

# Physical Medicine and Rehabilitation

## Division Details

### RESEARCH AND TRAINING DETAILS

Faculty	8
Research Fellows and Post Docs	2
Research Graduate Students	3
Total Annual Grant Award Dollars	\$2,095,041
Total Publications	23

### CLINICAL ACTIVITIES AND TRAINING

Staff Physicians	1
Clinical Fellows	4
Inpatient Encounters	4,394
Outpatient Encounters	5,307



Row 1: D Pruitt

Row 2: J Vargus-Adams, S Wade, A Bolger, M McMahon

Row 3: B Kurowski, D Kinnett, N Evanson

## Traumatic Brain Injury (TBI) Research

### Social-environmental and Genetic Influences on TBI Recovery

Drs. [Shari Wade](#) and [Brad Kurowski](#) made important contributions to our understanding of influences on recovery following traumatic brain injury (TBI) including social-environmental and genetic influences. They are the first to consider the combined influences of genetic vulnerability and environmental adversity in determining recovery trajectories following early TBI. Partnering with biostatistics, they have used novel statistical approaches to better understand neuropsychological profiles following TBI and trajectories of recovery over time.

### Innovative Interventions for TBI Recovery

Drs. [Brad Kurowski](#) and [Shari Wade](#) expanded their work to identify evidence-based interventions to facilitate short and long-term recovery. Dr. Wade's multi-center (Cincinnati, OH; Denver, CO, Cleveland, OH; and Rochester, MN) study evaluating the efficacy of web-based counselor assisted problem solving providing further insights into its effects on parent-child conflicts and social behavior. Results from Dr. Kurowski's study of the benefits and biologic correlates of aerobic exercise in the management of post-concussion syndrome in children support the potential utility of aerobic exercise to hasten recovery in youth with persistent post concussive symptoms. Moreover, imaging findings provide tentative evidence that increased structural connectivity may be a biological correlate of behavioral recovery. Dr. Kurowski is working with collaborators to expand on these findings to better understand how physical activity influences early recovery after mild traumatic brain injury (TBI) in children.

### Modeling TBI Recovery in Animals

[Dr. Nate Evanson](#) obtained funding to examine the effects of environmental adversity and enrichment on traumatic brain injury (TBI) recovery using mouse models.

## Awards and Recognitions

The [International Pediatric Brain Injury Society](#) recognized [Dr. Shari Wade's](#) contributions to the field of pediatric brain injury when they awarded her with the first Jane Gillett award at their inaugural conference in Liverpool, England. Dr. Wade was also recognized by the [American Psychological Association](#) Division of Rehabilitation Psychology for the paper that made the greatest contribution to the field.

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## Significant Publications

[Wade SL](#), Taylor HG, Cassedy A, Zhang N, Kirkwood MW, Brown TM, Stancin T. [Long-term Behavioral Outcomes after a Randomized, Clinical Trial of Counselor-Assisted Problem Solving for Adolescents with Complicated Mild-to-Severe Traumatic Brain Injury.](#) *J Neurotrauma*. 2015 Jul1;32(13):967-75.

This paper reports the long-term behavioral outcomes from a randomized trial comparing online Counselor-Assisted Problem-Solving to access to internet resource regarding traumatic brain injury (TBI) in a cohort of 132 adolescents age 12-17 years hospitalized for TBI in six months before treatment. Findings provide evidence that Counselor Assisted Problem Solving associates with persistent improvements in behavior among older adolescents, and those with higher initial levels of symptoms.

[Treble-Barna A](#), Zang H, Zhang N, Taylor HG, Yeates KO, [Wade S](#). [Long-Term Neuropsychological Profiles and their Role as Mediators of Adaptive Functioning after Traumatic Brain Injury in Early Childhood.](#) *J Neurotrauma*. 2016 May 9.

This study examined the long-term neuropsychological profiles of children who sustained traumatic brain injury (TBI) in early childhood. Findings revealed that the impact of severe TBI on children's long-term adaptive functioning is in part mediated by its effects on fluid reasoning and processing speed.

[Kurowski BG](#), [Wade SL](#), Dexheimer JW, Dyas J, Zhang N, Babcock L. [Feasibility and Potential Benefits of a Web-Based Intervention Delivered Acutely After Mild Traumatic Brain Injury in Adolescents: A Pilot Study.](#) *J Head Trauma Rehabil*. 2015 Sep 10.

Self-Management Activity-restriction and Relaxation Training (SMART) is a novel, web-based application of anticipatory guidance, psychoeducation, and cognitive-behavioral therapy that is feasible to initiate soon after mild traumatic brain injury (mTBI) in adolescents. Parents and adolescents, who used the program, reported it to be helpful and enjoyable. A web-based program potentially provides more convenient access to patients and families to treatment for mTBI than standard clinical care.

[Evanson NK](#), Herman JP. [Metabotropic glutamate receptor-mediated signaling dampens the HPA axis response to restraint stress.](#) *Physiol Behav*. 2015 Oct 15;150:2-7.

Activation of the hypothalamus-pituitary-adrenal (HPA) axis mediates a significant portion of the hormonal response to stress. Glutamate, which is the main excitatory neurotransmitter in the brain, plays an activating role in regulating HPA axis activity. In these studies, we show that glutamate also exerts an inhibitory influence on HPA axis activity via group I metabotropic glutamate receptor signaling. These results highlight the complexity of glutamate signaling in regulation of HPA axis activity in response to stress.

[Kurowski BG](#), Hugentobler J, Quatman-Yates C, Taylor J, Gubanich PJ, Altaye M, [Wade SL](#). [Aerobic Exercise for Adolescents With Prolonged Symptoms After Mild Traumatic Brain Injury: An Exploratory Randomized Clinical Trial.](#) *J Head Trauma Rehabil*. 2016 Apr 26.

This novel, exploratory randomized clinical trial suggests sub-symptom exacerbation aerobic training is potentially beneficial for adolescents with persistent symptoms after mild traumatic brain injury (TBI). These findings indicate active-based rehabilitation approaches may facilitate recovery after mild TBI. This study provides a foundation for future work needed to determine the optimal type, timing, and intensity of active rehabilitation programs for mild TBI.

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## Division Publications

1. Babcock L, Kurowski B. **Identifying Children and Adolescents at Risk for Persistent Postconcussion Symptoms.** *JAMA.* 2016; 315:987-88.
2. Babcock L, Yuan W, Leach J, Nash T, Wade S. **White Matter Alterations in Youth with Acute Mild Traumatic Brain Injury.** *J Pediatr Rehabil Med.* 2015; 8:285-96.
3. Evanson NK, Herman JP. **Metabotropic Glutamate Receptor-Mediated Signaling Dampens the Hpa Axis Response to Restraint Stress.** *Physiol Behav.* 2015; 150:2-7.
4. Evanson NK, Paulson AL, Kurowski BG. **A Narrative Review of Pharmacologic and Non-Pharmacologic Interventions for Disorders of Consciousness Following Brain Injury in the Pediatric Population.** *Curr Phys Med Rehabil Rep.* 2016; 4:56-70.
5. Houtrow AJ, Pruitt DW. **Meeting the Growing Need for Pediatric Rehabilitation Medicine Physicians.** *Arch Phys Med Rehabil.* 2016; 97:501-6.
6. Hummel TR, Salloum R, Drissi R, Kumar S, Sobro M, Goldman S, Pai A, Leach J, Lane A, Pruitt D, Sutton M, Chow LM, Grimme L, Doughman R, Backus L, Miles L, Stevenson C, Fouladi M, DeWire M. **A Pilot Study of Bevacizumab-Based Therapy in Patients with Newly Diagnosed High-Grade Gliomas and Diffuse Intrinsic Pontine Gliomas.** *J Neurooncol.* 2016; 127:53-61.
7. Kurowski BG, Backeljauw B, Zang H, Zhang N, Martin LJ, Pilipenko V, Yeates K, Taylor HG, Wade S. **Influence of Catechol-O-Methyltransferase on Executive Functioning Longitudinally after Early Childhood Traumatic Brain Injury: Preliminary Findings.** *J Head Trauma Rehabil.* 2016; 31:E1-9.
8. Kurowski BG, Hugentobler J, Quatman-Yates C, Taylor J, Gubanich PJ, Altaye M, Wade SL. **Aerobic Exercise for Adolescents with Prolonged Symptoms after Mild Traumatic Brain Injury: An Exploratory Randomized Clinical Trial.** *J Head Trauma Rehabil.* 2016.
9. Kurowski BG, Pomerantz WJ, Schaiper C, Ho M, Gittelman MA. **Impact of Preseason Concussion Education on Knowledge, Attitudes, and Behaviors of High School Athletes.** *J Trauma Acute Care Surg.* 2015; 79:S21-8.
10. Kurowski BG, Wade SL, Dexheimer JW, Dyas J, Zhang N, Babcock L. **Feasibility and Potential Benefits of a Web-Based Intervention Delivered Acutely after Mild Traumatic Brain Injury in Adolescents: A Pilot Study.** *J Head Trauma Rehabil.* 2015.
11. Narad ME, Minich N, Taylor HG, Kirkwood MW, Brown TM, Stancin T, Wade SL. **Effects of a Web-Based Intervention on Family Functioning Following Pediatric Traumatic Brain Injury.** *J Dev Behav Pediatr.* 2015; 36:700-7.
12. Petranovich CL, Wade SL, Taylor HG, Cassidy A, Stancin T, Kirkwood MW, Maines Brown T. **Long-Term Caregiver Mental Health Outcomes Following a Predominately Online Intervention for Adolescents with Complicated Mild to Severe Traumatic Brain Injury.** *J Pediatr Psychol.* 2015; 40:680-8.
13. Petranovich CL, Walz NC, Staat MA, Chiu CP, Wade SL. **Structural Language, Pragmatic Communication, Behavior, and Social Competence in Children Adopted Internationally: A Pilot Study.** *Appl Neuropsychol Child.* 2016:1-12.
14. Petranovich CL, Walz NC, Staat MA, Chiu CY, Wade SL. **Intelligence, Attention, and Behavioral Outcomes in Internationally Adopted Girls with a History of Institutionalization.** *Clin Neuropsychol.* 2015; 29:639-55.
15. Quatman-Yates CC, Bonnette S, Hugentobler JA, Mede B, Kiefer AW, Kurowski BG, Riley MA. **Postconcussion Postural Sway Variability Changes in Youth: The Benefit of Structural Variability Analyses.** *Pediatr Phys Ther.* 2015; 27:316-27.
16. Raj S, Antonini T, Oberjohn K, Cassidy A, Makoroff K, Wade S. **Web-Based Parenting Skills Program for Pediatric Traumatic Brain Injury Reduces Psychological Distress among Lower-Income Parents.** *J Head Trauma Rehabil.* 2015; 30:347-56.
17. Sohlberg M, Kucheria P, Fickas S, Wade S. **Developing Brain Injury Interventions on Both Ends of the Treatment Continuum Depends Upon Early Research Partnerships and Feasibility Studies.** *J Speech Lang Hear Res.* 2015; 58:S1864-S70.
18. Tlustos SJ, Peter Chiu CY, Walz NC, Wade SL. **Neural Substrates of Inhibitory and Emotional Processing in Adolescents with Traumatic Brain Injury.** *J Pediatr Rehabil Med.* 2015; 8:321-33.

19. Treble-Barna A, Sohlberg MM, Harn BE, Wade SL. **Cognitive Intervention for Attention and Executive Function Impairments in Children with Traumatic Brain Injury: A Pilot Study.** *J Head Trauma Rehabil.* 2015.
20. Treble-Barna A, Zang H, Zhang N, Taylor H, Yeates K, Wade S. **Long-Term Neuropsychological Profiles and Their Role as Mediators of Adaptive Functioning after Traumatic Brain Injury in Early Childhood.** *J Neurotrauma.* 2016.
21. Vargus-Adams J. **Pain as a Root of the Problem: Health-Related Quality of Life in Children with Cerebral Palsy.** *Dev Med Child Neurol.* 2016; 58:225-26.
22. Wade SL, Taylor HG, Cassedy A, Zhang N, Kirkwood MW, Brown TM, Stancin T. **Long-Term Behavioral Outcomes after a Randomized, Clinical Trial of Counselor-Assisted Problem Solving for Adolescents with Complicated Mild-to-Severe Traumatic Brain Injury.** *J Neurotrauma.* 2015; 32:967-75.
23. Wade SL, Zhang N, Yeates KO, Stancin T, Taylor HG. **Social Environmental Moderators of Long-Term Functional Outcomes of Early Childhood Brain Injury.** *JAMA Pediatr.* 2016; 170:343-9.

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## Grants, Contracts, and Industry Agreements

### Annual Grant Award Dollars

Investigator	Title	Sponsor	ID	Dates	Amount
Nathan K. Evanson, MD- PHD	The Role of Environment in Recovery from Experimental TBI in Adolescent Mice	National Institutes of Health (University of Pittsburgh)	K12 HD001097	7/1/2015 - 2/28/2018	\$78,840
Brad Gerald Kurowski, MD	Efficacy of Methylphenidate for Management of Long-term Attention Problems after Pediatric Traumatic Brain Injury	National Institutes of Health	K23 HD074683	8/22/2013 - 7/31/2016	\$131,085
Brad Gerald Kurowski, MD	Center for Disease Control	Ctr for Disease Control and Prevention	CDC_IPA_Kurowski	8/1/2015 - 7/31/2017	\$26,909
Megan E Narad	Ohio Department of Public Safety-EMS Grant	Ohio Department of Public Safety	OHEMS_Narad	7/1/2015 - 6/30/2017	\$35,799
Shari L Wade, PHD	SPAN - A Tool for Social Participation And Navigation	Department of Health and Human Services	90IF0059-01-00	4/1/2015 - 9/30/2016	\$508,752
Shari L Wade, PHD	Rehabilitation Research and Training for Traumatic Brain Centers Program	Department of Health and Human Services	90RT5004-01-00	4/1/2015 - 9/30/2017	\$440,705
Shari L Wade, PHD	Comparative Effectiveness of Family Problem-Solving Therapy	Patient-Centered Outcome Research Inst.	CER-1306-02435	8/1/2014 - 7/31/2017	\$844,349
Shari L Wade, PHD	VA Problem-solving Online for Wellness Results (POWER)	Department of Veteran Affairs	VA250-15-P-1091	4/1/2015 - 3/31/2016	\$28,602
<b>Total Annual Grant Award Dollars</b>					<b>\$2,095,041</b>