

# Parkinson's Disease and Movement Disorders Center

# Parkinson's Update

Northwestern University Feinberg School of Medicine

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## Women and Parkinson's Disease

by Cindy Zadikoff

**A**fter Alzheimer's, Parkinson's disease is the second most common neurodegenerative condition, and aging remains one of the greatest risk factors for PD, regardless of gender. However, studies show that being male is also a risk factor, with men being 1.5 times more likely than women to develop PD.

Why is that so? Where else may differences lie between men and women with PD?

### Disease factors

Is the reason for higher rates of Parkinson's disease in men genetic, environmental, or both? We know that head trauma and pesticide exposure increase the risk for PD. Thus, PD may be more prevalent in men not because of any genetic underpinnings but simply because men are more likely to engage in activities that place them at risk for brain injury (such as certain sports) or to have worked in settings where pesticides are commonly used (such as farms).

But beyond differences in lifestyle and occupation, inherent differences between men and women—hormone levels, for instance—may be factors in PD. Since women are less likely to develop Parkinson's than men, we are trying to better understand estrogen's role in the disease. We know that sex hormones, specifically estrogen, influence the dopamine pathway in the substantia nigra, one of the main areas of the brain affected in PD. Estrogen affects the making and releasing of dopamine. We also know that estrogen can protect neurons from different kinds of injury. Some presumed theories for how it does so is

by reducing oxidative stress (cellular damage resulting from metabolic imbalances) and inflammation—both possible causes of PD. Moreover, some studies suggest that risk factors for PD include early menopause and experiencing fewer pregnancies; what these two conditions have in common is less estrogen exposure—again, suggesting that estrogen may be protective.

The problem is that the evidence in animal models and in petri dishes is more compelling than the clinical evidence. If estrogen were protective in any way, exposing people with PD to more estrogen—by way of hormone replacement therapy (HRT), say—should somehow alter the course of the disease. Unfortunately that has not been the case. Many of the clinical studies suffer from small sample sizes and short duration, but in general the results have been disappointing. Exposure to estrogen has also become more complicated because of concern over longer-term use of estrogen. In a recent review article on the topic, the authors concluded that “given the complex and . . . contradictory relationship between PD risk and estrogen exposure, hormone replacement therapy currently has no role in the treatment of women with PD.”

### Disease severity and response to therapy

Even if HRT has so far proven ineffective as treatment, there remains the question as to whether women with PD “look” different than men with PD and whether they respond to therapies any differently. Typically the age of onset in females is two years later than in males. This may be because women often present with milder symptoms, and so it may just take them

*continued on page 6*

# Strategies for Preventing Falls at Home

by Kari Brouwer and Lauren Raphael

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**P**romoting safety and preventing falls while maintaining quality of life and independence are important to people with Parkinson's. Here's what you can do at home, room by room.

## Bathroom

**Nonskid mat:** Many injuries happen in the shower or bathtub, where hard, wet surfaces can cause slips and falls. A nonskid mat prevents the floor from becoming slippery.

**Shower chair:** Warmth from the shower can cause dizziness, and standing for longer periods can cause fatigue. A shower chair allows for rest breaks if needed.

**Grab bars:** Grab bars around the toilet and shower provide arm support during transfers, helping prevent falls.

**Elevated toilet seat:** Getting up from low surfaces can be difficult and result in falls or inability to stand. The toilet is one of the lowest surfaces used regularly; an elevated seat increases ease during the transfer.

## Bedroom

**Night-light:** Vision is one of the most important components of maintaining balance. A strategically placed night-light helps you safely maneuver in the dark.

**Portable commode:** When nature calls, it often feels like an emergency. A portable commode in your bedroom removes the stress of walking far distances during the night or when fatigued.

**Position changes:** Because blood tends to pool in our extremities when we're lying down, it's common to feel dizzy or light-headed when getting up. To alleviate this, take your time when changing positions—for example, sit on the side of the bed after lying down, or stand near the bed after getting up, taking 10 to 30 seconds for your body to adjust. If you continue feeling light-headed, consider returning to the previous position and doing gentle exercises, such as ankle pumps and glute squeezes, to help circulate blood and reduce symptoms before changing position again.

**Bed rail:** Depending on your arm strength and stiffness, a bed rail can be an easy addition to help you get in and out of

bed as well as keep you safe while sleeping. Easily installed options slide between your mattress and box spring.

**Logroll:** Using the "logroll" technique puts you in a more efficient position to get out of bed. Think of your body as a seesaw; while you're lying on your side, your legs go down off the bed as a counterweight while your arms and trunk come up.

## Kitchen

**Liftware utensils:** This brand's stabilizing and leveling handles and attachments are designed to help people with hand tremor and limited hand and arm mobility.

**Kangaroo cup:** Using handles on each side of the cup, you can hold it securely, making drinking easier.

**Tray or bag for walker:** While using a walker, it is unsafe (and sometimes impossible) to carry things. Having a bag or tray makes life a little easier.

## Living room

**Higher-surface furniture with armrests:** Make getting out of a chair easier by selecting one with armrests and a higher seat. Your legs don't have to work as hard, and the armrests offer a stable way to push yourself up. If your furniture doesn't feel high enough, consider furniture risers for chairs and couches.

**Rugs, blankets, and cords and wires:** Declutter the floor and remove tripping hazards such as cords and wires. Remove throw rugs, which can catch feet and walkers and are easy to trip on. Make sure blankets are folded and out of the way; after using, make sure to remove them completely before getting up so they won't catch on your feet.

## General tips

**Make sure your cellphone is within reach:** Consider carrying it around your neck or in a belt-loop holster so it's close at hand.



**Consider a life alert system:** This is a convenient way to contact help when you're not near a phone. Push a button to let someone know you need help.

**Physical and occupational therapy:** Ask your physician for a referral to a local clinic where a therapist can help you improve such skills as balance, endurance, flexibility, and strength. These therapists help you maintain or improve your functional independence and ability to enjoy life with minimal limitations.

**Exercise:** Regular exercise and stretching can do wonders to maintain or improve your abilities. Having trouble getting started? Ask your physical or occupational therapist for help finding exercises that are right for you, or consider joining a Parkinson's-specific exercise class. Find classes near you at [parkinsonsnetwork.org/classes](https://parkinsonsnetwork.org/classes).

**Support groups:** Northwestern Memorial Hospital offers a group led by physical and occupational therapists who will

guide you through strength, balance, and endurance exercises. Held the first Tuesday of the month, the group also offers a way to socialize with others experiencing similar limitations.

Kari Brouwer, MS, OTR/L, has been an occupational therapist at Northwestern Memorial Hospital and part of Northwestern's Parkinson's community for over three years. She is experienced working with patients with neurological diagnoses, leads the monthly Parkinson's support group, and has presented at Northwestern's annual Parkinson's symposium.

Lauren Raphael, PT, DPT, is a physical therapist at Northwestern Memorial Hospital with extensive experience with patients with neurological disorders. An active leader in the Parkinson's support group and a presenter at the annual symposium, she is Otago certified and enjoys working with patients on fall prevention and recovery.

# Hope. Nourish It.

by Susan Krueger

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**Y**ou have Parkinson's disease. It's a staggering diagnosis. Mind swirling, you make your way out of the doctor's office. Just like that, the future you'd been carefully planning for so long is up for grabs. Will I still be able to work? How long? How soon before I need a cane, a walker, a wheelchair? So many questions.

This is scary stuff. You feel nothing but uncertainty. You have a degenerative, progressive disease, and oh by the way, it's incurable—and someone wants to talk about hope. Not funny!

This is your life. It's the only one you've got. You've been dealt a tough hand. Will you be hopeless or hopeful?

PD is not life threatening, many good medicines are available, and researchers are feverishly trying to find a cure. There is a ray of hope.

Organizations like the Michael J. Fox Foundation, the Davis Phinney Foundation, and the Parkinson's Foundation are robust sources of educational information. Take the time to sign up at all three websites. They send emails you'll want to read. Stay up to date with the latest news on drugs, exercise, and alternative treatments. Take time to read patient testimonials to learn what others are doing not only to cope but to thrive. Shamelessly adopt any good idea you hear. Hope!

What do I hope for? A cure. That the disease moves slowly. That I can gracefully cope with the changes. That I continue to have access to good doctors and good medicines to help me. That I have people who love me. More hope!

What am I doing to help myself have what I hope for? How can I step up, beyond just cheering for the scientists?

Hope is possible if you take responsibility for what is within your control. We will all still experience moments of hopelessness, but if we practice being positive, there will be fewer of those moments.

It seems like we read something every week about the powerful effects of exercise on PD. So I will skip the pity party and go work out. When I feel strong, my attitude improves and I don't see my symptoms getting worse. I am hopeful!

Clinical trials help science to help us. You don't have to be a human guinea pig if you're not inclined; there are surveys you can fill out online and new ways to collect new data. You can



wear a watch-like device that transmits your daily activities. Something may spark the breakthrough idea. See, there is hope again!

Lean into your faith, whatever that looks like for you. If you believe in it, pray as often and fervently as you can.

Start to lead a more balanced life. Into each day, fit in some work, some exercise, some play, some human interaction, and some rest. Try to eat more healthily. In planning all this, you are taking back some control. You'll begin to feel more confident. You'll start to be a positive person. Positive people are hopeful!

And finally, when you are ready, find a support group where hope is alive and well. We may not see a cure in our lifetime, but realize that you have a lifetime. This is your life. Know that even with this awful disease, it can be a good life, full of love, fun, and hope!

Susan Krueger was diagnosed with PD in 2003 after experiencing a tremor in her right hand for about six months. She continued working in corporate positions and consulting for 10 years before retiring. As a volunteer with the Northwestern Medicine–Lake Forest Hospital PD Support Group, Krueger works hand in hand with the program coordinator, selecting topics and facilitating discussion on the PD side of the monthly meeting's care and share portion. She also helps with communication and maintaining contacts. Believing that exercise is the key to living your best life with PD, Krueger belongs to Northwestern Medicine's Lindenhurst Health and Fitness Center, where she works out and attends classes four to five times per week. She is happily married to Tom, and they live near their son, Matt, daughter-in-law, Katy, and grandchildren Chloe, 5, and Charlotte, 2, whom Krueger takes care of two days a week. Krueger's other interests include flower gardening, antiques, flea markets, time with friends, and trips anywhere "up north" to Wisconsin. She credits her faith, her supportive husband and family, solid friendships, a positive attitude, and good medical care for keeping her able to enjoy life despite PD.

## Susan's Words of Wisdom

- **If others offer you help, do not turn it down. Believe that they sincerely want to ease your burden. Instead of saying no, say thank you.**
- **Relax your standards. This is my motto. Perfection is overrated.**
- **Manage your meds according to your doctor's direction. Take them on time. PD meds require precision dosing—not enough, and your symptoms aren't in control; a tiny bit too much or too soon, and they may cause what they are meant to alleviate.**
- **Provide lots of feedback to your doctor. The organizations referenced on page 4 offer advice on how to prepare for a visit to your movement disorder specialist. Use one of their worksheets or make your own.**
- **Hang with positive people! They are hopeful, and it will rub off on you.**
- **Take responsibility for all things that remain in your control. This will help you hold on to hope.**
- **Concentrate on what is still possible, not on things lost to you.**
- **Always express gratitude when things go well. Acknowledge all victories and be thankful.**

## Women and Parkinson's Disease

*continued from page 1*

longer to see a physician. They also present with more tremor than men. While they are more likely to have nervousness, sadness, depression, anxiety, and constipation, they are less likely to have sexual dysfunction or a decreased sense of smell. They are also less likely to have cognitive impairment than their male counterparts. Despite this, they are more likely to use long-term care facilities and to report more disability and reduced quality of life than men.

Levodopa, a mainstay of PD therapy, shows higher plasma concentrations and bioavailability in women, which means more is “available” to the brain. This can lead to two things: women may require lower doses, and they tend to experience more dyskinesias (abnormal involuntary movements) due to more levodopa exposure. Some patients can develop impulse control disorders (ICDs) as a result of dopaminergic therapy, typically with a class of drugs known as dopamine agonists. A wide range of behaviors can be seen, including hypersexuality and

compulsive gambling, eating, and shopping. While the overall risk of ICDs is similar in men and women, women are more likely to report compulsive buying and binge eating and less likely to report hypersexuality.

Lastly, do sex differences have any bearing on deep brain stimulation? DBS is a surgical intervention for patients with advanced Parkinson's disease who respond well to levodopa but experience frequent fluctuations—wearing off of the effect of medications and dyskinesias not seen when the medication is working best. In one article that reviewed surgical interventions between 1985 and 1999, men were more than twice as likely to undergo DBS than women. In a different, smaller study, the delay between disease onset and undergoing DBS was longer in women than in men (15 versus 10 years). The study did not clarify if this is because women tend to have a milder disease course with delayed symptom onset, because they have different access to care, or because physicians show





bias in selecting patients for surgery. Interestingly, even though women were less likely to undergo DBS, they tended to have better outcomes.

### Access to care

Women with Parkinson's disease are less likely to see a neurologist, let alone a movement disorders specialist, and are more likely to be misdiagnosed by their primary care doctor. In one study, it took women longer to see any physician from the time of onset of symptoms, longer still to get a diagnosis of PD, and longer still to see a movement disorders specialist. In a study using data from its patient outcomes project, the National Parkinson Foundation reported that women were more likely to perceive caregivers as unavailable to them if they needed one; they were less likely to have informal caregiving resources and more likely to use paid resources. So despite having less cognitive impairment and perhaps a milder disease course, women were more likely to rely on paid caregivers and to be placed in skilled nursing facilities.

### Imperatives for further study

Clearly, Parkinson's disease is different in women than in men. Environmental conditions play a part in this, but the role of sex differences and hormones is probably intrinsic. The latter is difficult to sort out, and for now there does not seem to be a compelling role for hormone replacement therapy (HRT) in PD.

As the medical community at large continues to redefine the risks and benefits of estrogen and HRT, perhaps the use of HRT in Parkinson's disease will be revisited. Larger randomized controlled trials with greater patient numbers and more robust outcomes would be needed to determine whether HRT should play a role in PD management. In the meantime, the medical community must try to understand why men and women differ in their responses to therapies and in access to care. Any gender bias in how patients are selected for advanced therapies must be identified and addressed, as must disparities between men's and women's access to care and support services. There appear to be gender differences in the social impact of PD, with the burden felt in many ways by women. Only multicomponent interventions, with special attention to gender-specific roles, can help reduce this burden.

Cindy Zadikoff, MD, is associate professor of neurology at the Feinberg School of Medicine and one of the movement disorders specialists on the Parkinson's Disease and Movement Disorders Center's multidisciplinary team. Board-certified in neurology,

she codirects the surgical program for patients at Northwestern Medicine.



After completing her MD at the Ohio State University College of Medicine and her internship and residency at Harvard's Beth Israel Deaconess Medical Center, Zadikoff did her fellowship training at the University of To-

ronto with Anthony Lang, a world-renowned expert in movement disorders. She received a research fellowship from the American Academy of Neurology and completed a master's degree in clinical epidemiology, developing expertise in surgical management of movement disorders. She has received several teaching and research awards and is the principal investigator on several clinical trials. "I believe that my role is helping patients live their best life possible," says Zadikoff. "For me that means individualizing the care I provide as well as having access to the most up-to-date and cutting-edge treatment options for our patients."

# Powers of Attorney: Don't Wait Until It's Too Late

by Bill Wilson

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Among the most important documents for estate planning are the two types of powers of attorney (POAs)—one for property or finances and one for healthcare. Both documents have a “principal” who signs the POA and who designates an “agent” to carry out the principal's wishes if the principal is unable to do so.

The property or financial POA permits the agent to sell or buy real estate, sign tax returns, and handle bank accounts—basically, anything that the principal had been able to perform. Language may be inserted to stipulate that the agent can make gifts, transfer real estate into the principal's living trust, and coordinate Medicaid planning for long-term care if needed. Many banks mandate using their own POA form and require that the POA has been signed no more than five years before it is submitted to the financial institution.

The healthcare POA covers situations when principals are unable or prefer not to make healthcare decisions for themselves. It authorizes the agent to make these decisions, which may involve treatment or imminent death. In preparation for cases where death may be imminent, the principal completing the statutory form must choose from two options. One states that the agent is to take into consideration the cost, relief from suffering, and possibility of the principal regaining a satisfactory quality of life in determining whether life-sustaining measures should be taken. The other states that the agent should insist on all actions to keep the principal alive, regardless of cost, suffering, or quality of life.

It is important to remember that in order to execute a valid POA, the principal must have the mental capacity to do so. In this context, mental capacity means the mental ability to understand the document being signed. Unfortunately, many clients wait until the principal no longer has the mental capacity to sign the POA and thus must proceed with a costly and time-consuming probate-court procedure to be granted guardianship.



Bill Wilson has practiced law for over 30 years, concentrating in elder law, estate planning, and estate planning for families that have children with disabilities. He has offices in La Grange, Northbrook, Warrenville, and Tinley Park, Illinois. A graduate of Northwestern's Pritzker School of Law, Wilson is a charter member of the Academy of Special Needs Planners and a member of the National Academy of Elder Law Attorneys. He has been quoted in *U.S. News & World Report* and writes articles and gives presentations on estate planning, elder law, and special-needs planning.

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## Genetic Counseling Offered at Northwestern

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Genetics is one of the most exciting frontiers in medicine, and Northwestern Medicine can help you understand its role in your health and the health of your family. Our board-certified geneticists and licensed genetic counselors offer comprehensive services, including evaluation, counseling, and health management.

Northwestern Medicine's neurology department now has a weekly neurogenetic counseling clinic staffed by certified genetic counselor Lisa Kinsley, MS, CGC. People with or with a family history of Parkinson's disease, other movement disorder, or any neurological condition can schedule a genetic counseling appointment for a family history discussion and interpretation; education about inheritance, testing, family planning options, and research; and counseling to promote informed choices about genetic testing.

Kinsley has provided neuromuscular genetic counseling services at Northwestern since 2010 and has recently expanded her services to the entire neurology department. If you would like to learn more, please email her at [l-kinsley@northwestern.edu](mailto:l-kinsley@northwestern.edu).

# Support Groups and Programs

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## Chicago

### **Monthly Parkinson's Disease Support Group**

251 East Huron Street,  
Feinberg Pavilion, Room A  
First Tuesday of the month

**Dance/music therapy and movement:** 10:30 a.m.  
**Group physical therapy:** 11:15 a.m.  
**Provided box lunch:** noon  
**Guest speaker:** 1 p.m.

### **Care Partner Support Group**

251 East Huron Street,  
Feinberg Pavilion, Room A  
First Tuesday of the month, noon  
Separate table for facilitated discussion with box lunch provided.

### **Art and Yoga**

250 East Superior Street,  
Prentice Pavilion, Room Q  
Second, third, fourth, and fifth Tuesdays of the month

**Art therapy:** 1–2 p.m.

**Yoga:** 2–3 p.m.

### **Parkinson's Disease 101**

250 East Superior Street,  
Prentice Pavilion, Room P  
First Wednesday of the month,  
3–4:30 p.m.  
Registration is required.  
Contact Carolyn Taylor, APN, at  
312-695-1822.

### **"Empowering You through Parkinson's: Cognitive Behavioral Skills for Reducing Anxiety and Depression and Improving Sleep in PD"**

Contact Danielle Marino at 312-695-2168 for more information.

### **Parkinson's Wellness Classes and Support Groups at the JCCs**

Bernard Horwich JCC, 3003 West Touhy Avenue  
Hyde Park JCC, 5200 South Hyde Park Boulevard  
For information about PD exercise classes and support groups at the JCCs, call 312-503-4397.

## Suburbs

### **Support Group**

NM Lake Forest Fitness Center  
1200 North Westmoreland Road, Lake Forest  
Second Wednesday of the month, 10 a.m.–noon

### **Fitness Classes**

NM Lake Forest Fitness Center  
1200 North Westmoreland Road, Lake Forest

Lindenhurst Health and Fitness Center  
3098 Falling Waters Boulevard, Lindenhurst

Visit [lakeforesthfc.com/parkinsons-programming](http://lakeforesthfc.com/parkinsons-programming) or call 847-535-7000 for details.

**Pedal for Parkinson's, levels 1 and 2**

**TRX for Parkinson's, levels 1 and 2**

**Pilates for Parkinson's, levels 2 and 3**

**Strength and Balance, levels 2 and 3**

**Dance for Parkinson's, levels 3 and 4**

**Functional Fitness, levels 3 and 4**

**Yoga for Parkinson's, levels 3 and 4**

**Rock Steady Boxing, all levels**

## Partnering with PF

The Northwestern Medicine Parkinson's Disease and Movement Disorders Center, recognized by the Parkinson Foundation as a Center of Excellence, collaborates with PF on events such as conferences, professional training, and the annual Moving Day Chicago fundraising event.

Founded in 1957 and located in Miami, PF is a premier international organization that funds research and provides support services, educational outreach, and advocacy for people with PD and their loved ones. Its Centers of

Excellence must provide the highest quality in patient care, implement best practices, take the lead in developing targeted research to extend knowledge of PD, and create innovative models of education, services, and outreach.

Northwestern and PF work together to deliver high-quality patient care, form a united front against Parkinson's, and make a difference.

For more information, visit [parkinson.org](http://parkinson.org)

# Research Participation Opportunities at Northwestern Medicine

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The Parkinson's Disease and Movement Disorders Center is grateful for the contributions of our research participants. Consider making a personal contribution to research by participating in a clinical trial. All study-related care is provided at no charge, including

- physician visits and physical examinations
- laboratory services
- study medication

For more information about participating in clinical trials, please contact the Movement Disorders Research Office at 312-503-0755 or [pdclinicaltrials@northwestern.edu](mailto:pdclinicaltrials@northwestern.edu).

## **EARLY PARKINSON'S DISEASE**

### **Efficacy of GZ/SAR402671**

This study will evaluate the possible risks and effectiveness of the study drug (GZ/SAR402671) in PD patients carrying the GBA gene mutation. In addition, the study will enable a better understanding of the role of GBA as a risk factor in the development and progression of PD. The effects of the study drug will be compared with a placebo, an inactive substance made to look like an active medicine. Participants will receive either the study drug or the placebo.

### **Efficacy of Intravenous R07046015 (PRX002)**

The objective is to determine whether the study drug (R07046015) has an effect on Parkinson's disease. This type of drug is called a "monoclonal antibody." Antibodies are proteins produced as part of the body's immune response; monoclonal antibodies have the possibility of slowing the course of PD by recognizing and binding to a specific type of protein. The effects of the study drug will be compared with a placebo, an inactive substance made to look like an active medicine.

## **ADVANCED PARKINSON'S DISEASE**

### **Apomorphine**

This study tests a new formulation of the marketed drug APOKYN® (apomorphine hydrochloride injection) for treatment of the loss of control of body movements in adults with advanced PD. In this study, the drug will be administered by a continuous infusion through a small needle and pump under the skin of the stomach.

## **ALL PARKINSON'S PATIENTS**

### **APL-130277**

The objective is to test the effectiveness of a soluble thin film for sublingual administration of apomorphine as an alternative to the injectable form of apomorphine hydrochloride, which is marketed as APOKYN®. The product APL-13027 is designed to deliver apomorphine systemically through absorption from the oral cavity mucosa, thus bypassing the extensive first pass metabolism associated with gastrointestinal absorption.

### **Droxidopa**

This study will test the long-term effects of the drug droxidopa for the treatment of neurogenic orthostatic hypotension (dizziness, light-headedness, or the feeling that one is about to black out) in patients with a clinical diagnosis of symptomatic NOH due to Parkinson's disease, multiple system atrophy, pure autonomic failure, nondiabetic autonomic neuropathy, or dopamine-beta-hydroxylase deficiency. The effectiveness of droxidopa was established in short-term (two week) studies; its effectiveness for more than two weeks has not yet been demonstrated. This long-term study will evaluate the durability of the clinical benefit of droxidopa in NOH patients in a randomized withdrawal (time-to-treatment intervention) design.

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### **Motivational Interviewing and Physical Activity in Parkinson's Disease**

The objective is to evaluate ways to motivate people with Parkinson's disease to increase their physical activity through exercise. Participants will be placed in one of four groups:

- motivational interviewing
- web-based application to keep track of activity
- combination of motivational interviewing and web-based application
- educational program on various issues related to Parkinson's disease.

### **Attention Bias: Testing a Potential Marker for the Diagnosis of Atypical Movement Disorders**

The objective of this study is to determine if problems with attention lead to abnormal movements. The study involves a few thinking tests to determine if certain patterns of thinking or focusing can be associated with abnormal movements.

### **Northwestern Movement Disorders Center Biorepository**

The objective is to create a repository of tissue and DNA samples, clinical information, and family medical histories from patients diagnosed with movement disorders, familial controls, and healthy control subjects for use in research to identify factors that either cause these neurologic conditions or increase the risk of developing them. Samples collected include a blood or saliva sample and a skin biopsy. Participants may choose to donate one or both samples.

### **Biomarkers Discovery in Parkinsonism**

This study investigates how the brain and motor behavior change over time in people with movement disorders and in healthy individuals. Information will be collected through structural and functional MRIs, blood samples, and behavioral motor and cognitive assessments. Participants include people with Parkinson's disease, progressive supranuclear palsy, or multiple system atrophy as well as healthy controls.

### **Nilotinib**

The objective is to assess the safety and tolerability of the daily oral administration of the study drug (nilotinib) in moderate/advanced and early/de novo PD patients. Analysis will compare the observed changes in Parkinson's symptoms between baseline and six months.

### **BIIB054**

This study evaluates the safety and potential efficacy of the drug BIIB054 in slowing or reducing Parkinson's disease progression. This investigational drug targets alpha-synuclein, a molecule associated with Parkinson's disease.

### **PROGRESSIVE SUPRANUCLEAR PALSY BMS-986168**

The purpose of this study is to test the long-term safety and tolerability of an investigational, intravenously administered drug called BMS-986168. This is a randomized, double-blind, placebo-controlled, parallel-group study.

### **WILSON'S DISEASE WTX101**

The objective is to compare WTX101, an investigational drug being developed for the treatment of Wilson's disease, to standard-of-care medications.

**Parkinson's Disease and Movement Disorders Center**

710 North Lake Shore Drive, 11th floor  
Chicago, Illinois 60611-3006  
[www.parkinsons.northwestern.edu](http://www.parkinsons.northwestern.edu)



Northwestern Medicine's Parkinson's  
Disease and Movement Disorders  
Center is proud to be a Parkinson's  
Foundation Center of Excellence.

**CONTACT**

312-503-4397 or 312-695-7950

**CLINICAL TRIALS**

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[northwestern.edu/hr/equalopp-access/equal-employment-opportunity](http://northwestern.edu/hr/equalopp-access/equal-employment-opportunity).  
For crime and safety data, see [northwestern.edu/up/safety/annual-report](http://northwestern.edu/up/safety/annual-report).  
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**PARKINSON'S DISEASE PATIENT AND  
FAMILY SYMPOSIUM**

Saturday, October 13

8:30 a.m.–12:30 p.m.

Prentice Women's Hospital

250 East Superior Street, Conference Room L  
Chicago

Free parking with validation at 222 East Huron Street

**Continental breakfast provided. Sessions include**

- Walking across America with Parkinson's
- Speech, hearing, and cognition
- New treatment pipeline for Parkinson's disease
- Patient panel: tips and tricks to manage Parkinson's disease
- Long-term planning

**Register at [classes.nmh.org](http://classes.nmh.org) or 877-926-4664**