A PIONEERING PROGRAM
NOW 40 YEARS STRONG

*(left to right) Andrew Levey, MD,
Ronald Perrone, MD and Richard
Rohrer, MD.*

YOU'D BE HARD-PRESSED to find a more eloquent champion for kidney transplantation at Tufts Medical Center than Andrew Levey, MD. He's not only Chief of the William B. Schwartz, MD Division of Nephrology — he's also a kidney donor who was part of a life-saving six-person organ exchange at Tufts Medical Center.

Last year, Levey's wife — oncologist Roberta Falke, MD — needed a kidney transplant due to worsening polycystic kidney disease. Levey was a willing but incompatible donor. So he and Falke did what Levey had been advising some of his own patients to do — they signed on with the New England Program for Kidney Exchange in Newton. The exchange program helps to increase the pool of potential donors by orchestrating matches among altruistic strangers.

In late October, Falke was notified of a match. But it didn't stop there. Levey was a match for a man named Peter Scheibe. Scheibe's wife Susan wasn't a match for her husband, but she was a match for a man named Hai Nguyen. And Nguyen's wife Vy wasn't a match for him, but she was a match for Falke. And on December 15, in an exquisitely choreographed series of operations at Tufts Medical Center and the Lahey Clinic Medical Center, the three healthy donor kidneys were harvested and transplanted into the three recipients. Today, all six participants in this "circle of miracles" are doing fine.

"I obviously think this is a great place for people to get care for kidney disease," Levey says with masterful understatement, referring to the medical center where he has worked for 31 years. He directed the dialysis program and was Medical Director of Kidney Transplantation before becoming Chief of the Nephrology Division in 1999. "Of all the places where we could get a kidney transplant, I'd prefer to bring my family here," he adds.

Tufts Medical Center has a distinguished history in kidney transplantation. The institution's contributions to the field began in the 1950s, when research into the immune system led Tufts University researchers Robert Schwartz, MD and William Dameshek, MD to the discovery of the chemical 6-mercaptopurine and its immunosuppressive effects. This breakthrough led to formulation of the drug azathioprine, ushering in the modern era of transplant immunosuppression. The first kidney transplant at Tufts Medical Center was performed in 1971, and more than 1,000 procedures have been performed here in the nearly 40 years since then.

Today, Tufts Medical Center performs about 40 kidney transplants a year, making it a mid-sized program by national standards. Most recently, the kidney disease program was recognized in the 2010 US News and World Report's "Best Hospitals."

"I feel our program comes as close as possible to offering the best of both worlds," says Richard Rohrer, MD, Chief of Transplant Surgery — and the surgeon who harvested Levey's donor kidney. "We have enough history and experience to take on the toughest cases, yet we're small enough to get to know our patients and give them personalized attention."

"We are a great team that works well together," says Ronald Perrone, MD, Associate Chief of the Division of Nephrology and Medical Director of Kidney Transplantation, referring to the

collaboration among surgeons, physicians and transplant coordinators — and including the referring physician. "We're able to evaluate patients thoroughly, make sure transplantation is the right choice, and cover all the bases safely. As a result, we have excellent outcomes that meet or exceed national norms."

Rohrer quantifies that: "With live-donor kidney transplants, we consistently have a better than 95 percent success rate," he says. "With deceased-donor transplants, we see 90 percent success rates. These numbers are equal to the best anywhere," he adds.

Nationally and particularly in New England, there are still too few donor kidneys, however, for the number of patients who need them. In New England, 2,500 people are on the waiting list for a new kidney, and each year about 168 will die before getting one. Tufts Medical Center has been on the forefront of finding solutions to this problem.

In the 1980s, Levey and Susan Hou, MD, who completed her nephrology fellowship here, wrote about how kidney donation from living unrelated donors could help expand the donor pool. Today, approximately 20 percent of kidney transplants at Tufts MC are from such donors (with 30 percent from living related donors and the remaining 50 percent from deceased donors). Hou, incidentally, went on to become Medical Director of the Renal Transplant Program at Loyola University Medical Center in suburban Chicago and made headlines when she donated a kidney to one of her patients in 2003.

Tufts Medical Center also was a pioneer in advancing the idea of an organ donor exchange, says Rohrer.

"Patients would come in to see about a transplant, and we'd meet with their family and friends who wanted to be donors," he relates. "When there was no match, we'd end up sending away healthy,

continued on next page

DOCTOR'S NOTES

To refer a patient to Tufts Medical Center's Division of Nephrology, please call 617-636-5866.

willing donors. Sometimes we'd get a donor with blood group A and a recipient with group B, then by chance a month later we'd get the exact opposite. About 10 years ago, a light bulb went off — why can't we arrange a system to swap them?"

That system — the New England Program for Kidney Exchange — is now managed by the New England Organ Bank. "It's evolved into different exchanges and chains of donors and recipients," Rohrer says. "And the rest of the country is coming around to the idea," he adds, noting that the Washington (DC) Regional Transplant Community and Johns Hopkins have developed programs to register recipients and donors, using computer algorithms to identify potential swaps.

"Now they're being knitted together as a network to help establish best practices and expand," Rohrer says. "I'm sure that within three to five years, donor exchanges will be common across the U.S."

In the meantime, here at Tufts Medical Center, patients and their physicians have access to an exemplary kidney transplantation program that has been fully vetted by someone who's truly in the know.

"I was very happy with the thoughtful and considerate care shown by the doctors and surgeons, transplant coordinators, the OR staff, nurses, everyone," Levey says. "They were the same professional and caring individuals I know them to be from working with them."

"All of us doctors want to help our patients," he continues. "But it's rare to get the chance to do anything so direct and meaningful to restore someone's health. To give a personal gift that you can give only once to another person, it's a unique confluence of both professional and personal ideals." □

In an exquisitely choreographed series of operations, Andrew Levey, far left, was able to donate his kidney to Peter Scheibe, second from left. Scheibe's wife, Susan, third from left, was a match for Hai Nguyen, third from right. And Nguyen's wife, Vy, second from right, donated her kidney to Levey's wife, Roberta Falke.



Here are just a few ways our patients and, by extension, our referring physicians are already benefitting from this new model:

▶ As of June, Tufts Medical Center's Medical Intensive Care Unit has achieved zero central line infections for six months; thanks to a team effort and a centralized approach to quality initiatives. Physician and nurse leadership came together to build a process using evidence-based practice to eliminate central line infections in the unit. The team developed a central line cart (containing all the items necessary to insert a central line), implemented a central line insertion checklist and changed the way dressings are performed and monitored.

▶ As part of the Care Delivery Model, pharmacists and nurses teamed up to promote best practices for teaching patients and families at Tufts Medical Center and Floating Hospital for Children about their medications. One of the first efforts of the Patient Medication Education Team has been to select new electronic patient education materials that provide patients with the best information to help them take their medications safely. The team considered a variety of resources and evaluated content, writing style and format. They then formally surveyed our



nurses to choose the one system that would become our standard source of patient drug information. Having newly hired Clinical Care Technicians throughout the hospital to assist nurses with non-nursing tasks means nurses have more time to educate the

patient with these informational materials. Due to the efforts of the pharmacy/nursing task force, our patient satisfaction scores that measure how well we communicate about medications have been right on target.

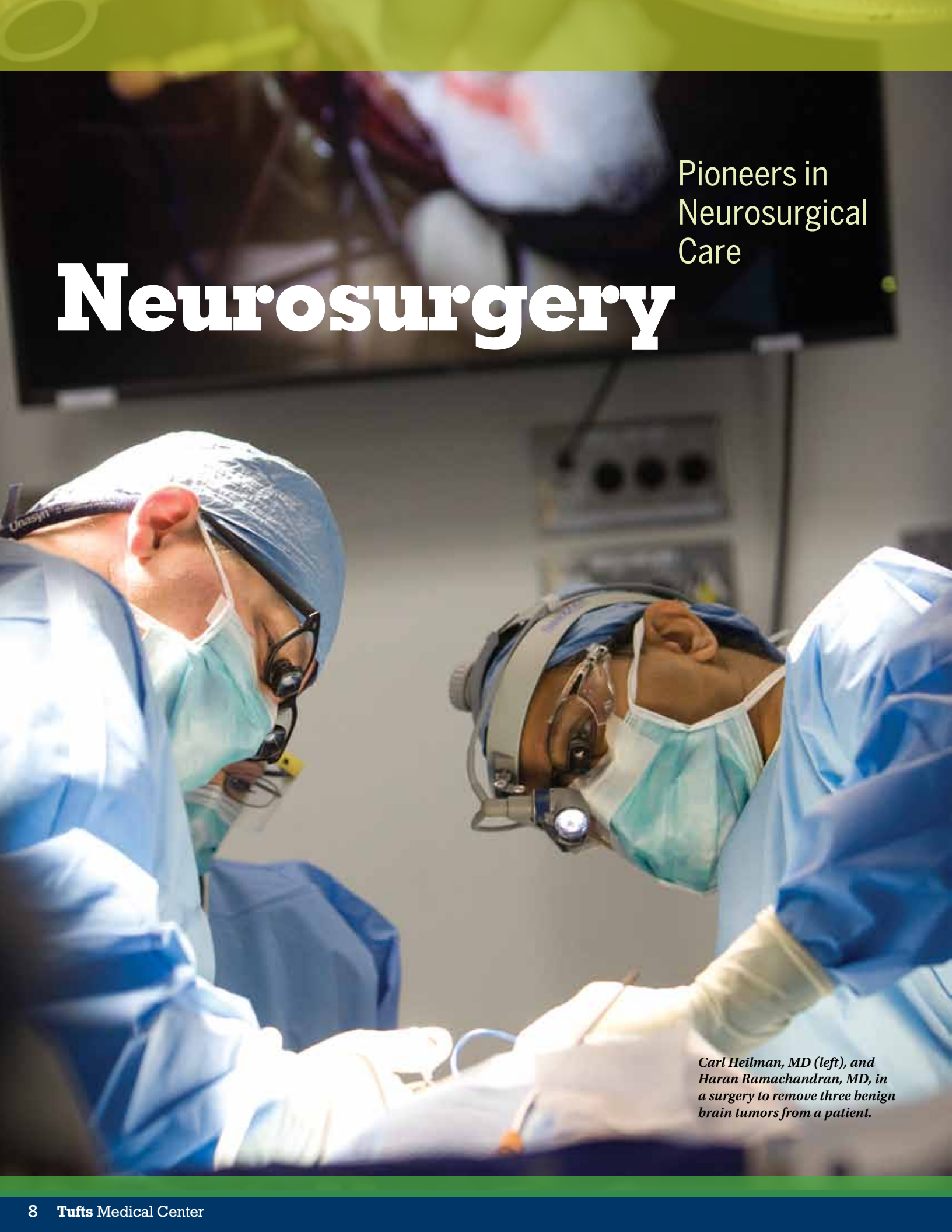
▶ The new Care Delivery Model ensures that very ill patients in the Surgical Intensive Care Unit receive timely morning x-rays. A designated clinical care technician rounds every morning with a radiology technologist. A portable x-ray machine is used to obtain needed images from patients. Having the technicians work in partnership allows the patient's nurse to focus on other key elements of patient care. This teamwork has also improved the timeliness of the image-taking on the unit.



One key goal of the new model is to ensure patients feel good about their entire stay, not just the quality of medical care. Not an easy task when a patient is feeling ill, but an extremely important one for the staff at Tufts

Medical Center. Recently, Richard Karas, MD, PhD, a cardiologist and Interim Chief Scientific Officer at Tufts Medical Center, wrote to Nancy Shendell-Falik, RN, MA, Chief Nursing Officer and Senior Vice President of Patient Care Services, with praise from his patients.

"In all the many years I've been attending here, I can't remember the last time I got so many heartfelt, enthusiastic compliments about how the patients were cared for while they were here," Karas wrote. "In each case, they made a point of saying that it wasn't just me and the other doctors, but 'the whole team,' singling out the transport people, the facilities staff who clean the rooms, and others. So, I just wanted to pass this along to say that from my experience, the Care Delivery Model is really paying off." □

A photograph of two neurosurgeons in an operating room. They are wearing blue scrubs, surgical masks, and blue bouffant caps. The surgeon on the left is wearing glasses and has a headlight mounted on his cap. The surgeon on the right is also wearing glasses and has a headlight mounted on his cap. They are both looking down at a patient, who is not visible in the frame. The background is a blurred operating room environment with various medical equipment.

Pioneers in
Neurosurgical
Care

Neurosurgery

*Carl Heilman, MD (left), and
Haran Ramachandran, MD, in
a surgery to remove three benign
brain tumors from a patient.*

Tufts Medical Center's Department of Neurosurgery provides an unwavering level of outstanding clinical expertise for adult and pediatric patients with diseases of the brain, spine and peripheral nervous system.

In fact, the department's specialists are nationally recognized for their expertise in minimally invasive treatments for brain tumors, skull base and pituitary tumors, aneurysms, spinal disorders and more.

"We have a huge minimally invasive endoscopic and endonasal practice for skull base and pituitary tumors," says Carl Heilman, MD, Chair of Neurosurgery. "We were the first in Boston to do these complex procedures; today we do as many or more of them as anyone. And we have the best equipment," he adds, referring to a state-of-the-art operating suite with high-definition cameras, made possible with support from the Cam Neely Foundation for Cancer Care.

Tufts Medical Center also is the first Massachusetts hospital — and the only one in northern New England — to offer treatment with the Leksell Gamma Knife®. The most accurate form of stereotactic radiation, the Gamma Knife enables non-invasive surgery for malignant and benign brain tumors, brain metastases, trigeminal neuralgia and other neurological conditions.

Spinal surgery is another area in which Tufts Medical Center excels. "We're pretty conservative," says Simcha Weller, MD, Chief of the Division of Spinal Surgery. "We're not eager to perform surgery when we feel we can obtain the same outcome with non-operative measures."

"When we do operate, we emphasize minimally invasive surgery," he continues. "That's not just a buzzword; we look to perform surgery through the least intrusive method available to accomplish the best outcome. All the surgeons on our team are expert at both minimally invasive and microsurgical techniques." Weller and his team perform about 800 spinal procedures annually.

"We also have the use of radiosurgical equipment so we can treat spinal tumors with highly focused radiation and thereby avoid surgery in many cases," he adds.

He stresses that it's not imperative that patients be prescreened and identified as a surgical candidate before a referral to his division. "We're happy to take on the comprehensive management



CARL B. HEILMAN, MD

Neurosurgeon-in-Chief

Medical School

University of Pennsylvania
School of Medicine,
Philadelphia, 1986

Postgraduate Training

Tufts Medical Center

Board Certification

Neurosurgery

Clinical Specialties

Meningiomas, acoustic neuromas, skull base surgery, pituitary surgery, pediatric neurosurgery and Chiari surgery

of any patient with a spine problem and determine the best treatment which, in most cases, is non-operative," he says.

The Neurosurgery Department also has considerable expertise in vascular and endovascular treatment. "We probably coil a higher percentage of aneurysms than anyplace else," Heilman notes. "Most centers do a 50-50 mix of open clipping and endovascular procedures, but we're about 80 percent coiling and 20 percent clipping. It saves a lot of craniotomies."

The Division of Pediatric Neurosurgery also is noteworthy for its ease of access, caliber of its surgeons, and the comprehensive services the Division offers. "The pediatric neurosurgery team has great surgeons with excellent surgical techniques," Heilman notes. "Access is prompt and they're who I'd send my kids to."

Bottom line, he says, "We're a group of experienced, excellent surgeons who only operate when necessary. We're good at deciding who needs surgery, and performing it in a safe and effective way."

"We also do a good job of communicating with the doctors who send us cases," Heilman adds. "And once we've taken care of a super-subspecialty issue, our goal is to send the patient back to his or her community physician." □

DOCTOR'S NOTES

To refer a patient to Tufts Medical Center's Department of Neurosurgery, please call 617-636-5858.



Knee Osteoarthritis Research

**BRINGING EVIDENCE-BASED
THERAPIES INTO
CLINICAL PRACTICE**

For people who suffer the pain and disability of knee osteoarthritis (OA), Tufts Medical Center not only has one of the nation's largest and most respected research programs, but its multidisciplinary physician-scientists also care for OA patients — streamlining the application of research findings to real-world clinical practice.



“OSTEOARTHRITIS IS A COMMON DISORDER

that currently has no disease-modifying treatments,” says Timothy McAlindon, MD, Chief of Rheumatology at Tufts Medical Center. “Our research focuses on interventions to address the structural progression of OA.”

Two major clinical studies currently are enrolling patients. The first is testing the structural effect of intra-articular

corticosteroids injected into the knee joint. “We’re using dGEMRIC — delayed gadolinium-enhanced MRI of cartilage — to measure regional changes in bone density around the knee joint,” McAlindon explains. “It enables us to measure cartilage volume in three dimensions with considerable precision.”

A second trial, led by Chenchen Wang, MD, MSc, is evaluating the physical and psychological effect of tai chi and strength training and education on knee OA. It’s funded by the National Institute of Health’s National Center for Complementary and Alternative Medicine.

Another NIH-funded study to determine if vitamin D taken once a day helps to slow the progression of knee OA is just wrapping up, and an industry-sponsored phase I trial is getting underway to test an injected growth factor called bone morphogenic protein 7 to determine if it will help restore bone or cartilage to knee joints.

Eric Smith, MD, Chief of the Arthroplasty Service in the Department of Orthopaedics, also is involved in knee OA research with a surgical bent.

“Most of our current studies are retrospective,” he says. “Right now, our biggest push is looking at patients who’ve undergone bariatric surgery who go on to need total knee replacement. We’re also comparing alignment outcomes in computer-assisted versus conventional total knee arthroscopy, and investigating ways to enhance the effectiveness and longevity of prosthetic knee replacements by minimizing angulation errors.”

“In addition, we’re doing a prospective, randomized trial comparing the traditional suture method against a barbed suture to see if the latter could lead to a reduction in the cost of total joint arthroplasty by reducing time spent in the operating room,” he notes. It all comes together in a new multidisciplinary Osteoarthritis Clinic at Tufts Medical Center.

“We apply the treatments shown in trials to be beneficial to patient populations with OA through our clinic,” says its director, rheumatologist William Harvey, MD, MSc, FACR. “We know that knee replacement currently is the most effective treatment, and refer patients to Orthopedics when appropriate. But we also offer non-operative, evidence-based treatment of knee OA, including weight management, physical therapy, and complementary and alternative medicine, particularly for patients who don’t want surgery or wish to delay surgery. And we can refer them to appropriate clinical trials.”

“Part of our overall goal is to engage in comparative effectiveness research of proven therapies, always coming back to evidence-based care,” he adds. “Our research gets translated into clinical care,” Smith affirms. “And a non-operative approach has been shown to be the first mainstay of treatment.” □

Timothy McAlindon, MD (left), and William Harvey, MD, MSc, reviewing their research on knee OA.

DOCTOR'S NOTES

If you have patients you would like to refer for potential enrollment in a knee OA clinical trial, please call 866-483-KNEE (5633) or email arthritisresearch@tuftsmedicalcenter.org.

ON CALL

A regular feature introducing the specialists at Tufts Medical Center

TRAUMA CENTER

When Dr. Reuven Rabinovici was a military tank commander, he knew he had to act fast, with great precision and keen intelligence. He knew that teamwork was the key to success. Lives were at stake and he was in charge. Fast forward 35 years, and you will see that not much has changed for Rabinovici. He is still leading the troops, expecting perfection and powering through obstacles, only now as Chief of Tufts Medical Center's Trauma Center.

Rabinovici was recruited from Yale-New Haven four years ago to develop a first-rate adult Trauma Center that would utilize the deep surgical and emergency resources that Tufts Medical Center has been known for. Today, Tufts Medical Center is an American College of Surgeons verified Level II Trauma Center. Daily, neurosurgeons, orthopedic surgeons, emergency physicians, trauma



Tufts Medical Center offers a wealth of expert specialists to assist you in the care of your patients. During the past several years, we have added new physicians in many specialties to better serve you. This feature highlights several of our newest physicians, your newest referral resources. To learn more about our other new specialists, visit tuftsmedicalcenter.org and click on "find a physician."

surgeons and many more team members rapidly come together to respond to emergency cases involving the most complex multisystem injuries. The Trauma team provides a comprehensive continuum of multidisciplinary care, including resuscitation, evaluation, emergency surgical intervention, medical treatment, and intensive care.

"We see a very broad range of trauma injuries from falls, traffic related incidents, and assaults, to stab and gunshot wounds," Rabinovici says. "Our model utilizes a multidisciplinary approach working with other specialty services in the hospital to ensure that trauma patients receive seamless care under one roof."

Tufts Medical Center receives trauma patients via transport from other hospitals, or directly from the scene, as well as those who enter through the Emergency Room doors from the local community. Tufts MC has excellent relationships and trauma agreements with community hospitals so that any patient needing trauma care is rapidly transferred from the affiliated hospital to Tufts Medical Center.

Referring physicians have access to the Tufts MC Trauma Center through a one-call-does-all trauma hotline (877-TRAUMA-0). Rabinovici points out that his team is very responsive to referring physicians and other institutions. "We provide almost instant written feedback and status on each patient to the referring physician or the patients' primary care provider," he says.

In the near future the Trauma Center is going to implement a new web-based imaging system to benefit both Rabinovici's team as well as referring physicians. The system allows for diagnostic images, such as CT scans, x-rays or MRI's taken at community hospitals, to be viewed by Rabinovici prior to the patient's arrival, saving valuable time.

"Time is a critical factor in trauma care," says Rabinovici. "The sooner we can see diagnostic imaging on the patient, the better prepared we will be when the patient arrives."

For Rabinovici and team it really is mission accomplished since coming to Tufts Medical Center to build a trauma center four years ago. "Providing outstanding trauma care at Tufts Medical Center allows us to better serve our neighboring communities, provides for coordinated and efficient care with community hospitals and offers important and unique training to residents seeking to learn from some of the best trauma surgeons around in a state-of-the-art academic trauma center. It is a great program, and the best part is seeing every day how we are helping patients and working in partnership with community physicians and hospitals," says Rabinovici.



REUVEN RABINOVICI, MD

Chief, Division of Trauma and Acute Care Surgery
Professor, Tufts University School of Medicine

Medical School

Hadassah Medical School at the Hebrew University, Jerusalem, Israel

Postgraduate Training

Hadassah Medical Center, Jerusalem, Israel; Uniformed Services University, Bethesda, MD; Jefferson Medical College, Philadelphia, PA

Clinical Specialties

Trauma, surgical critical care, acute care surgery

Research Interests

Inflammatory response to injury

Board Certification(s)

Surgery

Foreign Language(s)

Hebrew, Dutch



HORATIO M. HOJMAN, MD

Associate Chief, Division of Trauma and Acute Care Surgery
Co-Director, Surgical Intensive Care Unit

Assistant Professor of Surgery, Tufts University School of Medicine

Medical School

Universidad Del Salvador, Argentina

Postgraduate Training

Maimonides Medical Center, Brooklyn, NY; Massachusetts General Hospital

Clinical Specialties

Trauma, surgical critical care, acute care surgery

Research Interests

Wound ballistics

Board Certification(s)

Surgery, Surgical Critical Care

Foreign Language

Spanish



STANLEY A. NASRAWAY, MD

Co-Director, Surgical Intensive Care Unit
Professor, Tufts University School of Medicine

Medical School

University of Southern California

Postgraduate Training

Hennepin County Medical Center, MN

Clinical Specialties

Internal medicine, critical care medicine

Board Certification(s)

Critical Care Medicine, Internal Medicine

DOCTOR'S NOTES

To refer a patient to Tufts Medical Center's Trauma Center, please call 877-TRAUMA-0 (877-872-8620).

TUFTS MEDICAL CENTER is verified by the American College of Surgeons and designated by the Massachusetts Department of Public Health as Level II Adult and Pediatric Trauma Centers, ensuring that the highest quality standards are maintained. A team of expert physicians, nurses and technologists is available 24/7 to meet the needs of all injured patients. The teams are lead by world-class adult and pediatric trauma surgeons. Patients are transported to the hospital or arrive from the surrounding community at the hospital's ED. Facilities available to the patient include 24-hour access to CT and MRI scans, to fully-staffed operating rooms and adult and pediatric intensive care units. Trauma care starts with prevention. Our professionals work to identify injury trends and develop educational programs to help keep our communities safe and injury free. Tufts Medical Center has a variety of injury prevention programs available.

Head Injuries

Q & A WITH BILL BRIGGS, RN, MSN, ALEX PAVOLL, MPH AND LESLIE RIDEOUT, RN, MS, FROM THE ADULT TRAUMA TEAM

What is a traumatic brain injury (TBI)?

Injuries to the brain can be classified as either Acquired Brain Injuries (ABI) or Traumatic Brain Injuries (TBI). ABIs are caused by internal factors such as a tumor, stroke, infection, lack of oxygen or a preexisting medical condition. TBIs are related to an external impact to the head or from rapid acceleration or deceleration to the head which tears nerve fibers.

A concussion is a specific type of TBI caused by a bump, blow or jolt to your head that can cause a change in the way your brain works. Concussions can be serious even if you were not “knocked out.” A small percentage of patients go on to have long-term symptoms.

What are the most common causes of TBI?

Everyone is susceptible to suffering a TBI. The following are the most common sources:

- ▶ **Car accidents** — impact-related or from a sudden acceleration or deceleration
- ▶ **Fall-related injuries** — falling off of ladders, tripping over objects, slipping on a wet or slick surface
- ▶ **Sports** — contact sports impact or a fall
- ▶ **Physical violence** — bullet wounds, assault with an object



How can I prevent head injury?

Always be aware of potential trip or slip hazards in your surroundings. Hold onto handrails on stairs and make sure pathways in and around your home are well-lit and free of clutter. Installing safety equipment in your home such as grab bars and non-slip mats in the shower can prevent falls. Physical exercise and the balance improvement characteristics of exercise such as tai chi can help protect you as well. Use extra caution when walking on slippery surfaces, and wear rubber soled shoes that have traction. Review your prescription medications with your physician to ensure that there are no conflicts that may lead to coordination problems and receive regular vision tests. Do not drive under the influence of drugs or alcohol. Do not text or perform actions that take your focus off the road, and always wear your seatbelt. Children should not text while riding on a bike, skateboard or scooter. Wear a helmet and safety equipment when performing any sport with a potential for TBI, from biking and skiing to football and hockey. Remove yourself from potentially harmful social situations, and alert the police if violent conflict arises. Make sure the coaches, teachers and trainers for your children's sports teams have been trained to recognize and intervene with head injuries.

What are the symptoms of a serious head injury?

A mild TBI can result in headache, nausea and vomiting, mild confusion or feeling “foggy” or “just not right.” A severe TBI can be fatal. Symptoms can include headaches, seizures, weakness, fatigue, sense deficiencies such as blurred or double vision, balance problems, impaired reasoning and memory, and coma. In the long term, TBI can lead to distractibility, emotional desensitization, substance abuse, depression, anxiety and/or mental instability. Even a minor TBI can have long term consequences and should be treated by a physician.

How are head injuries diagnosed?

A comprehensive assessment by a physician or other medical provider is the first step in determining the type and location of a TBI. This will include a thorough history of the injury, any previous injuries and your medical history. The provider will ask a series of questions to assess the patient’s mental status as well as do a physical exam. The Glasgow Coma Scale is a scored test that assesses the severity of a brain injury by checking your ability to follow directions, blink your eyes and move extremities. This test is used by health care professionals from EMTs to doctors. The coherence of your speech and your behavior also provides important clues. A CT scan is a specialized x-ray that creates multiple cross-sectional images of the head, which can reveal bleeding and clotting in the brain, in addition to swelling. An MRI is a very sensitive test often used to diagnose head and spinal cord injuries; it is typically used after the patient has stabilized, and not in the Emergency Department.

What are some treatments for head injury?

Treatments vary depending on the type and severity of the TBI. Mild TBI may only require observation, rest and medications. At the opposite extreme, surgery may be required to stop internal bleeding, remove blood clots and reduce the pressure on the brain. These patients are best cared for in a trauma center, such as Tufts Medical Center, that has the specialized capabilities, including trauma surgery, neurosurgery, neurology, intensive care, and 24-hour access to testing including CT and MRI.

Patients who suffer from concussions and mild TBI who have symptoms that persist more than a few days should follow-up with a neurosurgeon or neurologist.

When should you consult a physician?

You should consult your physician or go directly to the Emergency Department if you experience any injury with loss of consciousness (knocked out) or amnesia; vision problems; bleeding from eyes, ears or mouth; change in behavior (sleep, irritability, lethargy); fluid draining from nose; repeated vomiting; or irregular breathing or heart rate. Children under the age of 2, persons under the influence of alcohol or other drugs, and anyone with suspected child or domestic abuse should be seen right away.

In the case of any serious injury with loss of consciousness, abnormal behavior, neck pain or other injuries, call 911 right away.

If you are taking any blood thinners such as Coumadin® (warfarin), aspirin or Plavix, you are at a higher risk for serious brain injury. Even a minor injury can cause bleeding into the brain, and you should be evaluated by a medical provider or in the Emergency Department.

How long should you expect symptoms to last?

The length of time that symptoms last varies considerably from patient to patient. Some patients’ symptoms clear instantly, while as many as one third of concussion patients have symptoms at three months. Your doctor should follow your progress.

Patients with severe TBI may have permanent brain damage and require extensive rehabilitation. Even then, there may be changes in personality, behavior, memory and intelligence. The patient may have to relearn many of the skills lost due to the injury. Support groups may help the patient and family adapt to these changes.

What about playing sports after a concussion?

Do not return to playing sports until after a physician has cleared you for symptoms. Resuming too early could lead to the more serious second impact syndrome, in which the brain swells following a second concussion before the symptoms from an earlier concussion have passed. □

Where can I find more information?

**www.cdc.gov/concussion
www.brainline.org
www.braintrauma.org**

Have Our Physicians Visit You

If you would like to schedule a meeting with any of our physicians or have them to your hospital for grand rounds or other educational sessions, **please contact Physician Liaison Jennifer Roberts at 617-636-1398 or jroberts2@tuftsmedicalcenter.org**

Physicians' Referral Guide

For a copy of our most recent Physicians' Referral Guide, with a complete listing of all our physicians, their specialties, and contact information, **call Jennifer Roberts at 617-636-1398 or email jroberts2@tuftsmedicalcenter.org**

Refer a Patient for Inpatient Care

Use our simple one call service to admit a patient any time – 24 hours a day, 7 days a week – at **877-OK-TUFTS**

Working Together Is Good Medicine is for physicians who are interested in learning more about referring their patients to Tufts Medical Center. We value your partnership with us and are committed to doing all we can to make it easy for you to refer your patients to us. It is our mission to ensure that they, and you, have a positive experience while benefiting from some of the finest care and cutting-edge research available in New England.

Working Together Is Good Medicine is published by Tufts Medical Center. For more information, **contact the Office of Public Affairs and Communications at Tufts Medical Center, 617-636-0200 or goodmedicine@tuftsmedicalcenter.org**

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