



Toronto
Rehab

Everything Humanly Possible

Real need
Real science
Real solutions
Improving
lives through
research

Toronto Rehabilitation Institute
*A University of Toronto
Teaching and Research Hospital*

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Advancing Rehabilitation Enhancing Quality of Life

Toronto Rehab is at the forefront of one of the most important and emerging frontiers in health care today—rehabilitation science. A fully affiliated research and teaching hospital of the University of Toronto, we are dedicated to advancing rehabilitation and enhancing quality of life for the 3.6 million Canadians, and millions more worldwide, living with disabling injury and illness or age-related conditions.

>To learn more about [Toronto Rehab](http://www.torontorehab.com), visit www.torontorehab.com

It can happen in the blink of an eye—a sudden stroke, a severe heart attack, a traumatic brain or spinal cord injury or a myriad of other disabling conditions and illnesses that affect us, our family members, colleagues and friends.

When people's lives are turned upside down by sudden illness or chronic conditions, research is key to finding practical solutions to help them overcome daily challenges and live as fully and independently as possible.

Home to one of the fastest growing and most comprehensive rehabilitation research programs in the world, Toronto Rehab is a leader in research that focuses on improving the lives of those affected by disability and aging.

At Toronto Rehab, we generate new knowledge,

put it into practice and share our discoveries with others—to help people everywhere.

Most of us know someone coping with the often daunting challenges of a disability caused by illness, injury or older age. In fact, at some point in our lives, we will all experience some form of disability—or care for someone who has one.

As our population grows and ages, and medical advances save and prolong lives, demand for rehabilitation services is increasing and with it the need to develop new and more effective treatments, assistive devices and technologies to support people with disabilities and those encountering older age.

Toronto Rehab is rising to this challenge. Our vigorous research program, created in 2001 with a grant from the Ontario Ministry of Health and Long-Term Care, has dramatically expanded the horizons of rehabilitation research. We have a unique mandate from the Government of Ontario to build capacity for rehabilitation research in the province and advance rehabilitation knowledge and practice through this research.

Our scientists are turning ideas into innovative and practical solutions to:

- enhance quality of life, participation and productivity
- develop new and marketable assistive technologies, devices and products
- facilitate a quicker return to the community and work, and support people safely in their homes
- develop devices to increase people's mobility
- prevent disability in the first place

We do *everything humanly possible* to maximize recovery so that people can lead full, productive and independent lives. Our discoveries also assist those who care for people with disabilities.

“...a remarkable
research enterprise”

– *International Scientific
Advisory Committee*

The International Scientific
Advisory Committee conducts
annual assessments of Toronto
Rehab’s research program.

Our team

Toronto Rehab’s research team has the skills and the will to make a difference. In all, more than 50 scientists and over 100 graduate and postdoctoral students are involved, many of them cross-appointed to the University of Toronto and other leading academic institutions. The team is based at the largest academic adult rehabilitation hospital in Canada.

Our investigators bring to their studies a rich and varied mix of academic experience and technical expertise. Many are also clinicians. They enjoy a collaborative and multidisciplinary environment where engineers trade ideas with industrial designers, and social scientists work alongside clinicians and patients.

Toronto Rehab is a place where research is truly integrated into care. Our team benefits from the wide breadth of clinical programs provided at the hospital’s six sites. Their studies are further enriched by our affiliation with, and proximity to, the University of Toronto.

Passionate about what they do, our scientists are publishing in peer-reviewed journals, obtaining external grants from funding agencies, inventing new assistive technologies and improving the lives of people with disabilities and age-related conditions.

Collaborative environment

Toronto Rehab is part of a community and our collaboration with other institutions is important to us. We work with a broad network of Canadian and international academic, clinical and private sector partners—from Toronto’s Discovery District to the U.S., Asia and Europe.

We also have strong ties with other partnering organizations and universities. Consumers play an active role in our research, and we welcome the participation of private industry through our industry-friendly Club program. Toronto Rehab is also home to the Ontario Rehabilitation Technology Consortium, a network of assistive technology researchers.

Our flourishing research program has developed close relations with government, enabling us to share our findings and expertise with decision makers in an efficient and interactive way.

Together, we are working to solve problems with creative solutions.

Scientists at Toronto Rehab lead seven cross-functional research teams that focus on:

- **Activity** – the physical abilities people need to participate in society
- **Cognition** – the causes and treatments of brain injuries resulting from accidents and stroke
- **Communication** – the development of new treatments to improve and restore speech or understanding

- **Mobility** – the training, exercise and aids people need to maintain or improve mobility
- **Optimization of the Rehab System** – the improvement in efficiency and effectiveness of rehabilitation service delivery in the province
- **Sleep & Cardiopulmonary Function** – the study and treatment of people with cardiovascular disease and sleep disorders
- **Technology** – the development of innovative assistive devices and environmental designs to promote independent living

Speeding recovery with new interventions

Our pioneering work is already producing remarkable discoveries that are speeding recovery. From new treatments to better assistive devices, our research has practical implications for people. Take, for example, the advances we’re making with an extraordinary technique that can stimulate paralyzed muscles to work again. A small device is being used in a novel way to help a growing number of people immobilized by stroke and spinal cord injury to “relearn” basic tasks, such as grasping objects.

We’re working to improve people’s quality of life with innovations such as a “smart” wheelchair that stops on its own when it comes to an obstacle. This will help wheelchair users with cognitive impairments caused by dementia, brain injury or stroke to move around safely.

Toronto Rehab research has also led to:

- the discovery of a significant link between sleep apnea and stroke
- a fitness program for diabetics that helps reduce their risk of cardiovascular disease
- new insights into how people move and stay upright that will improve diagnosis and treatment of balance problems
- a novel language therapy for people with a form of early-onset dementia
- a technique to help people with swallowing problems relearn how to swallow

Translating knowledge into action

With so much exciting rehabilitation research going on, it's critical that results are put into practice. At Toronto Rehab, we translate key scientific evidence into action in a number of ways.

We're finding new ways to get the latest findings to the people who need the information most in hospitals and other clinical settings. Patients and practitioners deserve the latest that science has to offer.

It's also vital to put valuable findings into the hands of decision makers. In 2006, we launched a special unit that rapidly communicates our research results to the Ontario Ministry of Health and Long-Term Care to inform decisions about health services.

We take the initiative in other ways too, including hosting influential international conferences to promote the sharing of knowledge, foster collaborations and stimulate new ideas.

Healthy directions

So much of what we do has immediate implications for the future of the health system. Our advances are helping to ensure that health care is delivered in the best way possible. Some of our recent contributions:

Changing service delivery

Toronto Rehab is proud of its role in developing a new model of care to increase access to total joint replacement, shorten wait times, provide standardized care and reduce length of hospital stays for these procedures in the Greater Toronto Area.

Supporting “aging in place”

Working with colleagues at the University of Toronto, our scientists are using artificial intelligence to develop “prompting” systems that will allow people to stay safely and longer in their homes.

Assisting caregivers

Nurses experience a high rate of back injuries. Toronto Rehab's Technology Team is designing better patient lifts to help them safely lift, position and move immobile patients.

Health care outside the hospital

Some kinds of health care can be efficiently shifted to the home. Toronto Rehab scientists are developing remote monitoring and support systems to help people optimize their physical activity after they leave hospital.

Preventing disability

We are working to predict and prevent disability in many ways, including strategies to prevent devastating hip fractures and efforts to understand and ultimately prevent frailty.

Out of the lab and into the market

Whether it's a new infection-control device or safer handrails for stairs, we are determined to get innovative solutions into the market so people can use them as soon as possible. That's why we pioneered a new and different model of research-industry collaboration called "The Club". We involve companies as equal partners in developing products, right from the concept stage onwards. It's an open-door environment that promotes a vigorous exchange of ideas and expertise.

Our list of industry partners is growing as more companies take advantage of our new facilities for design and prototyping. With our state-of-the-art equipment, prototypes for much-needed assistive technologies can be created quickly and accurately, and tested with patients. "The Club" also provides companies with access to exceptional research experience, while our researchers benefit from the market knowledge brought by industry.

This interaction with the private sector is already producing new ideas and products that are helping people to lead better lives. We are creating jobs and wealth in our community by providing Canada's emerging assistive devices sector with an important boost and competitive edge.

iDAPT – the future of rehabilitation research

Until now, our ability to see how adults with disabilities fare day to day has been limited by a lack of research facilities where ideas can be cultivated, tested and applied in the real world. Toronto Rehab is home to what is expected to be the most advanced rehabilitation research environment of its kind in the world.

iDAPT (*Intelligent Design for Adaptation, Participation and Technology*) is a multi-million dollar project that is bound to revolutionize rehabilitation science. It will consist of 14 labs and several other research spaces focused on sharing new knowledge, creating more effective treatments and developing new assistive technologies.

Current assistive devices often do not function well in challenging environments or are not as user-friendly as consumers would like. iDAPT facilities will enable researchers to safely study the complex interactions between people and their environment, and deliver innovative and well-designed products that consumers will actually use and benefit from.

Invaluable contributions from the Canada Foundation for Innovation, the Ontario Innovation Trust, Ontario Ministry of Research and Innovation, University of Toronto, the Toronto Rehab Foundation and our corporate partners have laid the foundation for the development of iDAPT and the future of rehabilitation research.

Phase-one construction of iDAPT is complete, with the following new or expanded labs among those now open:

Rapid Prototyping Lab

The cutting-edge Rapid Prototyping Lab, which features the largest high-precision stereolithography machine in Canada, is where new technology and assistive devices are explored, designed, prototyped and studied—providing the emerging assistive devices sector with access to advanced product development facilities under one roof.

Rehabilitation Engineering Lab

Our scientists are better equipped than ever to study the complexities of the neuromuscular system in this new lab at Toronto Rehab's Lyndhurst Centre, home to Canada's largest spinal cord rehabilitation program. The lab allows researchers to study patients with spinal cord injuries during their rehabilitation and after discharge to help find new techniques, therapies and assistive devices that improve function and independence.

Cardiopulmonary Function Lab

You never know what season it will be in this lab, which is specially designed to study exercise treatments for cardiac failure. The temperature and humidity in the lab can be changed to replicate a range of environmental conditions so that investigators can develop exercise programs, interventions that are safe and practical for our environment, and products that can withstand the temperatures of the Canadian winter.

Communicative Function Lab

Communication disorders are common among people with dementia and those who have experienced a stroke, brain injury or other neurological condition. With state-of-the-art equipment, computer software programs and a sound-insulated room, the Communicative Function Lab is used to understand communication impairments and develop new and better devices for people with speech and hearing difficulties.

Swallowing Rehabilitation Research Lab

In this lab, scientists are investigating a major health concern for people affected by conditions such as stroke, brain injury and Parkinson's disease. The lab is believed to be the most sophisticated of its kind in North America for studying swallowing disorders. It is equipped with the latest tools to examine oral movements during swallowing.

iDAPT labs on the horizon

Phase-two construction of iDAPT labs will be completed by 2011, unveiling some extraordinary new research environments:

Challenging Environment Assessment Laboratory (CEAL)

CEAL will feature the world's first hydraulic motion simulator that can mimic everyday environmental challenges faced by older people and those with disabling injury or illness. Using a multitude of customizable testing environments, we will be able to recreate conditions such as ice and snow, different terrain and slopes, and vehicular motion, to safely and accurately measure the difficulties encountered in the real world. The lab will also be used to evaluate the impact of new treatments, devices or technologies developed at Toronto Rehab.

Home Environment Laboratory

This state-of-the-art lab will facilitate the testing of artificial intelligence and other assistive technologies in a home-like setting and will feature a typical single-storey dwelling. This will allow researchers to develop new tools to help people overcome the challenges they face in their own homes.

iDAPT facilities will also include labs to study mobility, biomechanics, sleep and stroke. In all, iDAPT will comprise more than 60,000 square feet of research space located at Toronto Rehab's University and Lyndhurst Centres and the Rehabilitation Sciences building of the University of Toronto.

Training a new generation of researchers

Toronto Rehab is preparing students for careers in the rapidly expanding field of rehabilitation research. We are nurturing the stars of tomorrow, with more than 100 graduate students and post-doctoral fellows in our program. They are cherished members of our research family.

Our dynamic environment provides trainees with an opportunity to work with clinicians and patients in a collaborative and multidisciplinary setting. During their time with us, they gain a broad perspective and access to our cutting-edge labs—just minutes away from the University of Toronto.

Toronto Rehab actively involves people with disabilities in our research through an innovative scholarship program, supported by TD Bank Financial Group. This program assists top students with disabilities as they pursue graduate studies in rehabilitation research.

Many of our former trainees are already launched in promising careers in rehabilitation research in Canada, the U.S., and abroad helping to expand the horizons of rehabilitation research.

Going forward

Toronto Rehab has embarked on an ambitious redevelopment of its patient care, research and education facilities. Now underway, Toronto Rehab's multi-million capital redevelopment will focus on renovating facilities at Lyndhurst Centre and Queen Elizabeth Centre. We are also well on our way toward a major redevelopment of University Centre, including the construction of a new 13-storey patient care wing and new rehabilitation research facilities. We are grateful for the ongoing support of the provincial and federal governments, and to the generosity of donors, who are making this vision a reality.

Toronto Rehab research is breaking new ground every day. We thank the Ontario Ministry of Health and Long-Term Care, and the growing number of agencies and foundations whose grants make our work possible. Heartfelt thanks also go to our friends who give individual donations to support our research through the Toronto Rehab Foundation.

Each year, the Foundation raises money to help fund items, such as endowed research chairs, investigator salaries and equipment not often funded through government sources. These donations are vital in helping us to retain and attract the brightest research minds—talented people who can further our goal to improve the lives of people recovering from, and living with, disabling injury and illness and age-related conditions.

Toronto Rehab

Toronto Rehab is a publicly funded hospital devoted to advancing rehabilitation science and enhancing quality of life. We provide seven clinical programs for adults who experience debilitating illness or injury:

Cardiac Rehabilitation

Complex Continuing Care

Geriatric Rehabilitation

Long-Term Care

Musculoskeletal Rehabilitation

Neuro Rehabilitation

Spinal Cord Rehabilitation

>Make a donation to Toronto Rehab today at:
www.torontorehab.com/foundation

>Learn more about research at Toronto Rehab:
www.torontorehab.com/research

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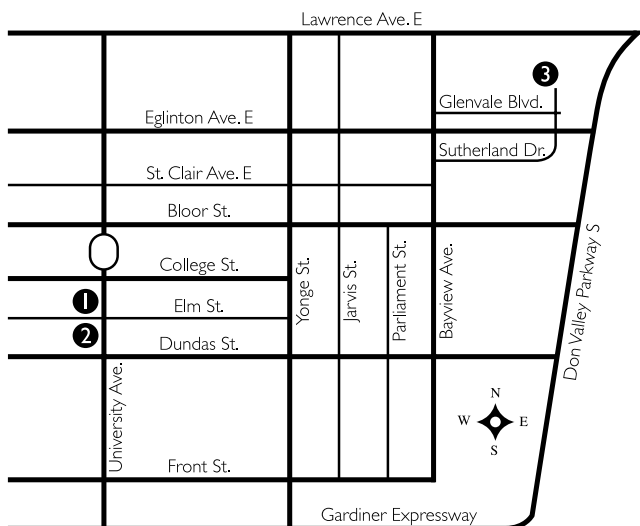
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If you are interested in participating in a research study, please contact:

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A larger type version of this brochure is available upon request. Please call 416-597-3422 ext. 3425 or email: communications@torontorehab.on.ca

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