

SPECIAL EDITION: CLINICAL NEUROSCIENCES

# colleagues

BRINGING RESEARCH INTO PRACTICE  
SEPTEMBER 2015

## in care

# Quality of Life

**M**  
HEALTH SYSTEM  
UNIVERSITY OF MICHIGAN



*K. Miller*



# Functional Wellness Initiative

Improving quality of life for brain tumor patients

*At the University of Michigan Brain Tumor Program, we surveyed our patients to find out what aspects of their care mattered the most.*

*We started with a simple question: If given the opportunity, would you choose a treatment strategy based primarily on the quality of your life or the length of your life?*

**Overwhelmingly, 85% said quality of life.**

*Their desires became the basis for the Functional Wellness Initiative Program.”*

—SHAWN HERVEY-JUMPER, M.D.

**T**his first-of-its kind clinical model brings together both the latest therapies to improve brain tumor survival and the comprehensive portfolio of rehabilitation services that patients need to help them maximize the quality of their lives.

An estimated 90 percent of brain tumor patients must cope with one or more significant functional, cognitive, motor or language impairments as a result of their tumors. The Functional Wellness Initiative identifies and treats both adult and pediatric patients with malignant and benign brain tumors that affect language, motor, psychological and neurocognitive outcomes.

“Many patients face a complex mix of challenges as a result of their tumors,” Hervey-Jumper says. “In the past, separate evaluations were needed from each discipline before arriving at a treatment strategy. That meant burdening patients with multiple appointments and making it more challenging for providers to coordinate their efforts. Here at Michigan, we bring the experts together for the patient right from the start.” Hervey-Jumper’s clinical and research focus is on brain mapping and functional reorganization.

## PATIENT VISIT

During a patient’s first clinic visit, he or she will see a multidisciplinary team of clinicians from neuro-oncology, physical medicine, clinical neuropsychology, speech pathology and neurosurgery. And they will collaborate on an all-inclusive, individualized care plan.

Every aspect of the care plan is based on the unique needs, values and preferences of patients and their families.

“This approach allows us to provide a more individualized care experience,” says Aaron Mammoser, M.D., a neuro-oncologist who specializes in novel therapeutics to improve survival. “Patients discuss their needs and concerns with all of their care providers at one time. By reducing the number of visits needed, we’re saving patients and families time and travel while enhancing their care experience.”

## FOLLOW-UP CARE

The timing and frequency of subsequent visits, treatment, rehabilitation and assessments will depend upon the patient’s individual care plan. These follow-up appointments allow for continued monitoring and support throughout the care process. As needs change, so will the treatment plan, focusing on both length of survival as well as achieving the best possible quality of life.



Shawn Hervey-Jumper, M.D.



Aaron Mammoser, M.D.

## WHAT TO EXPECT ON THE FIRST VISIT

- A baseline assessment of neurocognitive and motor functions, social structure and language capabilities, and a review of imaging and prior oncological history.
- In consultation with a neurosurgeon and/or neuro-oncologist, if necessary, patients can discuss treatment options including:
  - Surgery
  - Chemotherapy
  - Radiation therapy
  - Anti-angiogenic options
  - Clinical trials offered through the U-M Brain Tumor Program
- Experts in a range of rehabilitative therapies will work with patients to devise strategies to maximize and improve existing motor, language and cognitive function.
- At the end of these assessments, our team will provide the patient and referring physician with:
  - A full summary of findings that focus on the patient and his or her short-term and long-term needs
  - Strategies to maximize and improve any existing motor, language and cognitive deficits
  - A personalized comprehensive care plan



## CONTENTS

- 2**  
Functional Wellness Initiative
- 8**  
Concussion/Epilepsy
- 9**  
Endoscopic Skull Base and Pituitary Programs
- 10**  
Essential Tremor

- 14**  
Spine Surgery Program
- 16**  
Multiple Sclerosis
- 19**  
Comprehensive Stroke Center

*“With this approach, we can have stronger collaborations with our patients’ referring physicians. They are integral members of the team that will help these patients face the ongoing challenges of maintaining a full, productive life.”*

—SHAWN HERVEY-JUMPER, M.D.

### THE TEAM

In addition to Hervey-Jumper (*far right*) and Mammoser (*below with Donell Hall*), the team includes:

- Sean Smith, M.D., a physical medicine and rehabilitation physician specializing in improving the quality of life for patients with cancer
- Nicolette Gabel, Ph.D., a clinical neuro-psychologist who specializes in neurocognitive remediation
- Karen Kluin, M.S., C.C.C., BC-ANCCS (*right*), a speech pathologist who specializes in perioperative language testing.
- Thomas Ferguson, N.P., clinical coordinator for the program
- Other faculty of the University of Michigan Brain Tumor Program include Larry Junck, M.D., Oren Sagher, M.D., Jason Heth, M.D. and Daniel Orringer, M.D. (*top right*).



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**FOR REFERRING PHYSICIANS**  
 To refer a patient to the Functional Wellness Initiative, contact Clinic Coordinator Kaitlin McMurray at 734-647-5434 or [kaitmcm@med.umich.edu](mailto:kaitmcm@med.umich.edu).

To speak with a physician in the U-M Brain Tumor Program, call M-LINE 24/7 at 800-962-3555.

Web: [UofMHealth.org/brain-fwi](http://UofMHealth.org/brain-fwi)

**RESEARCH INITIATIVES**  
 The Functional Wellness Initiative also creates opportunities for U-M brain tumor researchers from all the participating disciplines to translate their findings into the clinical setting. Several projects are underway, including:

- An examination of the neurocognitive and behavioral consequences of brain tumor treatment and the impact of multidisciplinary remediation on survival, quality of life and health care costs
- An examination of the effect of an early intervention exercise regimen on physical function, symptom burden and health-related quality of life among patients with low- and high-grade glioma



## MEET **DONELL HALL**

Donell Hall was driving to work when he experienced another one of the massive headaches that would leave him temporarily unable to speak clearly. He managed to park, get out of his car, and lay on the ground to wait for help. Just able to function enough to call 911 and say a few words that would lead the operator to determine his location, Hall remembers police arriving on the scene and then waking up in the hospital.

After a series of tests, doctors told Hall he had a massive brain tumor that needed immediate treatment. Hall had been experiencing these headaches since the age of 14, and he had always thought the speech loss was a side effect of a bad migraine headache. As he approached his late 20's, the headaches became more frequent, occurring 2-3 times per year.

Hall first met Dr. Hervey-Jumper and some of the other Functional Wellness team members as he was being prepared for surgery to remove the tumor. As a TV/video/broadcast producer and business owner, the ability to speak is critical to Hall's work and his livelihood.

The team understood this and spent much time discussing how Hall could retain his language skills after surgery. They also anticipated the added complexity of radiation and chemotherapy to shrink the remaining tumor that would not be able to be removed without risking long-term speech loss.

"The team was fantastic. They spent a lot of time prepping me for post-surgery to make sure I would be able to talk like I did before the surgery," says Hall, who is now 30 years old. "If I can't speak quickly and have people understand me, my job is over."

After his surgery in November 2014 to remove the tumor, Hall continued working regularly with a speech pathologist to improve his language skills and his memory. Although less frequently now, he still visits the Functional Wellness Program about once a month and was able to return to work last month. "My language is coming back—I still forget a lot. But I've got most of it back. I feel good," says Hall with a smile. **M**

***"If I can't speak quickly and have people understand me, my job is over."***





## Concussion: Not an End Game

The variability of concussion injuries makes experience a critical component to providing quality care. Michigan NeuroSport sees 2,400-2,500 sport concussion cases every year, in addition to cases of peripheral nerve injury, spinal cord injury, stingers and other neurological injuries. It's one of the few programs in the country dedicated to the neurological concerns of athletes of all ages.

"We provide a comprehensive neurological approach because we know that not every injury produces the same clinical syndrome or appears at the same time," says Jeffrey S. Kutcher, M.D., director, Michigan NeuroSport, and associate professor of neurology. "A detailed yet focused history and examination allow us to put a lot of things in perspective like migraine, ADHD and depression. We're able to sort through those and provide an accurate diagnosis."

NeuroSport physicians include team physicians from the University of Michigan, Eastern Michigan University and USA Ski-Snowboard, and the NBA Concussion program director and NFLPA and NHLPA consultants. "Working with the teams, we're taking care of athletes in real time, understanding the brain in real situations," Kutcher says.

### CUSTOMIZED TREATMENT

Just as each athlete is unique, so is every concussion. NeuroSport uses a customized, gradual, step-by-step process for safe return to play. This approach is based on elements such as the patient's history and the nature of his or her sport.

"From diagnosing and treating thousands of patients and conducting research, we firmly believe that concussions are not a death sentence for athletes. Most of those who are concussed recover fully and can return to playing their sport safely, if they receive the appropriate medical care," Kutcher says.

"What sets us apart is that we offer athletes neurological care and concussion treatment that is focused in neurology." He notes that concussion clinics are popping up all over the United States. "They tend to only scratch the surface of the complex care these patients need."

### FOR REFERRING PHYSICIANS

Kutcher says that NeuroSport physicians can be helpful across the entire spectrum of athlete brain health management—anytime a referring physician feels uncomfortable evaluating a patient or making management decisions, whether it's concussion, post-concussion syndrome, long-term concerns or other neurological issues.



Michigan NeuroSport Clinic:  
734-930-7400

*"It's not good enough to say to an athlete, 'Maybe it's too late to treat you.' We have to do better than that. And we do."*

—JEFFREY KUTCHER, M.D.  
DIRECTOR OF MICHIGAN NEUROSPORT

## Endoscopic Skull Base and Pituitary Programs Pioneering Minimally Invasive Surgeries for Faster Recovery

The University of Michigan's Cranial Base and Pituitary programs diagnose and treat benign and malignant tumors involving the cranial base and pituitary regions, cerebrospinal fluid leaks, encephaloceles and traumatic injuries to the face and skull. Endoscopic skull base surgery is an increasingly used technique that does not require facial incisions.

"Minimally invasive endoscopic approaches to the skull base have largely replaced the more invasive transcranial and transfacial approaches that were the mainstay of treatment for decades," says Stephen E. Sullivan, M.D. Sullivan (upper right) is director of the minimally invasive skull base program based in the departments of otolaryngology and neurosurgery and the minimally invasive pituitary program.

"We're able to access most skull base brain tumors endoscopically, just through the nostrils. We actually get better visualization than we could previously in an open operation," he says. Computer image guidance like a GPS is often used.

This approach significantly reduces the hospital length of stay. For the patient, it means no incisions, less pain and quicker recoveries.

"We evaluate patients in a multidisciplinary manner with all of the necessary consultants. One stop shopping, so to speak," says Sullivan.

### HIGH VOLUMES AND TYPES OF CARE

Sullivan's programs perform about 225 skull base surgeries a year, approximately 120 of which are pituitary surgery. The remaining types of tumors are meningiomas, chordomas, craniopharyngiomas, esthesioneuroblastomas and sinonasal malignancies that involve the skull base.

Sullivan's clinic takes a multidisciplinary approach in assessing patients by including all the specialists involved, including neurosurgery; ear, nose and throat; neuro-ophthamology and radiology. "Together, we come to joint decisions about care," Sullivan says.

"We are one of the highest volume centers in the country, certainly in the Midwest."

### FOR REFERRING PHYSICIANS

His area also has ongoing research looking at chordoma treatments and cells lines, and the genetic profile of chordoma cells.

"I want referring physicians to know that, while these are complicated tumors, the treatment paradigms are changing very rapidly right now. What wasn't possible even a year ago is indeed possible now," Sullivan says. "We're happy to field any and all calls."

Patients needing surgery can be seen in clinic within 1 or 2 weeks.

Find more information at [UofMhealth.org/CranialBase](http://UofMhealth.org/CranialBase) or call M-LINE at 800-962-3555.

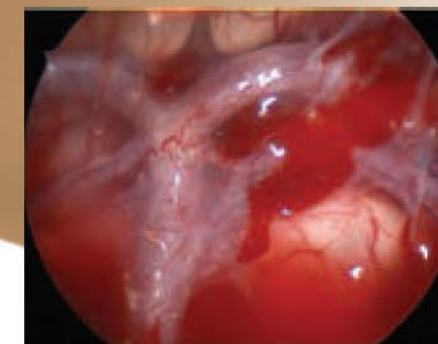


*"We're able to access most skull base brain tumors endoscopically, just through the nostrils."*

—STEPHEN E. SULLIVAN, M.D.



Resection of suprasellar craniopharyngioma



Resection of pre-pontine craniopharyngioma



# Essential Tremor

## A New Life Through Deep Brain Stimulation



### Surgical Therapies Improving Movement—changing the lives of people with ET using deep brain stimulation

Approximately 10 million people in the United States have essential tremor (ET), which eventually can interfere with daily activities such as eating, drinking and writing. Yet, most people with ET are never offered a therapy that was FDA approved in 1997.

At the University of Michigan, a program called STIM—Surgical Therapies Improving Movement—is changing the lives of people with ET using this very treatment, called deep brain stimulation (DBS).

“I think most people know DBS is a really good and effective therapy for Parkinson’s because two-thirds of our referrals are for Parkinson’s. But fewer people know how good it is for essential tremor. And ET is a much more common disease than Parkinson’s,” says Kelvin Chou, M.D., co-director of STIM and co-director of the Movement Disorders Clinic.

Approximately 10 million people have ET compared with approximately 1 million who have Parkinson’s.

“There’s an incredible unmet clinical need for this therapy. The major barrier to patients getting this quality-of-life-improving therapy is essentially a lack of awareness. That’s why we’re very interested in helping to educate providers and patients about the risks and benefits of DBS for ET,” says Parag Patil, M.D., Ph.D., an assistant professor in U-M’s departments of Neurosurgery, Neurology, Biomedical Engineering and Anesthesiology.

The STIM program treats essential tremor and Parkinson’s primarily, but DBS is also effective for patients with dystonia and a few other neurological disorders.

#### DBS DEVICE

A DBS device is similar to a pacemaker for the heart, but instead of having electrodes (or electrical wires) implanted in the heart, the electrodes are placed into the thalamus portion of the brain. The electrodes carry electrical signals to specific brain locations. These electrical signals cause the brain cells around the DBS electrode to change their activity. By changing the activity of brain cells, DBS can reduce the symptoms of many neurological disorders, depending on where the electrodes are placed.

DBS is not a cure for the disease but a way to manage it more effectively. It can offer many benefits, including the need to take less medication and therefore experience fewer medication side effects.

#### PATIENT EVALUATION

Before patients are considered for DBS surgery, they are evaluated by the multidisciplinary STIM team, which has extensive training in DBS. The team includes a neurosurgeon, neurologist, clinical neuropsychologist, speech pathologist, social worker and other team members who ensure that the patient and his or her family understand the procedure and discuss expectations and concerns.

“In our program, a third of patients who are referred for DBS just need to have their medication adjusted. Another third go through the evaluation process, are offered the surgery and choose to defer. They’re not quite ready. So, that leaves one-third who actually have the surgery. And that’s fine, because for us, the emphasis is education, not just operating on people,” Patil says.

#### FOR REFERRING PHYSICIANS

Call M-LINE: 1-800-962-3555



Parag Patil, M.D., Ph.D.



Kelvin Chou, M.D.



# MEET ELIZABETH SCHEFFLER

Retired teacher Elizabeth Scheffler had been dealing with some form of essential tremor (ET) for 10 to 15 years. Finally, she says, "It had become increasingly worse, to the extent that I had very little, if any, fine motor control and progressively compromised gross motor skills."

The tremor was bilateral, and she also had a head and voice tremor. "It was not possible to carry a cup of coffee without spilling, eat a sandwich without shaking it apart or feed my then-infant grandson," Scheffler remembers. She tried three or four medications, which made little or no impact on the tremors. "One neurologist in Colorado was even treating me for Parkinson's, which it turns out I do not have."

One day, Scheffler saw a television program about a man with essential tremor who underwent deep brain stimulation (DBS), a pacemaker-like procedure for the brain. The results were remarkable.

After Internet research, she met with Dr. Kelvin Chou, co-director of the University of Michigan Movement Disorders Clinic, who confirmed that she was a good candidate for DBS.

Like all DBS candidates, Scheffler underwent speech and neuropsychological testing before being accepted for surgery. "Dr. Parag Patil, the DBS neurosurgeon, also met with me, to explain the surgery," she says. "Although initially it was a difficult decision and I was apprehensive, the staff was very reassuring and gave me success rates, number of operations completed, etc. They allayed my anxiety by answering all my questions in such a caring way that I wasn't even really nervous before the surgery."

DBS is a two-part surgery. During the first part, in which the stimulator is placed in the brain, she says, "The neurosurgical staff told me exactly what to do and explained each step of the surgery and the result to expect. They also conducted speech evaluations throughout the surgery to ensure speech centers would not be affected."

The second surgery (two weeks later) implanted the battery pack into her chest. "Although the first surgery made for a long day, I experienced no pain and required none of the prescribed drugs. The second surgery was a breeze."

"I now have full control in my dominant hand and my head tremor is gone," Scheffler says. "Now I fully enjoy my retirement, volunteering as treasurer of a non-profit agency, playing bridge, doing floral arranging, yoga and golf. I can even do some photography and enjoy my electronic devices."

"I heartily encourage anyone with this condition to further explore whether they are a good candidate for DBS. It has changed my life in such positive ways." 📷

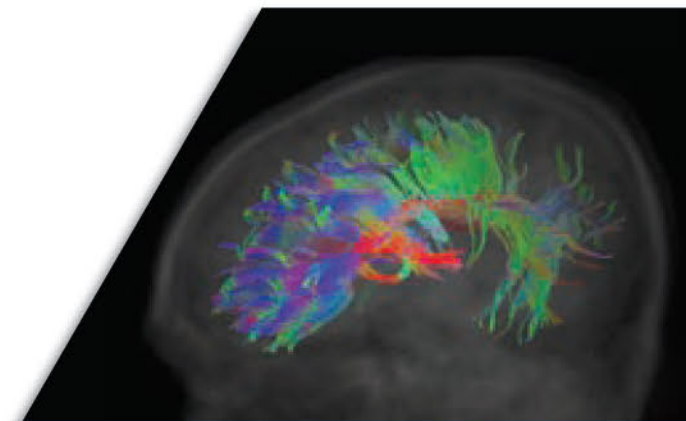
**"I now have full control in my dominant hand and my head tremor is gone."**



Scheffler received consultation from Laura Zeitlin, MSW, to understand how to control the batteries implanted in her chest that generate electrical pulses to her brain.



Dr. Patil uses magnetic resonance imaging (MRI) to map the brain to identify where electrodes will be placed.



## FALL PREVENTION RESEARCH FOR PARKINSON'S DISEASE

Every year, up to 70% of people with Parkinson's Disease (PD) will fall, often leading to serious medical and social issues. The National Institute of Neurological Diseases and Stroke has awarded the Michigan Department of Neurology a five-year, \$11.5 million grant to establish the Morris K. Udall Center of Excellence for Parkinson's Disease Research focused on developing a treatment to prevent falls.

### Clinical Trial Opportunities

Importantly, much of the Center's work is clinical research on patients with earlier stages of Parkinson's before falls emerge, but it is hoped that the novel therapeutic approach will ultimately help decrease falls in those experiencing them. Involvement of adequate numbers of patients is critical for success.

Those interested in participating can register to be contacted at [www.clinicalstudies.org](http://www.clinicalstudies.org) (search for "Parkinson's disease" and click on study titled "Cholinergic Mechanisms of Gait Dysfunction in Parkinson's Disease").

The Center conducts experimental, computational and human research to further investigate the possibility that the degeneration of cholinergic neurons is an important cause of gait dysfunction in Parkinson's Disease. The Center is both testing this possibility—based upon considerable earlier findings—and working to develop a novel treatment strategy targeted at cholinergic neurotransmission.

With this grant, Michigan becomes one of only nine Morris K. Udall Centers of Excellence in Parkinson's Disease in the United States.



For more information, visit [udallpd.umich.edu](http://udallpd.umich.edu).



# Spine Surgery Program

In the world of medicine, the words “minimally invasive” and “spine surgery” don’t usually go together. But for the past decade, the University of Michigan Spine Surgery Program has moved many spine surgeries into the minimally invasive realm—with great success. In fact, U-M is the first program in the state completely dedicated to the advancement of minimally invasive spine surgery.

“A lot of the minimally invasive spine procedures started with ‘basic’ spine procedures such as discectomies, laminectomies and level-one lumbar fusions of the spine,” says Paul Park, M.D. (right), associate professor of neurosurgery and of orthopaedic surgery. The program soon realized success in outcomes as good as or better than the traditional surgery. The surgeries also had the added benefits of smaller incisions, less tissue injury and blood loss during surgery, less postoperative pain and shorter hospital stays.

Now, discectomies and laminectomies are outpatient procedures, and the hospital length of stay for fusion surgery is much shorter.

“It’s a constantly evolving field because once we saw success for these more basic spinal surgeries, we started applying them to more complex situations such as tumor resections and deformity,” says Park. Although not all complex cases are amenable to minimally invasive surgery, each patient is evaluated for a less invasive approach with the ultimate goal of achieving the best possible outcomes.

**“We’re always investing in or trialing new technologies such as the O-ARM for increased patient safety and better outcomes.”**

— PAUL PARK, M.D.

## WHO WE TREAT

Today, the U-M Spine Surgery Program provides state-of-the-art services to individuals whose spinal disorders affect their health and productivity, and whose disorders require surgical intervention. Patients referred to the spine surgery program may suffer from pain and/or neurological deficits due to degenerative spinal disease, scoliosis, spinal tumors, spine cancer, spine infections or traumatic injury.

“We offer treatment options for the whole spectrum of spinal pathologies,” Park says.

Surgeons in the U-M Department of Neurosurgery also work closely with colleagues in the Department of Physical Medicine & Rehabilitation, Department of Anesthesiology and the Department of Orthopaedic Surgery to ensure the best and most comprehensive care possible for their spine surgery patients.

## NEW TECHNOLOGIES

Minimally invasive spine surgery is an area in which new technologies matter greatly. Along with the latest state-of-the-art computer-assisted image guidance and operating microscopes, U-M has technologies and resources that few other hospitals have. For example, the University of Michigan was the first hospital in the state to use the O-ARM Multidimensional Imaging System.

Neurosurgeons have the option to use the O-ARM to view patient anatomy in the operative position, monitor the status of the surgery and verify surgical changes with real-time 3-D volumetric images, all before the patient leaves the surgical suite.

“We’re always investing in or trialing new technologies such as the O-ARM for increased patient safety and better outcomes,” Park says. “We also use new technologies in conjunction with newer techniques for improved outcomes as well, such as using the O-ARM for image guidance for lateral interbody fusion, which is an alternative minimally invasive approach for fusion of the thoracic and lumbar spine.”

## FOR REFERRING PHYSICIANS

Dr. Park suggests it is appropriate to refer patients who have failed nonoperative management—for example, if they have had physical therapy and injections and are still having issues (the most common of which are back pain or leg pain). In patients with neurological deficits such as weakness, referral should be done urgently.

“If you have a patient with a weak foot, for example, I wouldn’t try nonoperative measures; they need more of an urgent surgical evaluation first,” Park says. “But if it’s a pain issue, a trial of nonoperative management is typically recommended.”



Call M-LINE: 1-800-962-3555

## CLINICAL TRIALS

Multiple clinical trials are ongoing or planned at the University of Michigan Spine Program involving treatments for a variety of spinal pathologies including degenerative disease, infection, trauma and deformity.

One example is our participation in a Phase 2 multicenter clinical trial to study stem cell transplantation in cervical spinal cord injury, sponsored by StemCells, Inc.



For more information contact:  
Clinical Trial Coordinator Karen Frisch,  
734-936-7469



kfrisch@med.umich.edu.



# New Hope for Multiple Sclerosis

Since the University of Michigan created its Multiple Sclerosis (MS) Center in 2007, Michigan has been fighting a good fight against MS. Under the direction of Benjamin Segal, M.D., the center has grown from 400 patients and one physician to 3,000 patients and six specialty physicians. This growth represents an all-out war against MS, with clinical, translational and clinical research arms. The strategy is working so well that the center was designated a Center of Excellence for Comprehensive MS Care by the National Multiple Sclerosis Society (NMSS).

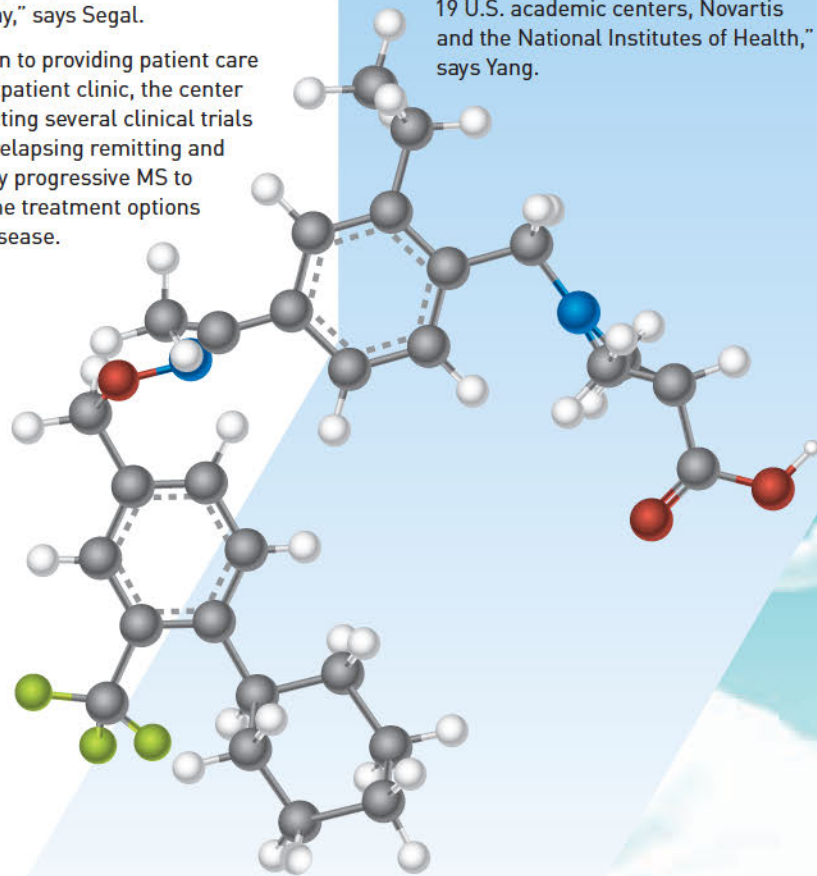
The center takes a multidisciplinary approach, collaborating with physical medicine, pain specialists, urologists and neurologists. "All in the interest of helping our patients in the most expert way," says Segal.

In addition to providing patient care in the outpatient clinic, the center is conducting several clinical trials for both relapsing remitting and secondary progressive MS to further the treatment options for the disease.

## SIPONIMOD PHASE III – LARGEST TRIAL IN THE WORLD

Dr. Yang Mao-Draayer is principal investigator and Segal is co-investigator on a Phase III trial to see how the drug siponimod impacts the immune system in patients with secondary progressive MS. Siponimod is a variation of fingolimod, a drug that is used in relapsed or remitting MS patients but was designed to have fewer side effects.

The study involves more than 300 centers around the world, is the largest secondary progressive MS trial ever conducted and includes nearly 1,600 subjects worldwide. "Our study is the first in-depth immunological study of its kind for MS and involves a unique collaboration among 19 U.S. academic centers, Novartis and the National Institutes of Health," says Yang.



## SURPRISING CONNECTIONS BETWEEN SLEEP DISORDERS AND MS

Dr. Tiffany J. Braley is interested in the causes of fatigue in MS and how to better treat it.

"It turns out that a good portion of people with MS have a sleep disorder that is contributing to their fatigue," says Braley.

Obstructive sleep apnea (OSA) is underdiagnosed in MS patients, and Braley has found that such sleep disorders are more common in patients with MS than the general population. She is studying whether the effects of the disease itself as well as the treatments given to patients to decrease relapse rates impact patients' sleep hygiene and put them at a higher risk for OSA.

She has started an MS/sleep and fatigue subspecialty clinic—the first of its kind in the country—where she and Dr. Ronald Chervin, director of the U-M Sleep Medicine Division, evaluate and treat MS patients with severe fatigue, tiredness and sleep disorders.

"In addition, I am looking at whether or not some medications that are used to treat MS may help alleviate sleep apnea in the general population," Braley says. "We continue to find connections between the two conditions."

## EXTRACORPOREAL PHOTOPHERESIS

"I am one of the people who believes inflammation plays a role during all stages of MS. However, every patient is unique," says Segal. "The type of inflammation that causes damage may vary between individuals. This may be why there is no immunoregulatory drug that is effective across all patient subsets."

There are now 13 FDA-approved medications that decrease risk of clinical exacerbation in patients in the relapsing-remitting stage of MS. "However, we do not have a cure, and there are no highly effective medications that slow, let alone reverse, the accumulation of disability in patients in the progressive stages of MS," he says.

So Segal has tried a different approach, concentrating on the idea of combating inflammation in progressive MS, but coming at it from a different direction. "The U-M Bone Marrow Transplant team uses a technique called extracorporeal photopheresis (ECP) to treat graft versus host disease—an inflammatory disease of multiple organs that occurs in some patients following bone marrow transplantation. In a way, it's like an autoimmune disease," he says.

CP is a relatively safe procedure involving removal of some white blood cells from a patient, exposing those cells to UV light in the presence of a photosensitizing agent and then reinfusing those cells.

Segal used ECP on a father of two with progressive MS who had not responded well to other treatments, even chemotherapy.

"He went from spending most of the day in a motorized scooter to walking with a cane. A second patient could stand in the shower for the first time in years. A third did not make gains but she did not deteriorate either."

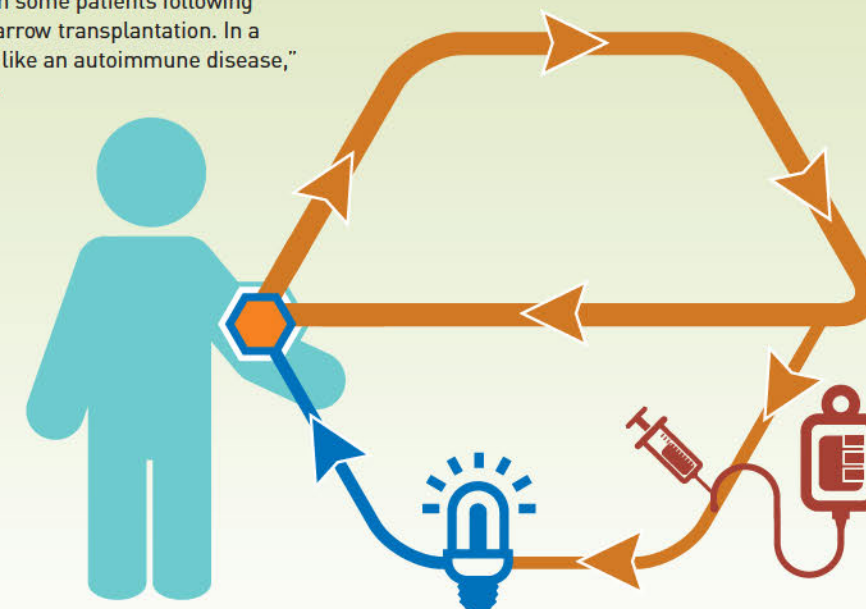
"As far as I know, we're the only site in the world that's doing this procedure in this way to treat progressive MS," Segal says.

"Compared to other MS treatments, it is relatively low risk. And if this works, it will be a huge advancement in the management of progressive MS," Segal says.



***"Compared to other MS treatments, it is relatively low risk. If this works, it will be a huge advancement in the management of progressive MS."***

—BENJAMIN M. SEGAL, M.D.,  
DIRECTOR,  
U-M MULTIPLE SCLEROSIS CENTER



*ECP is a relatively safe procedure involving removal of some white blood cells from a patient, exposing those cells to UV light in the presence of a photosensitizing agent and then reinfusing those cells.*



**FOR REFERRING PHYSICIANS**  
**ECP—Enrolling for Trial Now**

Patients with secondary progressive MS not currently treated with disease modifying therapies may be eligible for the ECP trial. Trial candidates should have experienced disability accumulation over the past 1-2 years.



Please contact Amanda Rasnake, clinical trial coordinator, at (734) 232-2452 if you would like to refer a patient to the trial.

**MS/OSA Trial**

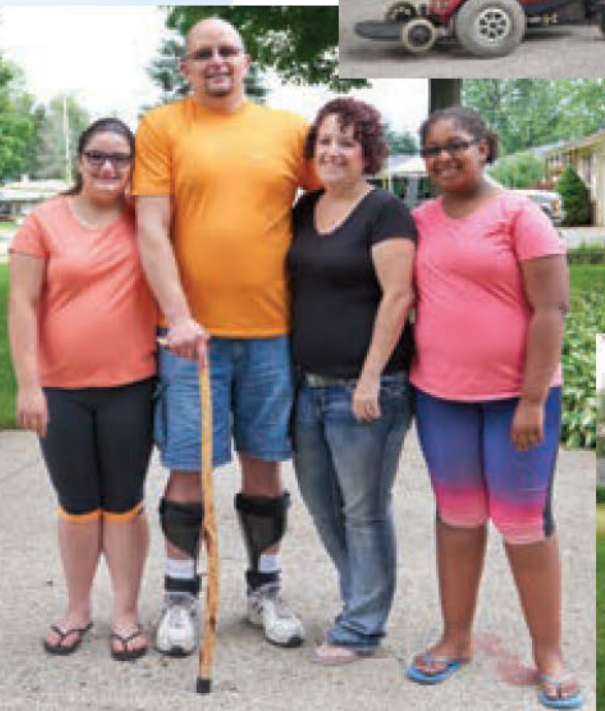
This clinical trial will evaluate the effects of Positive Airway Pressure (PAP) on cognitive function in multiple sclerosis patients who have obstructive sleep apnea. MS patients who have concerns about their cognitive function or who are at risk for obstructive sleep apnea may be eligible.



Please contact study coordinator Nancy Kessler (734) 647-9067, or nrypkows@med.umich.edu,



if you would like to refer a patient to this trial.



Photos: Robert Neumann



NEW HOPE FOR MULTIPLE SCLEROSIS

**MEET CHAD BOLEMA**

Patients always remember the month and year they were diagnosed with a life-changing illness. For Chad Bolema, it was October 2000. The illness was multiple sclerosis (MS). He was 26 years old.

“My wife and I didn’t have children yet,” he remembers, “and I wondered what the future would bring.”

In the early days of his illness, Bolema went to an MS clinic on the west side of Michigan. “The neurologist finally told me there wasn’t any more he could do. There were only three medications for MS in those days. He put all of them in front of me and said, ‘Choose one.’ I couldn’t believe it.

“That’s when I decided to go to the University of Michigan.”

Bolema started treatment with Dr. Benjamin Segal in the Multiple Sclerosis Clinic, and his disease was well controlled for a number of years. However, because MS is a progressive illness, the medications eventually stopped working. “I played football in college and it took a lot emotionally to fight the initial idea of using a cane, then a walker, then a scooter as my main way of getting around.”

By this time, he had two daughters, now ages 8 and 9. “I wanted to try to keep up with them,” he says. And, apparently, Segal wished that for him, too.

When Segal sought a solution for Bolema’s MS, he thought about U-M’s Bone Marrow Transplant program using extracorporeal photopheresis (ECP) to fight graft vs. host disease. Segal reasoned that because graft vs. host is essentially an inflammatory disorder, ECP could possibly work in treating MS as well.

It certainly appeared to help Bolema. After ECP treatment, Bolema is now walking with a cane, whereas before he was mainly confined to a wheelchair. He can even walk without the cane for very short distances. He also regained fine motor skills in his left hand.

“The first thing I noticed is that I could stand and look at the sky and not fall backwards,” Bolema says. “Balance had always been my big problem.

“My family and I are beyond thrilled,” he says.

Segal and Couriel are now enrolling patients in a clinical trial using ECP. [M](#)

**“The first thing I noticed is that I could stand and look at the sky and not fall backwards.”**

**COMPREHENSIVE Stroke Center**

Helping patients achieve best level of function

**“Our teams of physicians, nurses and therapists are set up to ensure all of our patients receive the highest level of care, from their emergency department (ED) stay until their discharge.”**

—ERIC E ADELMAN, M.D., CO-LEAD  
 U-M COMPREHENSIVE STROKE CENTER

The most advanced stroke treatments and equipment in the world won’t make a difference in an environment that can’t support their use.

Fortunately, the University of Michigan’s Comprehensive Stroke Center can meet stroke head on. Accredited by the Joint Commission, all physicians are board certified. And as they offer care for patients—from straightforward conditions through the most complex cases—they have the latest technologies readily available.





"Our teams of physicians, nurses and therapists are set up to ensure all of our patients receive the highest level of care, from their emergency department (ED) stay until their discharge," says neurologist Eric E. Adelman, M.D. Adelman co-leads the Center with neurosurgeon Aditya S. Pandey, M.D., and emergency medicine physician William Meurer, M.D.

"We have a strong focus on quality improvement and continually work to improve the care we provide." The Center treats patients before, during and after stroke, through preventive, emergent and rehabilitative care, and can accept new patients at any point throughout the care continuum.

**THE TEAM**

Patients at U-M are treated by a multidisciplinary team of emergency medicine, neurology, neurosurgery and neurointerventional radiology physicians who are specially trained in stroke care. Vascular surgeons, cardiologists, internal medicine and physical medicine and rehabilitation physicians are also part of the care team.

The Center always keeps in mind that just as no two strokes are the same, neither are any two patients the same.

"Our goal is to design a team specific to the patient and disease," says Aditya Pandey, M.D.

Cerebral aneurysms and arteriovenous malformations (AVMs) can also cause significant neurological disability and even death, and U-M has a multidisciplinary approach to treating individuals with such difficult conditions as well.

"Our radiologists and neurosurgeons use the latest techniques in providing cutting-edge treatments in the safest manner. We have three dual-trained cerebrovascular neurosurgeons who treat diseases with both minimally invasive endovascular techniques as well as open microsurgery techniques," Pandey says.

After any type of stroke procedure, patients go to either the Stroke Unit or the Neuro ICU. "Our state-of-the-art Stroke Unit and Neuro ICU ensure that patients can be safely monitored by nursing staff and have ready access to rehabilitation," Adelman says.



Eric E. Adelman, M.D.



Aditya S. Pandey, M.D.

**"Our goal has been to design a team specific to the patient and disease."**

—ADITYA PANDEY, M.D., CO-LEAD  
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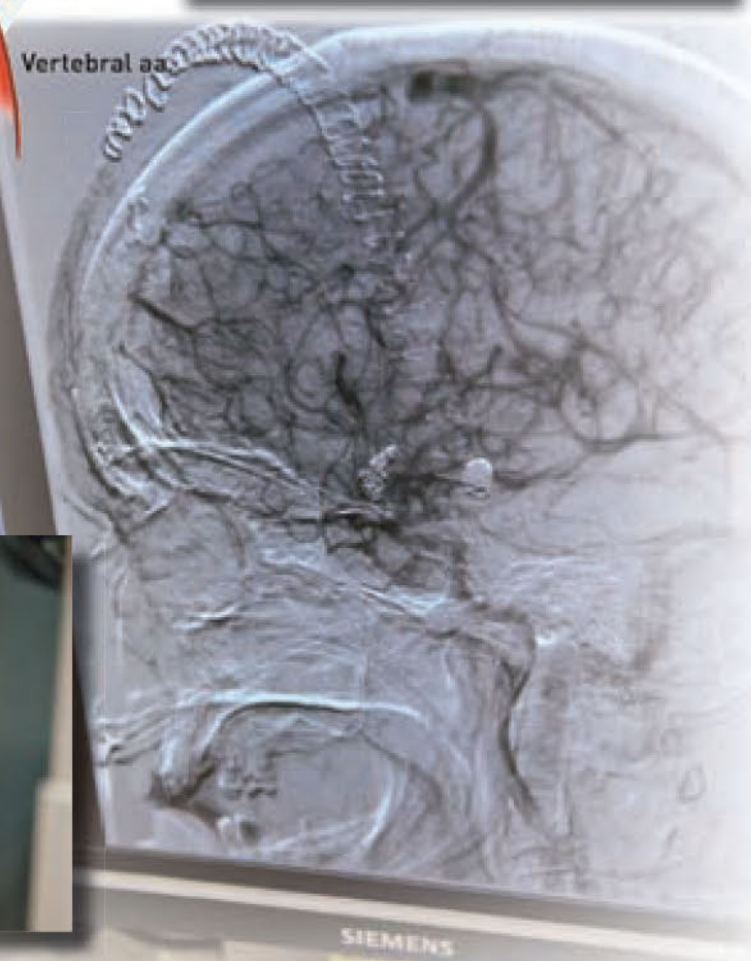
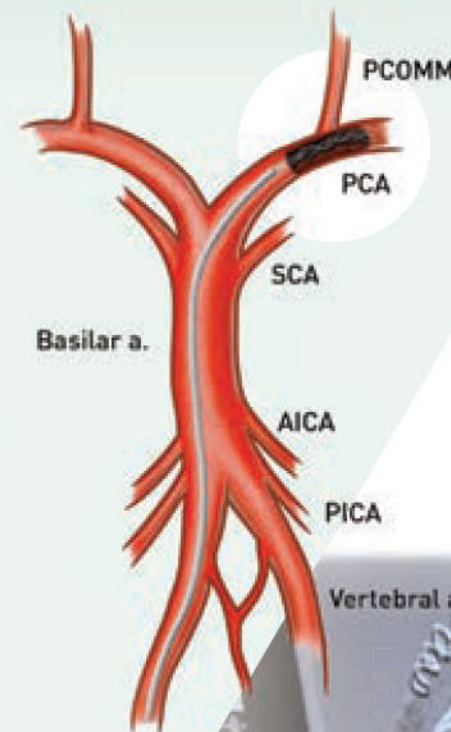
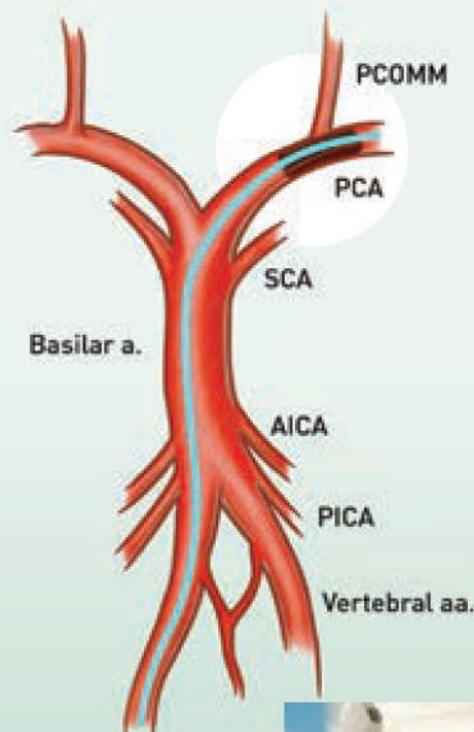
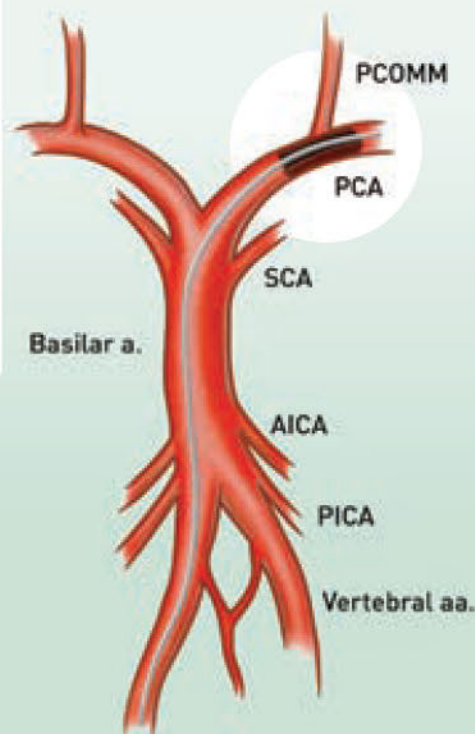
**CLOT-BUSTING STENT RETRIEVERS**

In one of Michigan's unique surgical rooms, a CT scan of the head can be performed in the same room where doctors can remove clots from vessels or repair brain aneurysms, saving critical time for the stroke patient.

"Here, we are able to use neurointerventional radiology to enable endovascular image-guided treatment of brain aneurysms, brain bleeds and opening of blocked brain vessels," says Neeraj Chaudhary, M.D., MRCS, FRCR. "Our endovascular practitioners are extremely well-trained in the use of all the state-of-the-art medical devices. And their expertise is supported by a robust setup of regular monitoring of clinical outcomes to ensure the best for our patients."

Among the newest generation devices are stent retrievers. They resemble the wire stents often used to keep coronary arteries open but function more like a trap. When a catheter containing a collapsed stent retriever reaches a clot blocking a cerebral artery, the stent moves out of the catheter, unfolds to form a 3-D mesh tube, ensnares the clot and retracts back into the catheter with its catch. Surgeons then thread the catheter with the clot back out of the body.

In the meantime, the artery is cleared and blood flows back into the brain, replenishing its vital supply of oxygen and glucose.





**NEUROSURGICAL INTENSIVE CARE UNIT (NICU)**

The Neuro ICU is a 15-bed unit that cares for critically ill neurosurgery and neurology patients, including stroke patients. The unit is led by neurointensivist Venkatakrishna Rajajee, MBBS, and staffed by four board-certified neurointensivists, which is relatively rare.

“We add value in different ways,” says Rajajee. “For the neurosurgery patient, the Neuro ICU allows particularly high-risk, complicated procedures to be performed. Yes, you know you can provide treatment and surgery, but you want to be certain that there is the ability to provide care afterwards if there are complications. You want the ability to monitor the patient extremely closely afterwards. You can lose all the benefits from the surgery if you don’t have the ability to provide the care afterwards.”

**STROKE REHABILITATION  
—INDIVIDUALIZED TREATMENT PLANS**

Rehabilitation Physician Edward S. Claflin, M.D., leads the U-M Acute Stroke Rehabilitation Program for patients who have significant disabilities because of stroke.

Once again, state-of-the-art equipment and technologies—such as the Lokomat robotic exoskeleton, BioEx gait training with biofeedback, Bioness technologies, Saebo hand and foot functional tone management, graded UE biking, and neuromuscular and functional electric stimulation—are backed up by the knowledge and expertise of a truly interdisciplinary and collaborative team.

Their team of experts includes a physical medicine and rehabilitation physician (a physiatrist), physical therapists, occupational therapists, speech language pathologists, neuropsychologists, rehab engineers, exercise technicians/personal trainers, orthotists/prosthetists and a case manager.

“The medical or surgical team asks for rehabilitation assessments by therapists as soon as it is deemed safe—usually within hours of a patient’s admission. These therapists will continue to see patients in the hospital until they move to the next level of rehab,” says Claflin. After assessment, the team develops specific rehab goals and a timeline for transitioning to another rehab setting or back home. The team even develops home exercise plans so that patients can maintain their level of function.

“Our goal is to help patients achieve their best level of function after stroke,” Claflin says.

**WORKING TOGETHER**

“A truly comprehensive stroke care setup cannot function unless there is genuine collaboration among its different components,” says Chaudhary. “Here at the University of Michigan, all the components of such a comprehensive stroke center work in perfect harmony.”

“We appreciate the privilege of treating all of these patients and appreciate each referring physician’s important contribution in allowing us these opportunities,” Pandey says. **M**

**“You can lose all the benefits from the surgery if you don’t have the ability to provide the care afterwards.”**

—VENKATAKRISHNA RAJAJEE, MBBS, NEUROINTENSIVIST, U-M NEURO ICU



*Dr. Rajajee evaluates a patient’s progress in the Neuro ICU.*





*“At the University of Michigan Brain Tumor Program, we surveyed our patients to find out what aspects of their care mattered the most. We started with a simple question: If given the opportunity, would you choose a treatment strategy based primarily on the quality of your life or the length of your life?”*

***Overwhelmingly, 85% said quality of life.***

*Their desires became the basis for the Functional Wellness Initiative Program.”*

—SHAWN HERVEY-JUMPER, M.D.

