Capturing the Momentum of Rehabilitation Medicine at NYU Langone Medical Center • Special Edition—Fall 2013

RUSK

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MEDICAL CENTER

From The Chair

This year marks the five-year anniversary of my arrival at Rusk Rehabilitation, during a time of incredible change for both NYU Langone Medical Center and healthcare. In order to meet the challenges of this environment, it was clear that we had to stay ahead of the curve in rehabilitation medicine. I'm very proud to look upon the past five years and say that we've succeeded outstandingly in that mission.

In our clinical programs, reflecting a healthcare-wide trend, our acute inpatient services have increasingly transitioned to ambulatory or subacute venues. Even in this changing environment, we continue to provide the best in inpatient rehabilitation care, with a greater focus on neurorehabilitation. In addition, Rusk has adapted by developing strategic partnerships with subacute programs throughout New York City. We have also expanded our Women's Health Rehabilitation Program; grown our brain injury, musculoskeletal, and sports programs; helped launch NYU Langone's new interdisciplinary Concussion Center; and continued to refine our core programs of stroke, medically complex, pediatric, and cardiopulmonary rehabilitation. Equally important was Rusk's move from our outdated building at 400 East 34th Street to state-of-the-art facilities throughout the NYU Langone campus—at the Center for Musculoskeletal Care, the Ambulatory Care Center, and the Hospital for Joint Diseases.

Our research and scientific dissemination program has made significant strides. In addition to the 2009 appointment of Tamara Bushnik, PhD, as our new director of research, we've gone on to recruit a number of outstanding physician-scientists and develop a new research division infrastructure. Rusk Research has expanded in other areas: psychology, physical therapy, occupational therapy, vocational rehab, and speech language pathology. Grants with Rusk researchers as principal investigators now total more than $7 million—a remarkable achievement. Our dissemination efforts have also expanded, with regional and national presentations more than doubling.

In education, we've extended our tradition as one of America's largest and oldest Physical Medicine & Rehabilitation (PM&R) physician training programs. Under the leadership of Alex Moroz, MD, the length of Rusk's residency accreditation cycle has doubled, and competition for residency positions has increased. We initiated a Brain Injury Fellowship in 2012, expanded our psychology intern program, and enhanced our psychology postdoctoral program to include research training. Fellowship training programs in pediatric rehabilitation and sports medicine will be launched in the near future. We remain a magnet for clinical training in physical, occupational, and speech therapies as well. And in the spirit of Dr. Howard Rusk, our international educational efforts span the globe, with ongoing programs in China and many others in development.

We've accomplished a great deal, but we don't intend to rest on our laurels. As healthcare evolves, we will continue to stay ahead of the curve to ensure that our patients receive the highest quality care, have access to the most cutting-edge research, and achieve the best outcomes possible. I look forward to working alongside our outstanding team and continuing our strong momentum in that ongoing effort.

Steven R. Flanagan, MD

The Howard A. Rusk Professor of Rehabilitation Medicine
Chair, Department of Rehabilitation Medicine
Medical Director, Rusk Rehabilitation

Pediatric Rehabilitation Update: Rusk's Youngest Patients Gain a New, State-of-the-Art Facility

"In the halls of our pediatric rehabilitation wing, it's routine to encounter three or four specialists huddled together in spontaneous consultation." So begins the profile of Rusk's Pediatric Rehabilitation Program in the Fall 2011 edition of *RUSK*. This collaboration, the article explains, "is emblematic of the pediatric program's approach to care, which meets the medical, functional, and developmental needs of young patients with a holistic philosophy shared by a tightly knit multidisciplinary team."

The article also described the program's seasoned staff, including Rusk's two board-certified pediatric rehabilitation specialists, Joan Gold, MD, and Renat Sukhov, MD, and its team of psychologists, pediatric nurse clinicians, and patient technicians. It went on to note the division's advanced rehabilitation technologies and treatment modalities; its empowering inpatient environment; the offer of in-hospital schooling; and Rusk's extensive outpatient rehabilitation services.

One innovative technology, the Lokomat®, got its own article in *RUSK*'s Spring 2011 issue. The device provides body-weight support to pediatric patients who can't stand on their own due to conditions such as brain injury and cerebral palsy, while a "computer-guided exoskeleton assists the child with walking by moving his or her legs in a predetermined pattern"—building the skills needed to eventually walk unaided.

Update: Summer 2013 marked the opening of Rusk's new inpatient and outpatient facilities in NYU Langone's Hospital for Joint Diseases (HJD). The 16-bed inpatient unit, on the eighth floor, has a mix of private and semiprivate patient rooms; a state-of-the-art physical therapy gym; a large recreation room that can be used for play therapy, socializing, or special events such as musical concerts; and a family room where patients and their loved ones can gather.

The outpatient unit, on HJD's fourth floor, brings together the full range of pediatric rehabilitation care, from physicians and therapists to psychologists and child-life specialists. "Both units are designed to provide an extremely positive patient experience in terms of their environment, while at the same time promoting a fluid delivery of services across every discipline," says Dr. Sukhov.

The program's clinical offerings continue to expand as well: a vestibular therapist has joined the staff, in part to help treat the increasing number of children and adolescents with concussions being referred by NYU Langone's new Concussion Center. Other features of the space in HJD include an aqua-therapy pool and Dynavision™ technology—a computerized light board that improves visual processing and related cognitive and motor functions.

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Clinical Research Update: Advancing Rehabilitation Science with Federal Support

Since the appointment four years ago of Tamara Bushnik, PhD, as research

director, Rusk's clinical research program has seen unprecedented strides. In an interview for our Fall 2011 issue, Dr. Bushnik noted the recent doubling of Rusk's NIH grant submissions, and also discussed the increasingly interdisciplinary nature of Rusk Research and the program's impending move to the Ambulatory Care Center (ACC). A follow-up article in the Winter 2012-2013 issue detailed Rusk's four newest federal grants: a two-year grant to study the use of vision therapy to improve hand function after stroke; a five-year grant funding six postdoctoral fellows in rehabilitation psychology; a three-year grant for a collaborative project with the VA New York Harbor Healthcare System, comparing outcomes between civilian and veteran populations following lower limb amputation; and a traumatic brain injury (TBI) model systems grant—the first time Rusk has received this major five-year award.

Update: Since the last *RUSK* article, Rusk has successfully transitioned to the ACC, hired two prominent researchers, Joe Ricker, PhD, and David Tulsky, PhD, and secured several additional grants, including NIH funding for the stroke recovery research of Preeti Raghavan, MD.

"I also want to spotlight our progress under the TBI model systems grant," notes Dr. Bushnik, "since this is so important for us on the national level." The grant, which is funded through the U.S. Department of Education's National Institute on Disability and Rehabilitation Research (NIDRR) and goes to just 16 U.S. centers, provides Rusk and its collaborators—NYU Langone, Bellevue Hospital, and selected trauma and medical centers throughout New York City—with funding to collect and analyze longitudinal data from TBI patients in their communities, and to conduct research on evidence-based TBI rehabilitation interventions.

"We've used the grant to launch two major studies testing innovative approaches to treating and assessing outcomes of individuals with TBI," reports Dr. Bushnik. One study examines cultural disparities in rehabilitation healthcare among TBI patients. Its first phase involves collecting data on culturally diverse TBI patients from Bellevue and Rusk Rehabilitation. The second phase will utilize these data to develop an educational program that provides patients with culturally accessible knowledge about their injury and the rehabilitation process.

The second study is assessing the responsiveness and sensitivity of computerized tests using the TBI Quality of Life Measurement System (TBI-QOL), an evaluation tool developed through the model systems initiative. "Our team has a wealth of experience with TBI model systems," adds Dr. Bushnik. "We're positioned to be a valued contributor to the 2012-2017 cycle, and to improving the lives of individuals with TBI, as well as their families and communities."

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Advice That's Easy to Swallow—Rusk Experts Help Implement a Cooking Class for Dysphagia

Preparing nutritious, appealing meals for patients with dysphagia (swallowing

difficulties) is an important but difficult task. Over the past several years, Rusk experts have contributed to a course in which students at NYU Steinhardt School of Culture, Education, and Human Development learn to manage—and cook for—dysphagic patients. The recipes arising from the course's "Top Chef"-like final competition are being compiled in a cookbook, and have even influenced the food offerings of the Medical Center.

"Cooking for dysphagia can be challenging," explains Preeti Raghavan, MD, director of Rusk's Motor Recovery Research Lab, who assists with medical aspects of the course along with Karen Riedel, PhD, director of Rusk's Speech-Language Pathology Program. **"The nature of swallowing difficulty varies depending on each patient's condition; some may have difficulty with solid foods while others can't swallow liquids. Yet if the food isn't enjoyable, these patients can easily become malnourished."**

The four-session course, "Interdisciplinary Case-Based Dysphagia Management," is offered each January at NYU's downtown campus. Taught jointly by Lisa Sasson, MS, clinical associate professor in the NYU Steinhardt School's Nutrition, Food Studies, and Public Health Department, and Erin Embry, MS, teacher in the school's Communicative Sciences and Disorders Department, the course introduces 20 students from their two departments to the National Dysphagia Diet, which ranges from totally pureed food to a "soft diet," containing whole foods that are easily chewed. As part of the course, students visit Rusk to watch a barium swallow test, and join a rehab team for mock rounds of dysphagic patients.

On the course's last day, students divide into four-person teams for the Iron Chef Dysphagia Challenge. Each team is assigned a fictional patient—whose dysphagia might be caused by stroke, Parkinson's disease, head or neck cancer, brain injury, or dementia—and given a limited time to prepare a beverage and meal suitable for that patient's condition and personal preferences.

"The meals have been outstanding!" reports Dr. Raghavan, who helps judge the annual competition. In 2011—a year when the first prize went to a meal created for a New Orleans lawyer with tonsillar cancer, featuring mojito tilapia over grits and a dessert of rice pudding with a fresh berry glaze—another observer was Jonathan Murray, director of food and clinical nutrition at NYU Langone. "I was amazed at the level of creativity and presentation," said Murray. A short time later, the hospital menu was expanded to include dysphagic-friendly dishes, including puréed fish with corn, polenta, and vegetable soufflé.

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Global Reach Update: Rusk's International Presence Continues to Grow

Rusk's international initiatives at home and abroad were the focus of "Rehab Ambassadors: Rusk Extends Its Global Reach," in *RUSK*'s Fall 2011 edition. The article highlighted our Visiting Scholars Program, which invites physicians from abroad to spend several months at Rusk each year observing clinical practices. It also cited international presentations given by Rusk faculty over the years "on topics including neuropsychology, comprehensive musculoskeletal care, and the medical management of traumatic brain and spinal cord injuries," as well as recent lectures in Poland, Greece, Korea, India, and China on the state of rehabilitation medicine.

Other topics included the 2011 international conference hosted by Rusk in tandem with the Sunnaas International Rehabilitation Network. The article concluded with an overview of a new physical therapy training program Rusk was launching in China in partnership with Qingdao Municipal Hospital, a 1,000-bed facility in Shandong Province.

Update: Since this article's publication, our international programs continue to thrive. Last year, Rusk welcomed visiting scholars from Korea, the Philippines, and Israel, among other countries. Recent presentations abroad included talks in China by Rusk's chair, Steven Flanagan, MD, on sports-related concussions, and Wayne Stokes, MD, director of sports rehabilitation medicine, on shoulder trauma. Rusk representatives also attended the 2012 Sunnaas conference in Tel Aviv.

The year's biggest news, however, has been Rusk's growing partnership with Qingdao Hospital. "Our agreement was just extended to cover four training visits from Rusk faculty and staff per year," reports Geoffrey Hall, MBA, MSW, LCSW, department administrator for Rusk. "We've made six visits to date, the most recent just in October." On these trips, which include a Rusk physiatrist, nurse practitioner, physical therapist, and more recently, a psychologist and occupational therapist, the Rusk team

trains Qingdao staff in the delivery of sports medicine, orthopaedic rehab, and neurorehabilitation services. Rusk hosted five rehabilitation professionals from Qingdao in New York in 2012 and will host another three this year, and is also advising the hospital on its construction of a new rehabilitation facility.

The relationship with Qingdao has resulted in inquiries from other Chinese hospitals about forming similar partnerships, reports Hall. Separately, Rusk is teaming with NYU Steinhardt School of Culture, Education, and Human Development to help develop a graduate-level physical therapy curriculum at Sun Yat-Sen University in Guangzhou, China's third-largest city. "We're also exploring relationships in India and the Middle East," adds Hall. "As a leader in rehabilitation care, we are committed to sharing knowledge and best practices on a global scale."

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"It's Not Just about the Plant": Rusk Horticultural Therapist Sows the Seeds of Healing at Home and Abroad

Horticulture therapy has always had a central place in the Rusk philosophy. And while the Glass Garden—a fixture of Rusk's former 34th Street headquarters—is now gone, the idea that nurturing plants can help a patient's own recovery is still alive and well at Rusk. "It's remarkable to see how positively people respond when I walk into their room with a cart full of plants," says senior horticulture therapist Matthew Wichrowski, MSW, HTR. "Their mood changes immediately—they start to smile, their anxiety or depression recedes, and they stop thinking about whatever pain they might be experiencing."

Just as Rusk has moved to multiple locations recently, the setting of its horticulture therapy program has shifted as well, notes Wichrowski. "We've adopted a more mobile model in which I come directly to the patients," he says. His greenhouse on wheels, which he uses to treat patients at their bedside or in small groups on the hospital floor, lets him work with more acutely ill or bedridden individuals, such as epilepsy patients who must stay connected to monitors, at a variety of locations.

Wichrowski typically has patients choose a plant and tend it in preparation for taking it home. "We'll discuss how to care for the plant to ensure its survival," he says. "It's not just about the plant, of course. In addition to reducing stress, gardening enhances physical, cognitive, and social function, and provides a platform for exploring the patient's own issues. I like to talk about how plants adapt to new circumstances, for example, since this parallels how the patient is adapting."

This past summer, Wichrowski covered even more ground than usual, traveling to Europe to present at a conference in Vienna and visit Helios Klinik Holthausen, a German rehabilitation facility, where he observed their methods and made a presentation to their neuropsychiatric team. After returning home, Wichrowski made a side trip to Washington, DC, to receive the American Horticultural Society's Great American Gardener's Horticultural Therapy Award.

"It was an exciting couple of weeks," he reports. "Horticulture therapy is increasingly being accepted in Europe. At the conference, there was a lot of interest in the research we're conducting at Rusk on how our therapy impacts patient outcomes."

Wichrowski's trip to the German clinic came at the invitation of a colleague who had previously visited Rusk. "He's moving to a more unit-centered treatment model as well, based on what we're doing here," notes Wichrowski. "They're also doing co-treatments with occupational and speech therapists, which is an avenue we're interested in exploring. We're constantly building off each other's modifications and improvements."

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Integrative Health Update: Using Mind-Body Techniques to Enhance Rehabilitation

Two recent *RUSK* articles focused on initiatives spearheaded by NYU Langone's Department of Integrative Health and Rusk to incorporate mind-body therapies into rehabilitation programs. In our Spring/Summer 2012 issue, "Mind-Body Medicine Meets Women's Rehab" described a women's health rehabilitation pilot program that aims to help relieve pelvic pain by training Rusk staff, "including

physical and occupational therapists, social workers, and psychologists," in techniques such as meditation, guided imagery, yoga, and stress management. The article also cited a planned research study on the pain-relieving effects of the Playaway©, a portable device preloaded with meditative audio programs.

Our Winter 2012-2013 issue profiled the new Pediatric Rehabilitation Integrative Health Program at the Hospital for Joint Diseases (HJD), where Rusk's inpatient and outpatient pediatric rehabilitation program is located. Funded by Goldman Sachs Gives at the recommendation of Mindy and Mark Dehnert, and administered by Mary Walsh Roche, ORT/L, LMT, a therapist with the Integrative Health Department, the program features "an array of mind-body therapies to reduce pain, anxiety, and nausea, improve sleep, promote self-healing, and teach coping and stress-reduction skills" to pediatric inpatients, their families and caregivers, and hospital staff.

Update: "The Playaway study was a success," reports Jaclyn H. Bonder, MD, medical director of women's health rehabilitation at Rusk. "All the patients who received them thought they were helpful." The Women's Health Program also recently added a six-week yoga program taught by a Rusk physical therapist who is also a certified yoga instructor.

Meanwhile, the Dehnert Pediatric Integrative Health Program has gotten off to a strong start, with individual sessions now offered in HJD's pediatric acute care and rehabilitation units to patients and family members. "Reiki therapy has been very well received by parents—it helps them feel more centered and calm," reports Walsh Roche. The units' children, she adds, generally respond well to guided imagery and expressive activities such as coloring or painting. **Integrative health and recreational therapists have also been co-leading mind-body group sessions for Rusk pediatric inpatients that employ guided imagery, adaptive seated yoga, mandala meditation, and relaxation techniques.** Group sessions in tai chi and meditation are available to parents and hospital staff as well.

Integrative services were also recently extended to HJD's adult inpatient rehabilitation units by the Integrative Health Department, whose seven-person staff collaborates with numerous other departments and also treats outpatients, families, and Medical Center staff. Future plans include expanding pediatric and adult integrative offerings, providing training for hospital staff, and conducting research on how integrative health techniques ease pain, anxiety, and stress.

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Motor Recovery Research Lab Update: Helping Stroke Patients Recover Limb Function

The article "From the Minutiae, Keys to Motility: Putting Research into Action at the Motor Recovery Lab," published in *RUSK*'s Spring 2011 edition, focused on Preeti Raghavan, MD, and her colleagues in Rusk's Motor Recovery Research Laboratory. Dr. Raghavan's lab is devoted to helping stroke patients recover motor function—particularly the use of their affected hand to grasp and manipulate objects, an ability many stroke patients have trouble regaining.

The article described research the lab is conducting based on its groundbreaking discovery that patients relearn motor tasks more readily with their stroke-disabled hand when they practice the task with their unaffected hand first. It also explained how Dr. Raghavan "studies the minutiae of fingertip forces and finger movements," then traces patients' injuries back to the brain itself to understand the best treatments for restoring hand function. "A study of how patients shape their hands around an object, for example," it noted, "helped physiatrists at the lab see that stroke patients use a different set of joints than healthy individuals do." Other topics included the lab's development of a rating scale for upper-extremity impairment, and its studies of how music therapy can help stroke patients relearn motor skills.

Update: The NIH has since awarded a prestigious R01 Grant to Dr. Raghavan. "After a stroke, there is a loss of motor and sensory memories on the affected side. We've found that when someone does a task with their unaffected hand, sensory information is shared with both sides of the brain. This grant will fund further examination of the alternate-hand training strategy, where the unaffected hand teaches the affected hand." She adds, **"The goal of this five-year study is to refine the approach and create an algorithm to determine how training should be administered to facilitate relearning in individuals with different types of sensory and motor problems after a stroke."**

The lab's music therapy project has also progressed, she reports. "We've teamed up with music therapists and created an intervention that provides upper-limb therapy and music therapy simultaneously." During a six-week pilot program, groups of stroke patients met twice a week to play percussion instruments together and share their personal experiences. "Patients loved the intervention, and after six weeks we saw dramatic improvement in hand function and reduction in disability," says Dr. Raghavan. Follow-up testing a year later found that the patients had continued to improve without additional therapy. The lab currently has a grant pending with the NIH to do a larger, controlled study.

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Neurorehabilitation Update: Comprehensive Therapy for Injured Brains

Two *RUSK* editions have featured articles on our brain injury rehabilitation program. The first, in Fall 2011, described how Rusk's Brain Injury/Neurorehabilitation Unit offers comprehensive rehabilitation management across the continuum of care, drawing on a "singularly qualified interdisciplinary team of physiatrists, rehabilitation nurses, physical and occupational therapists, speech and language pathologists, neuropsychologists, and social workers."

The article outlined Rusk's model of care, in which patients meet with specialized therapists for three or more hours per day, with their recovery carefully monitored by one of Rusk's fellowship-trained brain injury physiatrists. It also noted that their last review by the Commission on Accreditation of Rehabilitation Facilities (CARF) found the program had no areas of nonconformance—"an

extraordinary accomplishment," the Commission wrote, occurring in "only 3% of CARF surveys."

A Q&A with Brian Im, MD, co-director of Rusk's inpatient brain injury rehab program, appeared in our Winter 2012-2013 issue. Dr. Im explained how the experience and skill level of the rehab team and the program's dual inpatient-outpatient services contribute to Rusk's preeminence in brain injury rehabilitation. He also discussed Rusk's new inpatient brain injury facility at the Hospital for Joint Diseases (HJD) and the division's plans to expand clinical research, aided by its recent receipt of a five-year NIH model systems grant.

Update: Since these articles, an additional unit for stroke and general rehab patients has opened in HJD, enabling the inpatient brain injury program to occupy an entire 16-bed wing on the hospital's ninth floor. "With a dedicated unit, co-director Dr. Jaime Levine and I have been able to focus on developing new protocols, such as weekly team meetings focused exclusively on patients' cognitive progress," reports Dr. Im. "Behavioral neurologist Dr. Sonja Blum is now working more closely with us, as well."

HJD has also completed renovations to its fifth floor, which now houses neurorehabilitation offices, meeting rooms with teleconferencing technology, and a state-of-the-art rehab gym. This gym can be used by patients functionally and medically safe enough to leave the ninth floor, creating more space in the existing ninth-floor gym for patients who are more limited functionally and require closer medical monitoring.

On the outpatient side, the neurorehabilitation division is seeing more concussion patients, a result largely of referrals from NYU Langone's new Concussion Center. "We've always been effective at treating concussions, which have many treatment similarities to mild traumatic brain injuries," notes Dr. Im. "Now, thanks to the Concussion Center, more people are learning that we're here and that we can help."

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Superstorm Sandy Update: Pushing Forward in the Hurricane's Wake

For people who live and work in New York City and its surrounding communities, the devastation wrought by Superstorm Sandy left an indelible impression. The storm had a particularly intense impact on NYU Langone Medical Center, where power outages forced the evacuation of patients from Tisch Hospital.

The *RUSK* article "Hurricane Sandy: Heroes in the Night," in our Winter 2012-2013 issue, recounted the role played by Rusk faculty and staff in the Tisch evacuation—when, drawing on their extensive experience with transfer procedures, they conducted training sessions on the fly, teaching other personnel how to deploy the Med Sleds used to lower patients down the hospital's stairwells. "Meanwhile," the article continued, "Rusk's own adult patient population, which had been relocated to Tisch the day before, was tended to by Rusk nurses inside the darkened hospital as they waited for more urgent cases to be evacuated first." It also noted that the storm's damage had hastened the planned closing of Rusk's 34th Street headquarters: "Following Sandy, all remaining operations are being transferred from the building slightly ahead of schedule."

Update: In the weeks following the late-October storm, Rusk caregivers continued attending to patients who had been evacuated to other sites. In the meantime, intensive repair efforts enabled the Medical Center to resume most of its inpatient and outpatient services just nine weeks after Superstorm Sandy hit. Additional flood mitigation measures have been implemented since, including installation of a flood barrier system on the Medical Center's main campus. Another key flood-proofing step will be finalized with completion of NYU Langone's Energy Building in 2016, which will house infrastructure serving the campus including a new electrical service, emergency generators, boilers, and a co-generation natural gas power plant.

As noted above, the storm resulted in the permanent closing of Rusk's 400 East 34th Street building. While Rusk outpatient services had already moved to their new locations, certain inpatient services—including neurorehabilitation, complex medical conditions, and pediatric rehabilitation—were closed temporarily, until renovation of their new sites in the Hospital for Joint Diseases was completed in the spring of 2013. "The closing of our inpatient facilities actually had a silver lining," reports Geoffrey Hall, Rusk's department administrator, "since it freed up our therapists and nurses to do intensive

training of staff at our new subacute facilities—allowing them to get up and running more quickly."

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Core Activity: An Innovative Therapy Strengthens Spinal Cord Patients for Daily Life

For patients recovering from a spinal cord injury (SCI), the effectiveness of physical or occupational therapy is often limited by the very muscle weakness their therapy is trying to address. "Besides decreased sitting balance and upper body strength, people with SCIs typically have limited trunk mobility and stability," explains Maneshka Perera, OT, a Rusk occupational therapist who specializes in working with SCI patients. "This can seriously impede their ability to perform daily tasks such as grooming, bathing, dressing, toileting, and the ability to use a wheelchair in and outside of their home."

This inability often leads to frustration and a cycle of dependence, explains Perera. "When someone can't wash their own hair or dress themselves, they start to feel totally reliant on a caregiver." Lack of functional trunk strength also makes it harder to exercise, leading to decreased endurance, she adds. "As a result, many individuals with SCIs can't get through their morning routine without taking rest breaks."

Perera is offering SCI patients a way out of this cycle of limitation, however: building on a spinal mobility approach developed by a former colleague, she employs a protocol aimed at increasing core strength and mobility. A key element is a mobilization belt that she loops around the patient and herself. "The belt gives the patient a balance point, while leaving my arms free to offer resistance," says Perera. This lets patients do exercises in positions that would be unattainable otherwise—sitting upright on a mat, for example, or using their arms to stabilize themselves with an exercise ball.

From there, the patient works on strengthening specific muscle segments in the trunk. As core strength improves, they may progress to sitting on a balance disk or using resistive bands to further strengthen the lower trunk. **Using this approach, patients begin to activate muscles they were previously unaware of. The result is significantly better trunk control, as evidenced by improved scores on functional tests.**

"Each session typically starts with an activity analysis to determine the day's treatment activities," she says. "I'll then devote considerable time to strengthening exercises, then conclude by linking this to functional tasks." The patients' home caregivers often participate as well, and Perera video records sessions so therapy can be continued at home.

"What's always at the forefront of my mind," she says, "is teaching someone how to move and live in their wheelchair as they go about their daily activities. Whether someone is newly or chronically injured, being able to care for yourself while decreasing the burden on your caregivers is essential to improving quality of life."

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Education and Training Update: Extending a Distinguished History

The article titled "The Leaders of Tomorrow: Setting the Standard in Education and Training," which ran in the Winter 2011-2012 issue of *RUSK*, highlighted Rusk Rehabilitation's "distinguished history of training physicians, nurses, therapists, and other professionals in rehabilitation"—a tradition that has produced 25 rehabilitation department chairs at medical schools across the country, including five current chairs. The article went on to note that in our robust in-house Physical Medicine & Rehabilitation (PM&R) residency program:

- More than 300 NYU School of Medicine students have been trained in PM&R, in addition to 400-plus medical students rotating from other schools.
- More than 800 physicians from across the United States and Canada have taken our annual PM&R review course, now in its 37th year.
- Over 1,000 PM&R and orthopaedic surgery residents from programs around the country have trained at Rusk in the area of prosthetics and orthotics.

"Our faculty members encourage trainees to become active participants in patient care," the article observed. It also cited plans in the near future to add rotations in musculoskeletal medicine and sports medicine (including musculoskeletal ultrasound training), and to launch a brain injury medicine fellowship.

Update: "In the year and a half since this article appeared, we've continued to actively develop our medical school, residency, and postgraduate training programs," reports Alex Moroz, MD, Rusk's director of residency training and medical education. "We've begun participating in the neurology rotations of NYU's medical students, and our first brain injury fellowship has now entered its second year." On the PM&R residency track, new outpatient rotations have been added at NYU Langone's Center for Musculoskeletal Care and its Ambulatory Care Center, and residents' sports medicine and ultrasound experience has been greatly expanded.

"We've also revamped our research curriculum and instituted a mandatory research requirement for our residents," notes Dr. Moroz. Other innovations in Rusk's residency program include the incorporation of multiple new sites for electrodiagnosis training, introduction of self-assessment exams in electrodiagnosis for senior residents, implementation of training in left ventricular assist devices (LVADs), weekly anatomy reviews, and the use of teleconferencing so that residents can participate remotely in educational activities. Rusk is also experimenting with the use of mobile devices as training aids. **These various efforts, he adds, are reflected in the fact that Rusk's residency class of 2012 had an outstanding 100% board pass rate on the American Board of Physical Medicine and Rehabilitation Part I oral exam.**

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Giving Ex-GIs a Leg Up: New Rusk Program Helps Veterans with Disabilities Find New Vocations

For U.S. military veterans with combat-related disabilities, transitioning back into the civilian workforce can be a monumentally difficult undertaking. In 2012, to help New York-area veterans overcome this hurdle, Rusk Rehabilitation's vocational rehabilitation division launched Employment Pathways, a program designed to help place disabled veterans in permanent jobs.

"Most of the veterans in Employment Pathways are recovering from posttraumatic stress disorder, orthopaedic or spinal injuries, or traumatic brain injury," explains Robert Lindsey, CRC, LMHC, director of vocational rehabilitation. Following screening to ensure they are ready to enter the job market, participants attend regular sessions in which they undergo a job readiness evaluation, receive vocational counseling and training in job-seeking skills, and research job openings. Rusk's Business Advisory Committee (BAC), a group of 40 firms, assists by arranging internships and setting up mock job interviews to prepare veterans for the real thing. The BAC and other organizations provide mentors to help hone participants' networking skills.

"From day one of the program, they're actively seeking a job," says Lindsey. As part of the process, Rusk's vocational rehabilitation counselors try to identify jobs that are a good fit with the veterans' military experience while also taking into account their disabilities. "Posttraumatic stress disorder can affect a person's ability to cope with work stress, interact with

others, or concentrate on tasks," notes Lindsey. Similarly, an individual who has lost a limb may need workplace accommodations, while a brain-injured individual may have cognitive or behavioral deficits.

Fortunately, Rusk's vocational rehabilitation counselors have extensive expertise with these issues, both from their work with civilian populations and through Rusk's other ongoing programs for veterans. For the past seven years, at the Veterans Administration's request, they've conducted diagnostic vocational evaluations of several dozen disabled veterans annually. About 15 vets also participate each year in Rusk's 10-week vocational computer courses for disabled individuals.

Employment Pathways, which is supported by private funding, has screened 25 veterans and enrolled 17 to date. A number of them have already found jobs, including positions as a human resources assistant, medical support assistant at a VA Medical Center, analyst for a crisis management center, and talent acquisition specialist for a retail chain. **"These veterans have a lot to offer," says Lindsey. "They've had a lot of responsibility in the service, and many come out with great leadership skills. The question is, how do you communicate those traits to a potential employer? That's something we spend a lot of time working on."**

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Envisioning a New Future for Impaired Eyes: Rusk Physician-Scientist Takes an Innovative Approach to Visual Rehabilitation

"The white cane used by visually impaired individuals was developed in the 1920s," notes John-Ross Rizzo, MD, associate research scientist and clinical instructor of rehabilitation medicine. "And it's remained largely unchanged since then." In this age of advanced technologies, Dr. Rizzo is convinced there's a better way for those with poor eyesight to navigate. What's more, he's come up with several promising inventions to accomplish this—including the CumbaCane, a cane with two deployable arms at the distal end to provide better information about the terrain ahead, and a vibrating vest that "maps" the wearer's surroundings.

These innovative assistive devices are just one way the newly appointed Rusk faculty member is working to revolutionize the field of visual therapy. In 2012, as Rusk's chief resident, Dr. Rizzo established the Visuomotor Integration Laboratory (VMIL). The lab, which received a grant last year from the National Institute on Aging, studies the relationship between how the brain processes eye and arm/hand movements following acquired brain injuries. Working in conjunction with the lab of Michael Landy, PhD, professor of psychology and neural science at NYU's Center for Neural Science, Dr. Rizzo's lab is about to publish a paper on how visual processing affects reaching movements, and is developing visual rehabilitation exercises for the iPad.

On another front, Dr. Rizzo has teamed with the State University of New York (SUNY) College of Optometry to launch a first-of-its-kind, multidisciplinary visual

rehabilitation clinic. Based in NYU Langone's Ambulatory Care Center, the interdisciplinary clinic includes brain injury medicine specialists, visual and vestibular therapists, neuro-ophthalmologists, and optometrists. The aim is to treat visual deficits in stroke and traumatic brain injury patients as early as possible. "These patients may have lost half their visual field, but typically we wait until after they've gone through physical and occupational therapy to address their visual problems," says Dr. Rizzo. "Treating their vision simultaneously could accelerate recovery in other areas as well."

Dr. Rizzo, who was diagnosed with a degenerative eye condition in his teens, is particularly excited by the prospect of an electronic navigation system for the visually impaired. Working with members of NYU's engineering department, he's started a company to design a garment with inexpensive sensors implanted in it—similar to those that beep when your car is backing toward another vehicle—linked to small vibrators that alert the wearer to nearby objects. He's currently trying to raise venture capital to fund the device's manufacturing. If successful, he adds, "it could become reality within 18 months."

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Cardiopulmonary Rehabilitation Update: Helping to Strengthen Hearts and Lungs

Our Winter 2011-2012 issue featured an overview of our cardiopulmonary rehabilitation and wellness program, based in the Joan and Joel Smilow Cardiopulmonary Rehabilitation and Prevention Center. The article noted that Rusk's multidisciplinary program accounted for 27% of all regional acute inpatient cardiopulmonary discharges in 2011. It also cited the 80% completion rate for patients in Rusk's cardiac rehab outpatient program. The program's research activities were highlighted too, including the many outreach studies conducted over the past two decades to promote population health, and recent grant-funded projects on the benefits of heart-healthy lifestyle changes for cardiac rehab patients.

Update: "Inpatient rehabilitation facilities across the nation have been significantly impacted by healthcare changes made over the past two years," says Greg Sweeney, PT, program manager for cardiopulmonary rehabilitation. "But we've expanded in other ways to continue to provide the best care for our patients. Our acute care team is now working earlier with inpatients who undergo both surgical and nonsurgical procedures, doing early mobilization, range of motion, and breathing exercises right in the recovery room." This approach, he notes, has been shown to benefit patient outcomes substantially, while also shortening length of hospital stay.

To help counter the reduction of beds in Rusk's inpatient unit, Jonathan Whiteson, MD, Rusk's director of cardiopulmonary rehabilitation, now oversees a new 25-bed cardiac rehab subacute unit at Jewish Home Lifecare's (JHL) campus in upper Manhattan, where the JHL rehabilitation staff received training from Rusk clinicians.

In addition, Rusk's outpatient cardiopulmonary program is serving more patients than ever in its new location at NYU Langone's Ambulatory Care Center. The new site's larger space has enabled the program to expand in every area, including physical therapy, occupational therapy, and exercise physiology. **Patients also benefit from a new, state-of-the-art gym featuring exercise equipment with full heart-function monitoring, and a room dedicated to advanced cardiopulmonary stress testing.**

In another exciting update, Rusk's cardiopulmonary rehabilitation team is treating a growing number of patients who have had left-ventricular assistive devices (LVADs) implanted. This technology has improved markedly in recent years, and is increasingly being used to treat advanced heart failure. "The newer versions use a rotary pump to bypass the failing left ventricle and push blood directly into the aorta, providing additional blood flow to the body," Sweeney explains. It's so effective that patients who receive this device can often improve their heart failure classification, quality of life, and survival. "Our LVAD program is steadily gaining momentum," says Sweeney. "Besides providing rehabilitation to NYU Langone's patients who undergo the procedure, we're also getting patients from surgical centers across New York City to participate in our inpatient program."

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Relocation Update: Rusk Completes Its Move into New, State-of-the-Art Facilities

Rusk's transition over the past two years from our original headquarters on East 34th Street to new centers throughout the NYU Langone campus has been chronicled in a series of *RUSK* articles:

Our Spring/Summer 2012 issue contained an interview with Maria-Cristina Tafurt, site director for Rusk's expanded presence at NYU Langone's Hospital for Joint Diseases (HJD) at 17th Street and Second Avenue. In the interview she described how several floors, then under renovation at HJD—including two rehab gyms and a new 23-bed medical/surgical unit—"would become the hub for Rusk's inpatient neurologic rehabilitation, inpatient and outpatient pediatric rehabilitation, and acute medical/surgical bedside therapy."

The same issue also profiled Rusk's new orthopaedic rehabilitation and sports medicine site at NYU Langone's Center for Musculoskeletal Care at 38th Street and First Avenue. In Rusk's fifth-floor facility, physiatrists, physical therapists, occupational therapists, and hand therapists collectively treat orthopaedic and sports-related conditions and provide postsurgical rehabilitation, aided by a new 7,200-square-foot gym that "overlooks the East River and contains state-of-the-art therapeutic and training equipment."

The newsletter's Fall 2012 edition highlighted Rusk's new outpatient and research site at NYU Langone's Ambulatory Care Center (ACC) on East 38th Street. The 40,000-square-foot facility "consolidates access to all adult outpatient rehabilitation services relating to non-musculoskeletal conditions," the article reported. "Window-filled gyms and treatment spaces feature unobstructed views of Manhattan's skyline and surrounding waterways . . . At the ACC, a patient can visit her doctor, be treated by her physical therapist, and meet with her psychologist without ever having to leave the building."

Finally, articles in our Spring/Summer 2013 issue profiled a new satellite Women's Health Rehabilitation office in NYU Langone's Joan H. Tisch Center for Women's Health, and the launch of Rusk-supervised rehab services at a pair of subacute facilities: an orthopaedic postsurgical rehab unit in Gouverneur Health's skilled nursing facility on Manhattan's Lower East Side; and a 25-bed cardiac rehab unit at Jewish Home Lifecare's campus in Upper Manhattan.

Update: With the opening of full inpatient and outpatient pediatric rehabilitation services and a new adult stroke and general rehab wing at HJD, as well as the relocation of complex medical rehab to the Schwartz Health Care Center this past spring, the last elements of Rusk's new configuration are now in place. **The new facilities are getting high marks from patients and caregivers alike, in terms of both accessibility and technological capabilities.** Rusk administrators also report that the new subacute sites are maintaining a high-quality patient experience, with "excellent coordination of care" between Rusk's centers and those on point at the skilled nursing facilities themselves.

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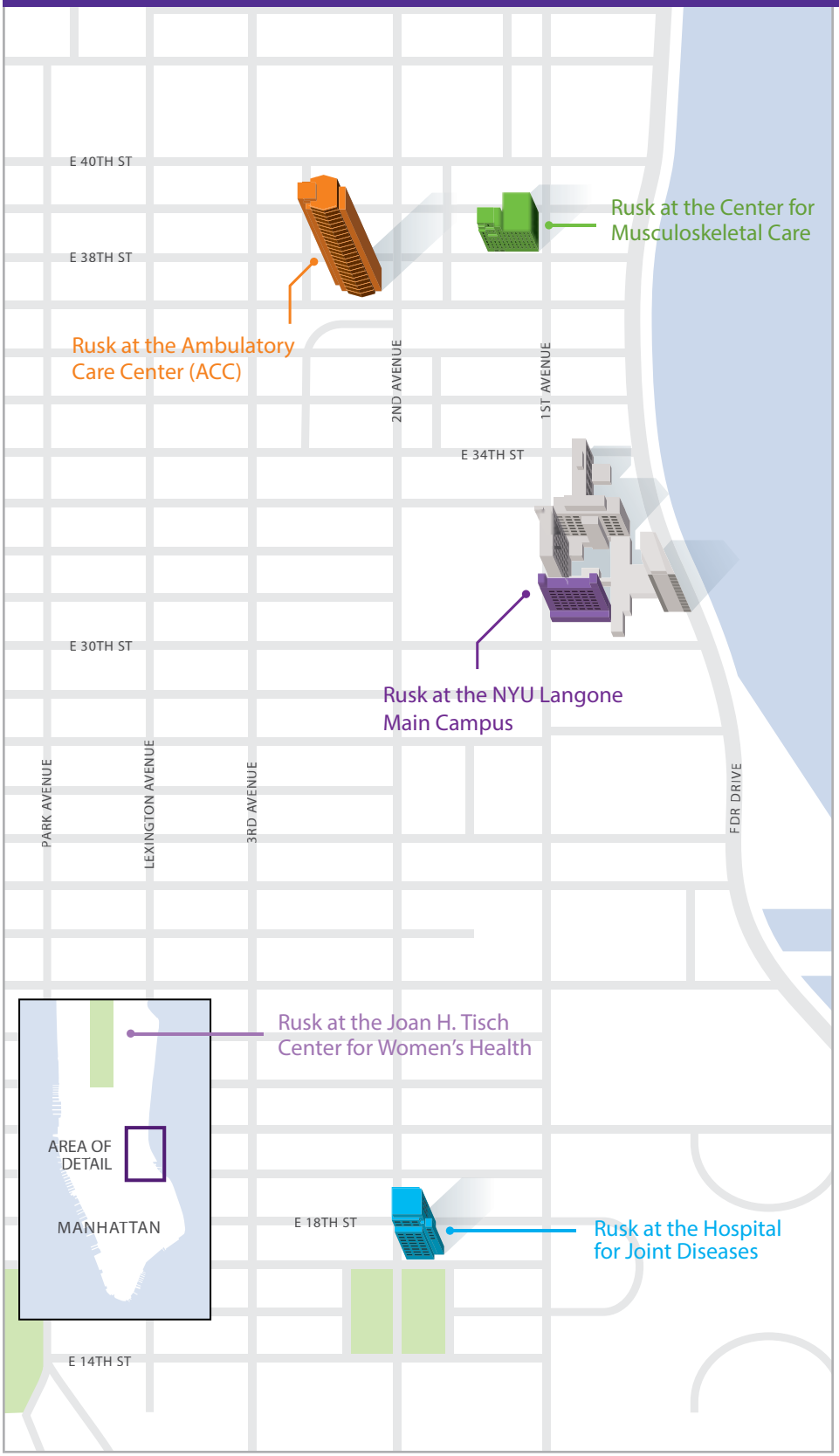
Rusk Rehabilitation at NYU Langone Medical Center



Rusk at the Ambulatory Care Center

240 East 38th Street (between Second and Third Avenues)

Outpatient Adult General and Neurologic Rehabilitation

Rusk at the Center for Musculoskeletal Care

333 East 38th Street (between First and Second Avenues)

Outpatient Adult Musculoskeletal/ Orthopaedic Rehab

Rusk at the NYU Langone Main Campus

530 First Avenue (at 30th Street)—9th Floor

Inpatient Adult Cardiopulmonary Rehab

Inpatient Adult Medically Complex Rehab

Rusk at the Joan H. Tisch Center for Women's Health

270 East 84th Street (at Third Avenue)

Outpatient Adult Women's Health and Orthopaedic Rehabilitation

Rusk at the Hospital for Joint Diseases

301 East 17th Street (between First and Second Avenues)

Inpatient Adult Neurologic Rehab (brain injury, spinal cord, stroke, other neurological conditions)

Inpatient Adult Orthopaedic Rehab

Inpatient & Outpatient Pediatric Rehab

Rusk Rehabilitation

www.nyulmc.org/rusk

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