

2014 Research Annual Report

Physical Medicine and Rehabilitation



Division Summary

RESEARCH AND TRAINING DETAILS

Number of Faculty	7
Number of Research Students	9
Direct Annual Grant Support	\$220,768
Direct Annual Industry Support	\$111,775
Peer Reviewed Publications	14

CLINICAL ACTIVITIES AND TRAINING

Number of Staff Physicians	1
Number of Clinical Fellows	3
Inpatient Encounters	3,761
Outpatient Encounters	3,789

Division Photo



L to R: D Pruitt, M McMahon, S Wade, J Vargus-Adams, A Bolger, B Kurowski, D Kinnett

Significant Accomplishments

New Funding for Brain Injury Clinical Trials

Our division received funding for three clinical trials in FY14. **Shari Wade, PhD**, received funding from the Patient-Centered Outcomes Research Institute (PCORI) to examine the comparative effectiveness of three family problem-solving therapies in reducing behavior problems and improving quality of life following adolescent brain injury. **Brad Kurowski, MD**, was awarded a K23 grant from NICHD to examine the efficacy of various dose levels of methylphenidate for attention problems following traumatic brain injury (TBI). Kurowski also obtained a grant from the Ohio Department of Public Safety and a Cincinnati Children's Trustee's Award to study the efficacy of an aerobic exercise intervention for persistent post-concussive symptoms. These interventions will expand the limited evidence base for treating both mild and severe TBI.

The Cerebral Palsy Clinic

The Cerebral Palsy Clinic led by **Jilda Vargus-Adams, MD, MSc**, is a team-based, multi-disciplinary clinic at the heart of our Cerebral Palsy Program. Our clinic provides individualized care plans and treatment for conditions ranging from surveillance for hip displacement to bone health. We have served more than 600 patients and families since 2011, and our clinic had a 34 percent increase in new visit team evaluations over the previous year.

The clinic team includes pediatric physiatrists, occupational and physical therapists, care coordinators,

dietitians, nurses and staff from the Perlman Center and Divisions of OT/PT and Pediatric Rehabilitation. Clinics operate in an arena style setting providing comprehensive, family-centered and coordinated care. We collaborate closely with **James McCarthy, MD**, in the Division of Orthopedics in a monthly combined clinic for CP and with **Charles Stevenson, MD**, in the Division of Neurosurgery.

Our research initiatives include validation studies of PROMIS in CP (Patient Reported Outcome Measurement Information System) and therapy-based intervention with robotic gait training and functional electrical stimulation. Moreover, pilot work is ongoing to explore magnetoencephalography as an outcome measure in CP, and outcomes of combined transcranial magnetic stimulation and constraint induced movement therapy.

National Honors and Presentations

Brad Kurowski, MD, was awarded the Association of Academic Physiatrists (AAP) Young Academician Award. At the same meeting, he and his student, Barynia Backeljauw, were recognized by the AAP with Best Paper Awards in faculty and student categories.

Brad Kurowski, MD, and **Shari Wade, PhD**, together with collaborators in Emergency Medicine **Lynn Babcock, MD**; **Judith Dexheimer, PhD**; and **NicoleMcClanahan, BA**, presented “A ‘SMART’ Approach to Managing Concussion: Development and Pilot Trial of a Web-Based, Self-Monitoring Activity-Restriction and Relaxation Training (SMART) Program for Kids with Mild Traumatic Brain Injury” at the International Society for Research on Internet Interventions (ISRII) annual conference, May 18, 2013, in Chicago.

Jilda Vargus-Adams, MD, MSc, presented “Tweet this! Social Media for the Medical Professional” and “Review of Neuropharmacology in Pediatric Brain Injury,” at the Annual Assembly of the American Academy for Cerebral Palsy and Developmental Medicine, Milwaukee, October 2013.

Shari Wade, PhD, presented, “Children from Disadvantaged Families Are More Likely to Benefit from Family-Centered Treatment for TBI” at the Tenth World Congress on Brain Injury, March 2014, San Francisco.

Shari Wade, PhD, also presented on, “Individual, Social-Environmental, and Treatment-Related Influences on Long-Term Functional Outcomes of Early Childhood TBI: Implications for Intervention” at the International Neuropsychological Society Conference, 2014, Seattle.

Research Highlights

Shari L. Wade

Rehabilitation Research and Training Center for Pediatric TBI Interventions. In the fifth year of the Center, important new findings regarding the efficacy of online family problem-solving therapy were published in the Journal of Head Trauma Rehabilitation, Pediatrics, and JAMA Pediatrics. These papers describe the results from one of the largest clinical trials of a behavioral intervention for pediatric brain injury to date and document the efficacy of family problem solving in reducing executive and behavioral deficits, with maintenance of treatment effects a full year after the intervention. As reported in the journal Rehabilitation Psychology, parents, particularly those of lower socioeconomic status, also reported significant reductions in depression and concomitant increases in self-efficacy following the intervention.

Results from our innovative online parenting skills training were published in Behavior Therapy and the Journal of Head Trauma Rehabilitation. Findings support the efficacy of the parent skills training in changing parenting behaviors and reducing child behavior problems and caregiver distress in lower income families. A companion paper published in the Journal of Child Abuse and Neglect in conjunction with Dr. Makoroff of the Mayerson Center documents the efficacy of the intervention for families of children with abusive head trauma, a group

that has been traditionally excluded from brain injury studies.

The pilot of our attention training intervention is concluding in early FY 15. Preliminary results support changes in structural connectivity on MRI among those receiving the intervention as well as improvements in executive functioning. This study directed by Dr. Wade is in collaboration with Dr. Weihong Yuan and Dr. Leanne Tamm at Cincinnati Children's as well as Dr. Peter Chiu at UC.

Ohio Head Injury Outcomes Study. This longitudinal follow-up study, funded by NICHD, examines long-term outcomes among children who sustained traumatic brain injuries between the ages of three and seven relative to an age-matched cohort of youth who sustained orthopedic injuries. To date, 65% of the original sample, recruited in 2003-2008, has returned for follow-up assessments as they enter middle school. Preliminary findings, presented at the 10th World Congress on Brain Injury, support the long-term effects of early brain injury on subsequent academic achievement.

Social Participation and Navigation. New funding from the Department of Education's National Institute on Disability and Rehabilitation Research is supporting the development of an app to promote social participation and engagement in youth with brain injury. The impetus for this project came from families of youth with TBI who were concerned by their child's lack of friendships and social activities. A prototype of the app will be tested in FY15.

External Collaborations and Translation. Dr. Lindsay Riegler at the Cincinnati Veteran's Affairs Medical Center obtained a rural telehealth grant to translate the interventions (online problem solving, online parenting skills) for rural Veterans with cognitive and psychological concerns following deployment. Dr. Kelly Jones at the University of Auckland in New Zealand obtained funding to adapt and test the online problem-solving intervention with adolescents in New Zealand. Dr. Jenny Limond at the University of Glasgow conducted a pilot of the positive parenting skills intervention in the UK. These local and international collaborations support the translation and dissemination of the evidence-based intervention programs that have been developed in the Division of Physical Medicine and Rehabilitation at Cincinnati Children's.

Brad Kurowski, MD

Genetic Influences on Recovery following TBI. Dr. Kurowski has done some of the only work to date examining the role of dopaminergic genes in recovery from traumatic brain injury. Dr. Kurowski has presented his findings regarding the influence of dopaminergic genes on recovery following early childhood TBI at national conferences (e.g. AAP) and is preparing these results for publication. He has also completed collection of genomic data on children receiving treatment for TBI that was supported by a grant from the Ohio Department of Public Safety.

Methylphenidate for Attention Problems following Childhood Brain Injury. Dr. Kurowski received a K23 career development award from NICHD to conduct a double-blind RCT examining the efficacy of methylphenidate for management of attention problems following TBI. This work will support his development as a clinical trialist.

Aerobic Exercise Intervention for Persistent Post-concussive Symptoms. Through funding from Ohio Department of Public Safety and Cincinnati Children's Trustee's grant, Dr. Kurowski is conducting a small RCT examining the efficacy of aerobic exercise in reducing the duration of post-concussive symptoms. In conjunction with Drs. Greg Lee and Kim Cecil, he is also examining changes in cerebral blood flow as the underlying mechanism of treatment response.

An Online Intervention for Acute Concussion Symptoms. Drs. Kurowski and Wade, in conjunction with Dr. Lynn Babcock in the Division of Emergency Medicine, are conducting a pilot trial of an online intervention for

acute concussion management that integrates symptom monitoring with cognitive behavioral strategies for managing symptoms. Development and piloting were supported by Place Outcomes and Ohio DPS grants to Dr. Babcock.

Division Publications

1. Arnett AB, Peterson RL, Kirkwood MW, Taylor HG, Stancin T, Brown TM, Wade SL. **Behavioral and cognitive predictors of educational outcomes in pediatric traumatic brain injury.** *J Int Neuropsychol Soc.* 2013; 19:881-9.
2. Dickey MP, Rice M, Kinnett DG, Lambert R, Donauer S, Gerber MA, Staat MA. **Infectious complications of intrathecal baclofen pump devices in a pediatric population.** *Pediatr Infect Dis J.* 2013; 32:715-22.
3. Fairbanks JM, Brown TM, Cassidy A, Taylor HG, Yeates KO, Wade SL. **Maternal warm responsiveness and negativity following traumatic brain injury in young children.** *Rehabil Psychol.* 2013; 58:223-32.
4. He Y, Brunstrom-Hernandez JE, Thio LL, Lackey S, Gaebler-Spira D, Kuroda MM, Stashinko E, Hoon AH, Jr., Vargus-Adams J, Stevenson RD, Lowenhaupt S, McLaughlin JF, Christensen A, Dosa NP, Butler M, Schwabe A, Lopez C, Roge D, Kennedy D, Tilton A, Krach LE, Lewandowski A, Dai H, Gaedigk A, Leeder JS, Jusko WJ. **Population pharmacokinetics of oral baclofen in pediatric patients with cerebral palsy.** *J Pediatr.* 2014; 164:1181-1188 e8.
5. Karver CL, Wade SL, Cassidy A, Taylor HG, Brown TM, Kirkwood MW, Stancin T. **Cognitive reserve as a moderator of responsiveness to an online problem-solving intervention for adolescents with complicated mild-to-severe traumatic brain injury.** *Child Neuropsychol.* 2014; 20:343-57.
6. Kurowski BG, Wade SL, Kirkwood MW, Brown TM, Stancin T, Taylor HG. **Long-term benefits of an early online problem-solving intervention for executive dysfunction after traumatic brain injury in children: a randomized clinical trial.** *JAMA Pediatr.* 2014; 168:523-31.
7. Kurowski BG, Wade SL, Kirkwood MW, Brown TM, Stancin T, Taylor HG. **Behavioral predictors of outpatient mental health service utilization within 6 months after traumatic brain injury in adolescents.** *PM R.* 2013; 5:1026-34.
8. Kurowski BG, Wade SL, Kirkwood MW, Brown TM, Stancin T, Taylor HG. **Online problem-solving therapy for executive dysfunction after child traumatic brain injury.** *Pediatrics.* 2013; 132:e158-66.
9. Osorio MB, Kurowski BG, Beebe D, Taylor HG, Brown TM, Kirkwood MW, Wade SL. **Association of daytime somnolence with executive functioning in the first 6 months after adolescent traumatic brain injury.** *PM R.* 2013; 5:554-62.
10. Quatman-Yates CC, Lee A, Hugentobler JA, Kurowski BG, Myer GD, Riley MA. **Test-retest consistency of a postural sway assessment protocol for adolescent athletes measured with a force plate.** *Int J Sports Phys Ther.* 2013; 8:741-8.
11. Raj SP, Wade SL, Cassidy A, Taylor HG, Stancin T, Brown TM, Kirkwood MW. **Parent psychological functioning and communication predict externalizing behavior problems after pediatric traumatic brain injury.** *J Pediatr Psychol.* 2014; 39:84-95.
12. Rajagopal A, Holland SK, Walz NC, Staat MA, Altaye M, Wade S. **A functional magnetic resonance imaging study of language function in international adoptees.** *J Pediatr.* 2013; 163:1458-64.
13. Wade SL, Karver CL, Taylor HG, Cassidy A, Stancin T, Kirkwood MW, Brown TM. **Counselor-assisted problem solving improves caregiver efficacy following adolescent brain injury.** *Rehabil Psychol.* 2014; 59:1-9.
14. Wade SL, Stancin T, Kirkwood M, Brown TM, McMullen KM, Taylor HG. **Counselor-assisted problem solving (CAPS) improves behavioral outcomes in older adolescents with complicated mild to severe TBI.** *J Head Trauma Rehabil.* 2014; 29:198-207.

Faculty, Staff, and Trainees

Faculty Members

Mary McMahon, MD, Professor

Leadership Division Director; Director, Residency Training Program, UC Dept. of PM&R; Director, Medical Student Education, UC Dept. of PM&R

Research Interests Outcomes and effectiveness of interventions in muscular dystrophy.

Ashlee Bolger, MD, Assistant Professor

Research Interests Outcomes and effectiveness of interventions in muscular dystrophy.

Douglas Kinnett, MD, Associate Professor

Leadership Director, Spasticity Management Program

Research Interests Outcomes and effectiveness of interventions for spasticity in cerebral palsy, use of electrodiagnosis in management in birth brachial plexus palsy.

Brad Kurowski, MD, MS, Assistant Professor

Leadership Director, Outpatient Head Injury Clinic

Research Interests Elucidating neurophysiologic, individual, and environmental influences of cognitive and behavioral recovery after pediatric traumatic brain injury (TBI) of all severities, with the ultimate goal of improving evidence-based management.

David Pruitt, MD, Associate Professor

Leadership Director, A4Rehab; Director, Pediatric Rehabilitation Medicine Fellowship

Research Interests Functional outcomes in children with brain tumors.

Jilda Vargus-Adams, MD, MSc, Assistant Professor

Leadership Research Director, Cerebral Palsy Center

Research Interests Outcome measurement and effectiveness of interventions for cerebral palsy.

Shari Wade, PhD, Professor

Leadership Director of Research

Research Interests Outcomes and effectiveness of interventions after pediatric traumatic brain injury.

Clinical Staff Members

- **Lainie Holman, MD**

Trainees

- **Erin Swanson, MD**, PGY-5, Medical College of Wisconsin
- **Nathan Evanson, MD, PhD**, PGY-5, University of Cincinnati
- **Andrea Paulson, MD**, PGY-4, University of Minnesota Medical School. Minneapolis
- **Andrew Collins, MD**, PGY-3, University of Medicine and Dentistry of New Jersey - New Jersey Medical School
- **Christina Santia, MD**, PGY-1, Touro College of Osteopathic Medicine New York

Grants, Contracts, and Industry Agreements

KUROWSKI, B**Aerobic Training for Management of Post-Concussion Syndrome in Children**

Ohio Department of Public Safety

07/01/13-06/30/14

\$62,924

Efficacy of Methylphenidate for Management of Long-term Attention Problems after Pediatric Traumatic Brain Injury

National Institutes of Health

K23 HD 074683

08/22/13-07/31/18

\$121,375

WADE, S**Long Term Functional Outcomes of Early TBI**

National Institutes of Health

R01 HD 042729

09/01/09-08/31/14

\$352,274

Rehabilitation Research and Training Center for Traumatic Brain Injury

US Department of Education

H133B090010

10/01/09-09/30/14

\$766,848

SPAN - A Tool for Social Participation And Navigation

US Department of Education

H133G130272

10/01/13-09/30/16

\$151,644

Current Year Direct \$1,455,065**Industry Contracts****KINNETT, D**

Tercica, Inc.

\$30,401

Current Year Direct Receipts \$30,401**Total \$1,485,466**