Welcome to the Department of Neurology at the Medical College of Wisconsin. I am proud to share with you this Impact Report, that highlights some of our important accomplishments and activities in recent years. The department currently has almost 70 faculty who are locally, nationally and internationally recognized as leaders in scientific advancement, educational excellence, and compassionate patient-centered care for neurologic disorders across the lifespan. We provide specialized neurologic care to our community from the neonatal period through the geriatric years; conduct innovative basic science, translational, and clinical research; and continue to educate the next generation of neurologists and neuropsychologists.

Over the last several years, the department has seen significant growth. We have greatly expanded our research portfolio, and our faculty now collaborate within MCW, as well as with other regional and national research centers, in all major specialty areas of Neurology and Neuropsychology. Through our ACGME-accredited residency programs, we continue to train both adult and child neurologists, and have multiple opportunities for students. We have recently added clinical fellowships in Multiple Sclerosis and Headache Medicine, in addition to our well-established fellowships in Neuropsychology, Clinical Neurophysiology, Epilepsy, Vascular Neurology, Neurocritical Care, and NeuroEndovascular Surgery. Our faculty also remain very active in providing community and continuing medical education.

We are privileged to serve not only the citizens of Wisconsin and the upper Midwest; but people from around the country. In collaboration with our partners at Froedtert Health, Children’s Wisconsin, and the Zablocki VA Hospital, we strive to provide the highest-quality of care for the full spectrum of neurological and neuropsychological disorders affecting children and adults.

I hope you enjoy this Neurology Impact Report. For more information about our faculty and department, I invite you to visit www.mcw.edu/departments/neurology.

Brian-Fred Fitzsimmons, MD
Chair

Support research at the Medical College of Wisconsin Department of Neurology and the translation of knowledge into therapies to control, treat, and prevent the conditions that impact our community. Interested in donating to further research? Please contact us at Department of Neurology, 414.955.5235 or neurology@mcw.edu.

Thank you!
The Medical College of Wisconsin ALS program at Froedtert Hospital has been designated a Center of Excellence by the ALS Association since 2006 and remains a top tier center for patient care, education, and research. The ALS program serves most of Wisconsin, adjacent areas in Illinois and the western UP of Michigan and is directed by Drs. Paul E. Barkhaus and Dominic Fee. Dr. Barkhaus started the first full multidisciplinary clinic to serve veterans in the VA system which has also been designated by the ALS Association as a Center of Excellence.

The ALS program has done more than 25 research studies and drug trials. Studies such as the development of MUNIX and children as caregivers in ALS (in collaboration with Dr. Melinda Kavanaugh at the University of Wisconsin-Milwaukee) are unique to this program.

MUNIX

Motor Unit Number Indexing (MUNIX) is a novel neurophysiological tool to estimate motor neuron loss in ALS and related disorders. This was developed at MCW by Drs. Barkhaus and Nandedkar and is becoming an internationally used surrogate marker for ALS progression in treatment trials.

HEADACHE

largest number of headache medicine providers for any institution in Wisconsin

with 4 Board-certified Headache Medicine physicians and 2 Advanced Practice Providers.

Only dedicated multi-disciplinary program for the treatment of Chronic Migraine in the state.

Only accredited UCNS Accredited Fellowship in Headache Medicine in Wisconsin

The Chronic Migraine program led to an 84% reduction in migraine disability days (MIDAS) and a 91% improvement in migraine quality of life score (MSQOL).
EPILEPSY

The Medical College of Wisconsin Adult Epilepsy and Child Epilepsy Centers are both accredited by the NAEC as level 4 epilepsy centers. Level 4 epilepsy centers have the professional expertise and facilities to provide the highest level of medical and surgical evaluation and treatment for patients with complex epilepsy.

3623 adults and 4846 children

Only MEG* system in Wisconsin, Illinois, and Iowa.

Epilepsy Program at MCW has conducted 316 MEG clinical studies over the past six years

*Magnetoencephalography studies evaluate and map brain activity prior to brain surgery with the goal of improving patient outcomes.

8469

Video-EEG studies and routine EEGs performed in 2018 (EMU, continuous EEGs, and inpatient and outpatient routines).

ADULT NEUROLOGY RESIDENCY

Training Neurology residents for more than 50 years

Former residents now teaching in an academic setting

Average number of applicants to our Neurology residency program each year from the US and around the world

50

61

700
MEMORY DISORDERS

We enrolled more than 300 patients in clinical trials over the last 20 years, making us the largest clinical trial recruitment center in the state. Drs. Laura Umflee and Malgorzata Franczak, along with colleagues in neuroradiology, are conducting innovative research using clinically available, quantitative MRI brain biomarkers to study the effects of white matter disease on brain atrophy and cognition in patients with mild cognitive impairment. Their research will inform future interventional studies to reduce morbidity in the aging population.

Only program in the state and one of a few in the nation to offer 3T MR-Neuroreader. Neuroreader provides volumetric data of 43 brain structures. Through 3T MRI we also obtain ASL (Arterial Spin Labeling) and DTI (Diffusion Tensor Imaging). The multimodal imaging approach may impact future research in early diagnosis of neurodegenerative disorders.

NEURO-IMAGING RESEARCH

MCW Neurology faculty are world leaders in research on how the brain processes language and speech. The Language Imaging Laboratory, directed by Dr. Jeffrey Binder, has been continuously funded by the National Institutes of Health for over 25 years and has produced landmark studies on how the brain perceives speech sounds, recognizes written words, and retrieves word meanings. For more information go to www.neuro.mcw.edu.

NORMAL PRESSURE HYDROCEPHALUS (NPH) PROGRAM was established in 2009 by Dr. Franczak and is the only NPH program in the state of Wisconsin. The NPH program serves patients in Wisconsin, northern Illinois and Iowa.

FATES

Dr. Binder and MCW faculty recently led a nationwide study called fMRI in Anterior Temporal Epilepsy Surgery (FATES), which tested these methods at 9 centers across the country and established the first standardized protocol for mapping language regions in the brain prior to surgery.
MS & NEUROIMMUNOLOGY

Our **comprehensive MS center** is designated as a partner in care by the National MS Society and a member of the Consortium of MS centers.

We are a **national destination** for patients with autoimmune and inflammatory diseases of the central nervous system including autoimmune encephalitis, anti MOG disease, neursorcoidosis, Susac Syndrome, and other related disorders.

We have the **only fellowship training program** in neuroimmunology and MS in the state of Wisconsin.

**5 CLINICAL TRIALS** are being conducted to improve treatment for MS patients:

- Two pharmacological studies assessing Elezanumab when added to standard therapy
- A clinical study to investigate the impact of Ocrelizumab on white blood cells in newly diagnosed, treatment naïve subjects
- A clinical study of technology-based measures employed to create a patient-centric assessment of ability in patients with MS
- A clinical study using 7-T MRI imagining to conduct artificial intelligence-driven volumetric lesion analysis in patients with MS.

MOVEMENT DISORDERS

**2410**

 Patients seen in 2018, including **521 NEW PATIENTS**.

In 2018, **more than 30 procedures were performed**, including DBS implants and Duopa pump insertions.
The comprehensive Neuromuscular Diseases Program (NMDP) at MCW integrates both pediatric and adult patients with diverse neuromuscular disorders that are seen in both dedicated NM Clinics and the Muscular Dystrophy Association (MDA) Clinics. As they reach adulthood, the pediatric patients are transitioned from the MDA Clinic at Children’s Wisconsin (CW) to the adult clinic at Froedtert Hospital (FH).

The NMDP at MCW is one of the few such programs in the country to perform and read their muscle biopsies. The FH Electroneuromyographic (EMG) laboratory is certified by the American Association of Neuromuscular and Electrodiagnostic Medicine (AANEM). Over 2500 basic EMG and advanced clinical neurophysiologic procedures (e.g., single fiber EMG and laryngeal EMG) are performed annually at FH, CW, and the Milwaukee VA Medical Center.

**Dr. Michael Collins** is a recognized WORLD AUTHORITY on vasculitic neuropathies. He has chaired numerous workshops and committees on these disorders.

The improvements and availability of genetic testing has facilitated making diagnoses in rare disorders. The NMDP program has also started a COLLABORATIVE PROGRAM with Plastic Surgery in the assessment and management of brachial plexus disorders in infants.

**NEUROPSYCHOLOGY**

**100**

Fellows have been trained since the program was established 40 years ago. The **MCW Neuropsychology Fellowship** was one of the first of its kind in the nation.

**100+ articles** have been published by MCW Neuropsychology faculty in the past five years.
Patient cases are presented each year at the weekly comprehensive brain tumor board. The board consists of doctors, scientists and researchers from neuro-oncology, neurosurgery, radiation oncology, neuroradiology, neuropathology, and neuropsychology.

The Neuro-oncology team administers and hosts a brain bank (whole-brain donation and tissue) to support brain cancer research. It is one of the largest of its kind. Because of the generosity of patients and their families, the neuro-oncology team participates in groundbreaking research funded by the National Cancer Institute and the National Institutes of Health.

Our Child Neurology Program is the LARGEST PROGRAM IN WISCONSIN specializing in Neurogenetics, Epilepsy, Pediatric Neurocritical Care, Pediatric and Neonatal Neurology.
Froedtert Hospital is a COMPREHENSIVE STROKE CENTER, designated by The Joint Commission with 7 vascular neurology specialists.

Door-to-needle (DTN): BEST IN THE NATION for rapid treatment of stroke presenting in the emergency room.

Research studies ongoing in the Department in the areas of:

- ALS
- Autonomics
- Child Neurology
- Epilepsy
- Headache
- Language and Cognition
- Memory Disorders
- Movement Disorders
- Multiple Sclerosis
- Neuromuscular Disease
- Neuropsychology
- Stroke
DEPARTMENT OF NEUROLOGY FACULTY

Chair
Brian-Fred Fitzsimmons, MD

Vice Chair, Research
Jeffrey Binder, MD

Vice Chair, Education
Ann Helms, MD, MS

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Christopher Anderson, MD
Piero Antuono, MD
Paul Barkhaus, MD
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Patrick Bauer, MD
Karen Blindauer, MD
Ryan Brennan, DO
Staley Brod, MD
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Thomas Chelimsky, MD
Michael Collins, MD
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Sheila Eichenseer, MD
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