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CURRICULUM VITAE

Education

MGH Institute of Health Professions, Boston, MA
Doctor of Physical Therapy (DPT), 2006

University of Minnesota, Institute of Child Development, Minneapolis, MN
September 2000 – July 2005
Developmental Psychology, Neuroscience minor
Doctor of Philosophy (Ph.D.), 2005

Emory University School of Medicine, Department of Rehabilitation Medicine, Atlanta, GA
January 1995 – May 1997
Master of Physical Therapy (MPT) with Highest Honors, 1997

University of Virginia, Charlottesville, VA
September 1990 – May 1994
Interdisciplinary Studies--Biological and Behavioral Sciences,
B.A with Highest Distinction, 1994

Licensure Information/Registration Number

Massachusetts Board of Allied Health, Licensure as a Physical Therapist, 2005-present (#17296)
Minnesota Board of Physical Therapy, Licensure as a Physical Therapist, 2000-2005
Commonwealth of Virginia, Board of Medicine, Licensure as a Physical Therapist, 1997-2000

Certifications:

Board Certified Specialist in Pediatric Physical Therapy (PCS), ABPTS.
Initial certification: May 2009 Re-certified: 2017-2026

Employment and Positions Held:

Associate Professor
MGH Institute of Health Professions
School of Health and Rehabilitation Sciences, Department of Physical Therapy
Boston, MA
July 2011 – present

Associate Director
PhD Program in Rehabilitation Sciences
MGH Institute of Health Professions
Boston, MA
August 2018 – present

Senior Research Physical Therapist
Neurogenetics/Pediatric Motor Disorders Research Program
Massachusetts General Hospital, Center for Genomic Medicine (CGM)
Boston, MA
March 2015 – present

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Physical Therapist/Clinical Associate Outpatient Service
Massachusetts General Hospital
MGH Pediatric Neuromuscular Clinic (2008-2014)
Boston, MA
September 2008 – September 2016, per diem

Assistant Professor
MGH Institute of Health Professions
School of Health and Rehabilitation Sciences, Department of Physical Therapy
Boston, MA
July 2005 – July 2011

Physical Therapist/Clinical Associate Inpatient Service
Pediatrics Team
Massachusetts General Hospital
Boston, MA
September 2005 – September 2008, per diem

Physical Therapist
Harbor Area Early Childhood Services
East Boston, MA
October 2007 – October 2012, per diem

Physical Therapist
Children's Hospital
Minneapolis, MN
September 2000 – July 2005, per diem

Physical Therapist
Medical College of Virginia Hospital
Richmond, VA
July 1997 - September 1999, full time

Physical Therapist
Children's Hospital
Richmond, VA
August 1998 - August 1999, per diem

Peer Reviewed Publications

Published/Accepted:

Alves, C. R., Petrillo, M., Spellman, R., Garner, R., Zhang, R., Kiefer, M., Simeone, S. Sohn, J., Eichelberger, E.J., Rodrigues, E., Arruda, E.A., **Townsend, E.L.**, Farwell, W. & Swoboda, K. J. (2021). Implications of circulating neurofilaments for spinal muscular atrophy treatment early in life: A case series. *Molecular Therapy-Methods & Clinical Development*, 23, 524-538. <https://doi.org/10.1016/j.omtm.2021.10.011>

Krosschell, K. J., **Townsend, E. L.**, Kiefer, M., Simeone, S. D., Zumpf, K., Welty, L., & Swoboda, K. J. (2021). Natural history of 10-meter walk/run test performance in Spinal Muscular Atrophy: A longitudinal analysis. *Neuromuscular Disorders*, 32(2), 125-134. <https://doi.org/10.1016/j.nmd.2021.08.010>

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- Schofield, C., Evans, K., Young, H., Paguinto, S.G., Carroll, K., Townsend, E., Kiefer, M., McGuire, M., Sodhi, J., Bray, P., Bayley, K. (2022). The development of a consensus statement for the prescription of powered wheelchair standing devices in Duchenne muscular dystrophy. *Disability and Rehabilitation*, 44(10), 1889-97. <https://doi.org/10.1080/09638288.2020.1810786>
- Evans, E. A., Cook, N. E., Iverson, G. L., **Townsend, E. L.**, Duhaime, A. C., & TRACK-TBI Investigators. (2021). Assessing Physical Function and Mobility following Pediatric Traumatic Brain Injury with the NIH Toolbox Motor Battery: A Feasibility Study. *Physical & occupational therapy in pediatrics*, 41(1), 56-73. <https://doi.org/10.1080/01942638.2020.1758985>
- Schofield, C., Evans, K., Young, H., Paguinto, S. G., Carroll, K., **Townsend, E.**, ... & Downs, J. (2020). The development of a consensus statement for the prescription of powered wheelchair standing devices in Duchenne muscular dystrophy. *Disability and Rehabilitation*, 1-9. PMID: 32878485.
- Townsend, E. L.**, Simeone, S. D., Krosschell, K. J., Zhang, R. Z., & Swoboda, K. J. (2020). Stander use in spinal muscular atrophy: results from a large natural history database. *Pediatric Physical Therapy*, 32(3), 235-241. doi: 10.1097/PEP.0000000000000713
- Evans, E., Cook, N. E., Iverson, G. L., **Townsend, E. L.**, Duhaime, A.C., Adeoye, O., Badjatia, N., Boase, K., Bodien, Y., Bullock, M. R., Chesnut, R., Corrigan, J. D., Crawford, K., Diaz-Arrastia, R., Dikmen, S., Ellenbogen, R., Feeser, V. R., Ferguson, A. R., Foreman, B., ... Zafonte, R. (2020). Monitoring outcome after hospital-presenting milder spectrum pediatric traumatic brain injury using the Glasgow Outcome Scale-Extended, *Pediatric Revision*. *Journal of Neurotrauma*, 37(14), 1627–1636. <https://doi.org/10.1089/neu.2019.6893>
- Yeo, C., Simeone, S. D., **Townsend, E. L.**, Zhang, R. Z., & Swoboda, K. J. (2020). Prospective cohort study of Nusinersen treatment in adults with spinal muscular atrophy. *Journal of Neuromuscular Diseases*, 7(3), 257–268. <https://doi.org/10.3233/JND-190453>
- Weaver, P. A., Catalino, T., **Townsend, E. L.**, Martin, K., & Dole, R. L. (2020). Assimilation of the pediatric essential core competencies by professional physical therapist education programs. *Pediatric Physical Therapy : The Official Publication of the Section on Pediatrics of the American Physical Therapy Association*, 32(3), 267–274. <https://doi.org/10.1097/PEP.0000000000000715>
- Evans, E., Asuzu, D., Cook, N. E., Caruso, P., **Townsend, E.**, Costine-Bartell, B., Fortes-Monteiro, C., Hotz, G., & Duhaime, A.C. (2018). Traumatic brain injury-related symptoms reported by parents: Clinical, imaging, and host predictors in children with impairments in consciousness less than 24 hours. *Journal of Neurotrauma*, 35(19), 2287–2297. <https://doi-org.treadwell.idm.oclc.org/10.1089/neu.2017.5408>
- Krosschell, K. J., Kissel, J. T., **Townsend, E. L.**, Simeone, S. D., Zhang, R. Z., Reyna, S. P., Crawford, T. O., Schroth, M. K., Acsadi, G., Kishnani, P. S., Von Kleist-Retzow, J.-C., Hero, B., D'Anjou, G., Smith, E. C., Elsheikh, B., Simard, L. R., Prior, T. W., Scott, C. B., Lasalle, B., ... Swoboda, K. J. (2018). Clinical trial of L-Carnitine and valproic acid in spinal muscular atrophy type I. *Muscle & Nerve*, 57(2), 193–199. <https://doi-org.treadwell.idm.oclc.org/10.1002/mus.25776>
- Townsend, E. L.**, Bibeau, C., & Holmes, T. M. (2016). Supported standing in boys with Duchenne muscular dystrophy... [including commentary by Laura E. Case and Ryan M. Draper]. *Pediatric Physical Therapy*, 28(3), 320–331. <https://doi-org.treadwell.idm.oclc.org/10.1097/PEP.0000000000000251>
- Zaidman, C. M., Wang, L. L., Connolly, A. M., Florence, J., Wong, B. L., Parsons, J. A., Apkon, S., Goyal, N., Williams, E., Escolar, D., Rutkove, S. B., Bohorquez, J. L., & **DART-EIM Clinical Evaluators Consortium**. (2015). Electrical impedance myography in Duchenne muscular dystrophy and healthy controls: A multicenter study of reliability and validity. *Muscle & nerve*, 52(4), 592–597. <https://doi.org/10.1002/mus.24611>

- Canapari, C. A., Barrowman, N., Hoey, L., Walker, S. W., **Townsend, E.**, Tseng, B. S., & Katz, S. L. (2015). Truncal fat distribution correlates with decreased vital capacity in Duchenne muscular dystrophy. *Pediatric Pulmonology*, *50*(1), 63–70. <https://doi-org.treadwell.idm.oclc.org/10.1002/ppul.23004>
- Townsend, E. L.**, Tamhane, H., & Gross, K. D. (2015). Effects of AFO use on walking in boys with Duchenne muscular dystrophy: A pilot study. *Pediatric Physical Therapy: The Official Publication of the Section on Pediatrics of the American Physical Therapy Association*, *27*(1), 24–29. <https://doi.org/10.1097/PEP.0000000000000099>
- Torriani, M., **Townsend, E.**, Thomas, B. J., Bredella, M. A., Ghomi, R. H., & Tseng, B. S. (2012). Lower leg muscle involvement in Duchenne muscular dystrophy: An MR imaging and spectroscopy study. *Skeletal radiology*, *41*(4), 437–445. <https://doi.org/10.1007/s00256-011-1240-1>
- Townsend, E. L.**, Richmond, J. L., Vogel-Farley, V. K., & Thomas, K. (2010). Medial temporal lobe memory in childhood: Developmental transitions. *Developmental science*, *13*(5), 738–751. <https://doi.org/10.1111/j.1467-7687.2009.00935.x>
- Choksi, A., **Townsend, E. L.**, Dumas, H. M., & Haley, S. M. (2010). Functional recovery in children and adolescents with spinal cord injury. *Pediatric physical therapy: the official publication of the Section on Pediatrics of the American Physical Therapy Association*, *22*(2), 214–221. <https://doi.org/10.1097/PEP.0b013e3181dc011a>
- Retarekar, R., Fragala-Pinkham, M. A., & **Townsend, E. L.** (2009). Effects of aquatic aerobic exercise for a child with cerebral palsy: Single-subject design. *Pediatric Physical Therapy: The Official Publication of the Section on Pediatrics of the American Physical Therapy Association*, *21*(4), 336–344. <https://doi.org/10.1097/PEP.0b013e3181beb039>
- Lucas-Thompson, R., **Townsend, E. L.**, Gunnar, M. R., Georgieff, M. K., Guiang, S. F., Ciffuentes, R. F., Lussky, R. C., & Davis, E. P. (2008). Developmental changes in the responses of preterm infants to a painful stressor. *Infant Behavior & Development*, *31*(4), 614–623. <https://doi.org/10.1016/j.infbeh.2008.07.004>
- Rao, R., Tkac, I., **Townsend, E. L.**, Ennis, K., Gruetter, R., & Georgieff, M. K. (2007). Perinatal iron deficiency predisposes the developing rat hippocampus to greater injury from mild to moderate hypoxia-ischemia. *Journal of Cerebral Blood Flow and Metabolism: Official Journal of the International Society of Cerebral Blood Flow and Metabolism*, *27*(4), 729–740. <https://doi.org/10.1038/sj.jcbfm.9600376>
- Callahan, J., Parlman, K., Beninato, M., **Townsend, E.** (2006). Perspective: Impact of the III STEP Conference on Clinical Practice. *Journal of Neurologic Physical Therapy* *30*(3), 157-166.
- Davis, E. P., **Townsend, E. L.**, Gunnar, M. R., Guiang, S. F., Lussky, R. C., Cifuentes, R. F., & Georgieff, M. K. (2006). Antenatal betamethasone treatment has a persisting influence on infant HPA axis regulation. *Journal of Perinatology: Official Journal of the California Perinatal Association*, *26*(3), 147–153. <https://doi.org/10.1038/sj.jp.7211447>
- Curtis, W. J., Zhuang, J., **Townsend, E. L.**, Hu, X., & Nelson, C. A. (2006). Memory in early adolescents born prematurely: A functional magnetic resonance imaging investigation. *Developmental Neuropsychology*, *29*(2), 341–377. https://doi.org/10.1207/s15326942dn2902_4
- Davis, E. P., **Townsend, E. L.**, Gunnar, M. R., Georgieff, M. K., Guiang, S. F., Ciffuentes, R. F., & Lussky, R. C. (2004). Effects of prenatal betamethasone exposure on regulation of stress physiology in healthy

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premature infants. *Psychoneuroendocrinology*, 29(8), 1028–1036.
<https://doi.org/10.1016/j.psyneuen.2003.10.005>

Rao, R., Tkac, I., **Townsend, E. L.**, Gruetter, R., & Georgieff, M. K. (2003). Perinatal iron deficiency alters the neurochemical profile of the developing rat hippocampus. *The Journal of Nutrition*, 133(10), 3215–3221. <https://doi.org/10.1093/jn/133.10.3215>

Kapasi, Z. F., Catlin, P. A., Joyner, D. R., Lewis, M. L., Schwartz, A. L., & **Townsend, E. L.** (2000). The effects of intense physical exercise on secondary antibody response in young and old mice. *Physical Therapy*, 80(11), 1076–1086. <https://doi-org.treadwell.idm.oclc.org/10.1093/ptj/80.11.1076>

Peer Reviewed Scientific and Professional Presentations

Flotte TR and UMass team & MGH team: Wishart B, Kiefer M, **Townsend E**, Eichler F et al. GM2 gene therapy trial findings. Abstract presented at European Society for Gene and Cell Therapy Annual Congress in Edinburgh, UK 11-14 Oct 2022.

Conquest P, McKee B, Cornforth E, Sizemore A, **Townsend E**, Rutkove S, Wheeler T. Electrical Impedance Myography Predicts Muscle Function in DM1 Patients. Virtual poster presented at the 13th International Myotonic Dystrophy Consortium Meeting (IDMC-13). June 22, 2022.

Kiefer M, Figueira S, Shellenbarger KC, Jones C, Wong B, **Townsend, E.** Associations between body composition estimates and motor function in ambulatory individuals with Duchenne muscular dystrophy. Poster presented at World Muscle Society (WMS) 2022 Congress in Halifax, Canada Oct 11-15.

Kiefer M, Khan A, Leiro B, Liharska L, Balsler J, Kenwood C, Yavorsky C, Laforet G, Kirby K, **Townsend E.** Transitioning from in-person to remote motor assessment of children with Canavan disease. Abstract presented at 2022 Autumn Conference of the International Society for CNS Clinical Trials and Methodology Sept 8-9, Boston, MA.

Mackey J, **Townsend E**, Leslie C. Interprofessional Student Learning in an Early Intervention Caregiver Group. Presented as pre-recorded Lightning Talk and live Discussion Panel at the Nexus 2020 Summit of the National Center for Interprofessional Practice and Education, Interprofessional Clinical Learning Environments Theme, August 13, 2020.

M Kiefer, **EL Townsend**, RZ Zhang & KJ Swoboda. Growth impairments as potential correlates of motor function in children with Spinal Muscular Atrophy (SMA). Poster for the Cure SMA Research and Clinical Care Annual Meeting, Orlando, FL on June 11, 2020 (cancelled due to COVID-19).

J Chen, S Simeone, **E Townsend**, R Zhang, other authors, Kathryn Swoboda. Phenotype Genotype Variability Among Sibships with Spinal Muscular Atrophy: Implications for Newborn Screening and Early Treatment Intervention. Poster presented at the Cure SMA Research and Clinical Care Annual Meeting, Anaheim, CA on June 28, 2019.

E Townsend, S Simeone K Swoboda. Combined effects of a comprehensive exercise program and nusinersen on motor function in fraternal twins with SMA: A case series. Poster presented at the Cure SMA Research and Clinical Care Annual Meeting, Anaheim, CA on June 28, 2019.

C Yeo, S Simeone, **E Townsend**, K Swoboda. Outcome Measures for Nusinersen efficacy in Adults with Spinal Muscular Atrophy (SMA). Platform presentation at the American Academy of Neurology 71st Annual Meeting, Philadelphia, MA on May 5, 2019.

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P Weaver, T Catalino, K Martin, R Dole, **E Townsend**. Implementation of the Essential Core Competencies into Entry-Level Pediatric Physical Therapy Education. Platform presented at APTA Academy of Pediatric Physical Therapy Annual Conference (APPTAC), Chattanooga, TN, November 11, 2018.

P Weaver, T Catalino, K Martin, R Dole, **E Townsend**. Implementation of Pediatric Essential Core Competencies in Entry-Level Physical Therapist Education. Platform presented at APTA Education Leadership Conference (ELC), Jacksonville, FL, October 12, 2018.

R Zhang, J Loutrel, M Kuhlmann, J Whaley, G Labilloy, S Simeone, **E Townsend**, K Krosschell, J Yun H Chen, A Brower, F Nery, K Trautman, P Nwe, A Johnstone, J Siranosian, T Newcomb, R Butterfield, M Watson, and K Swoboda for the Project Cure Investigator's Network. The Project Cure SMA Longitudinal Population Data Repository (LPDR). Poster presented at Cure SMA Annual Meeting, Scientific Conference, Dallas, TX, June 16, 2018.

E Townsend, S Simeone, K Krosschell, R Zhang, K Swoboda. Supported standing in SMA Types 1 and 2: Head rotation control and respiratory support predict meaningful stander use. Poster presentation at Cure SMA Annual Meeting, Scientific Conference, Dallas, TX, June 15, 2018.

E Townsend, S Simeone, K Krosschell, R Zhang, K Swoboda. To Stand or Not to Stand: Using early motor control to inform clinical decision making in Spinal Muscular Atrophy (SMA). Platform presented at APTA Combined Sections Meeting, New Orleans, LA, February 23, 2018.

S Simeone, **E Townsend**, K Krosschell, R Zhang, K Swoboda. To Stand or Not to Stand: Feasibility and Associations of Supported Standing Intervention in Children with Spinal Muscular Atrophy (SMA) types I and II. Poster presented at the MGH Clinical Research Day, Boston, MA on October 5, 2017.

K Krosschell, J Kissel, **E Townsend**, S Simeone. Clinical Trial of L-Carnitine and Valproic Acid in Spinal Muscular Atrophy Type I. Poster presented at the MGH Clinical Research Day, Boston, MA on October 5, 2017.

E Townsend, S Simeone, K Krosschell, R Zhang, K Swoboda for the Project Cure SMA Investigator's Network (2017). Stander use in Spinal Muscular Atrophy (SMA): Findings from a large natural history study. Poster presented at Cure SMA Annual Meeting, Orlando, FL, June 30, 2017.

E Townsend, K Krosschell, R Zhang, Y Zhang, G Acsadi, T Crawford, G D'Anjou, J Kissel, M Schroth, S Reyna, K Swoboda (2016). Natural history of timed motor function tests in SMA type 3: Associations between age and motor outcomes. Poster presented at Cure SMA Annual Meeting, Anaheim, CA, June 16, 2016.

J Baldwin, A Hassan, **E Townsend**, A McCarthy-Jacobson. Effectiveness of Body Weight Supported Treadmill Training on Gait Speed in the Stroke Population: A Systematic Review. Poster presented by first author at APTA Combined Sections Meeting, Neurology Section, San Diego, CA, January 2013.

H Tamhane, **EL Townsend**, KD Gross. Effects of Dynamic Response Ankle Foot Orthosis (DR-AFO) Use on Functional Performance and Walking Endurance in Ambulatory Boys with Duchenne Muscular Dystrophy: A Pilot Study. Poster presented by first author at APTA Combined Sections Meeting, Chicago, IL, February 11, 2012.

EL Townsend. Powered standing mobility in boys with Duchenne Muscular Dystrophy. 27th International Seating Symposium (ISS), Nashville, TN. March 4, 2011.

EL Townsend. Effects of supported standing on range of motion, bone mineral density and health related quality of life in boys with Duchenne muscular dystrophy. Platform presented at the Annual Meeting of the Massachusetts Chapter of APTA. November 6, 2010.

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A Choksi, **EL Townsend**, HM Dumas, SM Haley. Functional Recovery in Children and Adolescents with Spinal Cord Injury (SCI). Poster presented at the Combined Sections Meeting, San Diego, CA, February 2010.

R Retaraker, M Fragala-Pinkham, **EL Townsend**. Effects of Aquatic Aerobic Exercise on Endurance, Functional Mobility and Participation In a Child with Cerebral Palsy: A Single Subject Design. Poster presented at the APTA National Meeting, San Antonio, TX, June 2008.

E Maugere, **EL Townsend**, MP Watkins. Physical Therapy Management of Patients with Duchenne Muscular Dystrophy -A Systematic Review. Poster presented at the APTA Combined Sections Meeting, Nashville, TN, February 2008.

EL Townsend, KM Thomas, CA Nelson. Hippocampal functions in childhood: A brain-based approach to studying the development of declarative memory. Poster presented at the Biennial Meeting of the Society for Research in Child Development (SRCD), Boston, MA, April 2007.

EL Townsend, JL Lohr, CA Nelson. Neurocognitive function in school aged children with repaired cyanotic congenital heart defects (CHD). Poster presented at the annual meeting of the MGH Scientific Advisory Committee (SAC), Boston, MA, February 2006.

EL Townsend, JL Lohr, CA Nelson. Neurocognitive sequelae of repaired congenital heart disease. Poster presented at the APTA Combined Sections Meeting, San Diego, CA, February 2006.

EL Townsend, JL Lohr, CA Nelson. Neurocognitive sequelae of repaired cyanotic congenital heart defects. Poster presented at the Biennial Meeting of the Society for Research in Child Development (SRCD), Atlanta, GA, April 2005.

RH Hunt, **EL Townsend**, JW Couperus, CA Nelson, KM Thomas. A developmental fMRI study of Medial Temporal Lobe Function: Differences in Continuous Recognition Memory. Poster presented by first author at the Biennial Meeting of the Society for Research in Child Development (SRCD), Atlanta, GA, April 2005.

RH Hunt, JW Couperus, **EL Townsend**, CA Nelson, KM Thomas. Developmental Differences in Continuous Recognition Memory: An fMRI and ERP study of parametrically manipulated memory load. Paper presented by first author at the Biennial Meeting of the Society for Research in Child Development (SRCD), Atlanta, GA, April 2005.

KM Thomas, RH Hunt, **EL Townsend**, JW Couperus, CA Nelson, BA Mueller. Developmental Differences in Continuous Recognition Memory: an fMRI study of Medial Temporal Lobe Function. Poster presented by first author at the 10th International Conference on Functional Mapping of the Human Brain, Budapest, Hungary, 13-17 June 2004.

EL Townsend, JL Lohr, CA Nelson. Neurocognitive sequelae of repaired congenital heart disease (CHD). Poster presented at the Annual Meeting of the Pediatric Academic Society, San Francisco, CA, May 2004.

H Sesma, **EL Townsend**, CA Nelson, MK Georgieff. The role of memory in overall IQ for infants of diabetic mothers and intrauterine growth restricted infants. Poster presented at the Annual Meeting of the Pediatric Academic Society, San Francisco, CA, May 2004.

K Ennis, **E Townsend**, J Wobken, M Georgieff, R Rao. Perinatal iron deficiency increases vulnerability of the developing hippocampus to mild hypoxic-ischemic injury. Poster symposium presentation by first author at Pediatric Academic Societies' Annual Meeting, San Francisco, CA, May 2004. *Pediatric Research* 55:179A.

EP Davis, C Uy, **EL Townsend**, MR Gunnar, MK Georgieff, SF Guiang, CA Sandman, F Waffarn. Antenatal betamethasone exposure impairs stress responses in the healthy preterm infant. Poster presented by first author at the Annual Meeting of the Pediatric Academic Society, San Francisco, CA, May 2004.

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EL Townsend, JL Lohr, CA Nelson. Neurocognitive sequelae of cyanotic congenital heart disease: learning, memory, and hippocampal development. Poster presented at the Annual Meeting of the Cognitive Neuroscience Society, San Francisco, CA, April 2004.

KM Thomas, RH Hunt, **EL Townsend**, JW Couperus, CA Nelson, BA Mueller. Developmental Differences in Hippocampal Function: an fMRI study of Continuous Recognition Memory. Poster presented at the Annual Meeting of the Cognitive Neuroscience Society, San Francisco, CA, April 2004.

EP Davis, F Waffarn, C Uy, **EL Townsend**, MR Gunnar, MK Georgieff. Developmental consequences of third trimester glucocorticoid treatment. Paper presented by first author at Gatlinburg Conference on Research and Theory in Developmental Disabilities, San Diego, CA, April 2004.

EL Townsend & T Jacobson. Neurobehavioral functioning in children with chronic fetal insults. Poster presented at the Biennial Meeting of the Society for Research in Child Development (SRCD), Tampa, FL, April 2003.

WJ Curtis, JC Zhuang, **EL Townsend**, XP Hu & CA Nelson. Memory in Early Adolescents Born Prematurely: A Functional Magnetic Resonance Imaging Investigation. Paper Symposium: Neural Correlates of Memory Development Using ERP/fMRI. Paper presented by first author at the Society for Research in Child Development (SRCD), Tampa, FL, April 2003.

R Rao, I Tkac, **E Townsend**, R Gruetter, C Nelson & M Georgieff. Evaluation of Acute and Long-term Effects of Graded Hypoxia (HI) on Hippocampal Metabolites in Iron Deficient v. Iron Sufficient Developing Rats by Magnetic Resonance Spectroscopy at 9.4 T. Paper presented by first author at Pediatric Academic Societies' Annual Meeting, 2002. *Pediatric Research* 51:422A.

B Donzella, J Bruce, DA Kertes, H Eibs, N Talge, **E Townsend** & MR Gunnar. Relation between temperament and Emotion-Modulated Startle in Young Children. Poster presented by first author at the Occasional Temperament Conference, Newport Beach, CA, October 2002.

EL Townsend, EP Davis, MR Gunnar, MK Georgieff, SF Guiang, RF Cifuentes & RC Lussky. Cardiac and Behavioral Responses to Stressful Events in Premature Infants. Poster presented at the International Conference on Infant Studies (ICIS), Toronto, ON, April 2002.

EP Davis, **EL Townsend**, SF Guiang, M Georgieff & MR Gunnar. Cardiac response to potentially stressful events in premature infants. Poster presented by first author at the International Society for Developmental Psychobiology (ISDP), San Diego, CA, November 2001.

E Townsend, Z Kapasi, P Catlin, D Joyner, M Lewis, A Schwartz. Effects of intense exercise on secondary antibody response in young and aged mice. Platform presentation at the 3rd International Society of Exercise and Immunology (ISEI) Symposium, Paderborn, Germany, November 1997.

Non-Peer Reviewed Publications

Townsend, E. L. & Kiefer, M. J. (2022). Commentary on "Seated outcome measures in children with Duchenne Muscular Dystrophy". *Pediatric Physical Therapy: The Official Publication of the Section on Pediatrics of the American Physical Therapy Association*, 34(3), 381. doi:10.1097/PEP.0000000000000922

Kiefer, M. J., & **Townsend, E. L.** (2018). Commentary on "Stepping Activity in Children with Congenital Myotonic Dystrophy". *Pediatric Physical Therapy: The Official Publication of the Section on Pediatrics of the American Physical Therapy Association*, 30(4), 340. <https://doi.org/10.1097/PEP.0000000000000545>

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Townsend, E., & Chastain, P. A. (2013). Commentary on "Reliability and Validity of the TIMPSI for Infants with Spinal Muscular Atrophy Type I." *Pediatric Physical Therapy*, 25(2), 149.

Townsend, E., & Pallotta, S. (2012). Commentary on "Volumetric MRI and MRS and early motor development of infants born preterm". *Pediatric Physical Therapy: The Official Publication of the Section on Pediatrics of the American Physical Therapy Association*, 24(1), 44–45.
<https://doi.org/10.1097/PEP.0b013e31823e0abb>

Townsend, E.L. (2005). Declarative learning and memory in childhood: A brain-based approach to studying the development of hippocampal functions. Dissertation Abstracts International. UMI No. 3180032

Townsend, E.L., Georgieff, M.K., & Nelson, C.A. (2005). Neurocognitive functioning in children with chronic fetal insults. *Cognition, Creier, Comportament (Cognition, Brain, Behavior: Special issue on Developmental Cognitive Neuroscience)*, June, 363-381.

Gunnar, M.R. & **Townsend, E.L.** (2003). Cortisol measures in studies of children. Supplement to *International Journal of Behavioral Development*, 27 (3). [International Society for the Study of Behavioural Development (ISSBD) Newsletter, 1 (43), 4-6.]

Townsend, E.L. (1994). Mind-body interactions: Evidence for a biopsychosocial model for health care. Thesis submitted in partial fulfillment of the requirements for a B.A. in Interdisciplinary Studies at the University of Virginia.

Non-Peer Reviewed Presentations

Best practice management of Congenital Muscular Torticollis. Crimson Care Collaborative Interprofessional Rounds Presentation to Harvard medical students, and IHP PA and NP students. MGH Revere. May 2, 2019

To Stand or Not to Stand: Feasibility and Factors Associated with Stander Use in Spinal Muscular Atrophy (SMA) Types I and II. MGH IHP PhD in Rehabilitation Sciences, Interdisciplinary Research Seminar, Boston, MA. July 11, 2017.

Physical Therapy and Mobility Resources for Living with Pompe Disease. Massachusetts General Hospital Department of Genetics, Boston, MA. September 9, 2012.

Care Considerations in Duchenne Muscular Dystrophy. Massachusetts General Hospital for Children, Jett Foundation Roundtable, Boston, MA. November 12, 2011.

Managing the physical therapy needs of boys with muscular dystrophy: A team approach. Rhode Island Chapter APTA, Providence, RI. October 25, 2011.

Effects of supported standing on range of motion, bone mineral density and health related quality of life in boys with Duchenne muscular dystrophy. MGH Institute of Health Professions Faculty Research Fellowship presentation, Boston, MA. November 12, 2010.

Physical therapy management of children and young adults with muscular dystrophy. Hasbro Children's Hospital, Providence, RI, September 15, 2010.

Effects of supported standing on body structure/function, activity and participation in boys with Duchenne muscular dystrophy: Preliminary findings. Emory University School of Medicine, Division of Physical Therapy, August 2010.

Effects of supported standing on range of motion, bone mineral density and health related quality of life in boys with Duchenne muscular dystrophy: Preliminary findings. University of Minnesota School of Medicine, Program of Physical Therapy, December 2009.

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The role of physical therapy in Duchenne muscular dystrophy (DMD). Massachusetts General Hospital for Children, Jett Foundation sponsored roundtable “Helping your Child LIVE his best Life”, November 1, 2008.

Inflicted head injury and the developing brain. University of Minnesota Department of Physical Therapy, Clinical Instructor Continuing Education Series, June 2004.

Pediatric Physical Therapy: Historical and Contemporary Approaches (two-day seminar). Institutul pentru Dezvoltarea Copilului, Regional Conference, Bucharest, Romania, May 2004.

Effects of hypoxemia and cardiopulmonary bypass on memory in children with congenital heart defects: A proposal. Center for Neurobehavioral Development Colloquium, University of Minnesota, April 2003.

Recent Funded/In Review/Submitted Grants and Research Support

Principle investigator, Construction and Validation of the Infantile GM2 Rating Scale. \$139, 793. March 2022 – February 2024. Funding: National Tay-Sachs & Allied Diseases Association (NTSAD).

Co-Investigator, A Phase 1-3, Double-Blind, Randomized, Placebo-Controlled Study to Evaluate the Efficacy, Safety, Pharmacokinetics and Pharmacodynamics of Intrathecally Administered ION373 in Patients with Alexander Disease (AxD). <https://clinicaltrials.gov/ct2/show/NCT04849741>. MGH Site PI: Florian Eichler, MD (MGH Neurology). \$20, 973 via subaward. September 2021 – October 2026. Funding: Ionis Pharmaceuticals.

Co-Investigator, A Dose-escalation and Safety & Efficacy Study of AXO-AAV-GM2 in Tay-Sachs or Sandhoff Disease. <https://clinicaltrials.gov/ct2/show/NCT04669535>. PI: Terence R. Flotte, MD (University of Massachusetts Medical School); PI: Florian Eichler, MD (MGH Neurology). \$84,677 via subaward. Fall 2020 - Dec 2025. Funding: Sio Gene Therapies (formerly Axovant).

Co- Investigator, Correlates of motor outcomes in Duchenne Muscular Dystrophy. \$20,000 Funded by: Ryan’s Quest and Michael’s Cause Foundations, 2021.

Co-investigator, Extracellular RNA biomarkers of myotonic dystrophy. PI: Thurman Wheeler, MD (MGH Neurology). \$41,222. June 2020 - May 2023. Funding: DoD.

Research Collaborator of PI Kathryn Swoboda, MD. 20% FTE April 2015 – August 2020; 10% FTE August 2020 – Dec 2021. Funded by the following MGH Neurogenetics - based projects:

- A phase 4 study of nusinersen (BIIB058) among patients with Spinal Muscular Atrophy who received Onasemnogene Apeparvovec. <https://clinicaltrials.gov/ct2/show/NCT04488133>. Sponsor: Biogen, Jan. 2021 – Dec. 2021
- A prospective, multi-center, observational study of the safety, tolerability and effectiveness of SPINRAZA in adult patients with Spinal Muscular Atrophy. <https://clinicaltrials.gov/ct2/show/NCT03709784> Sponsor: Washington University School of Medicine, February 2020 – Dec. 2021
- AVXS-101-LT-002. A Long-term Follow-up Study of Patients in the Clinical Trials for Spinal Muscular Atrophy Receiving AVXS 10. <https://clinicaltrials.gov/ct2/show/NCT04042025> Sponsor: AveXis, March 2020 – Dec. 2021
- AVXS-101-CL-304 (Phase 3 Clinical Trial): A Global Study of a Single, One-Time Dose of AVXS-101 Delivered to Infants with Genetically Diagnosed and Pre-symptomatic Spinal Muscular Atrophy with Multiple Copies of SMN2 (SPR1NT). <https://clinicaltrials.gov/ct2/show/NCT03505099> Sponsor: AveXis, 2018 – Dec. 2021.
- An Open-Label Study to Assess the Efficacy, Safety, Tolerability and Pharmacokinetics of Multiple Doses of ISIS 396443 Delivered Intrathecally to Subjects with Genetically Diagnosed and

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Presymptomatic Spinal Muscular Atrophy (the NURTURE study).

<https://clinicaltrials.gov/ct2/show/NCT02386553>

Sponsor: Biogen, 2015 - 2020

- Newborn screening for identification and follow-up of infants with spinal muscular atrophy: SPOT SMA.

Funding: R01 HD69045-05, NICHD. 2015 - 2018

Past Funded/Submitted Scholarship and Grants (2009-2019)

Co-investigator, FDA R01 grant submission: 'Development of exRNA biomarkers of myotonic dystrophy type 1' A Natural History Study Addressing Unmet Needs of Rare Diseases: Orphan Products Research Project Grant. PI: Thurman Wheeler, MD (MGH Neurology). 5% FTE. Submitted Jan 2019, not funded.

Co-investigator, R01 grant submission: 'Extracellular RNA as Biomarkers in Neurogenetic Disorders' PI: Thurman Wheeler, MD (MGH Neurology). 5% FTE. Submitted Nov 2018, not funded.

Consultant/Evaluator

F Eichler (MGH Site PI). A Natural History Study of Molybdenum Cofactor and Isolated Sulfite Oxidase Deficiencies Prospective/Retrospective.

Funded by Alexion Pharmaceuticals, Inc.: \$2800; November 2014 – March 2016.

Author, Editor

Physical Therapy Management for Duchenne Muscular Dystrophy: A Resource for Community-based Providers Handbook/website.

Funded by Dillon Foundation Grant, MGH Department of Neurology: \$10,000; May 2013.

Consultant/ Study staff, sub-contract

CM Zaidman (PI). A Phase 1, Multi-center, Controlled, Prospective Correlative Study of Electrical Impedance Myography in Males with Duchenne Muscular Dystrophy and in Healthy Males.

Funded by DART Therapeutics: \$7500; January 2012 – September 2012

Consultant/ Study staff, sub-contract

N Goyal (PI). Safety, tolerability, and effects of L-Arginine on muscles in boys with dystrophinopathy on corticosteroids: A Pilot MRS study.

Funded by Quest Foundation and Race MD Grants: \$7044; September 2011 – July 2012

Co-Investigator

M Torriani (PI). Magnetic Resonance Spectroscopy (MRS) Biomarkers in Muscular Dystrophy.

Harvard Catalyst Pilot Grant: \$3155; 4% FTE (Total grant \$50,000); November 2009-November 2010

Principle Investigator

Effects of a supported standing program on bone mineral density, muscle length, function and health related quality of life in boys with Duchenne muscular dystrophy.

MGH Institute of Health Professions Faculty Research Fellowship: \$10,000; July 2009-June 2010

Hike for Hope Fund, MGH Pediatric Neuromuscular Clinic: \$4,000; May 2009-May 2011

Membership in Scientific/Professional organizations

TREAT-NMD Alliance Neuromuscular Network, member, Jan 2018 - present

American Physical Therapy Association, member 1995-2000; 2003-present

Pediatrics Section 2005-present; Education Section 2005-10; 2017-present; Neurology Section 2005-10

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Physical Therapy Association of Massachusetts, member 2005-present
Physical Therapy Association of Minnesota, member 2003-2005
Physical Therapy Association of Virginia, member 1997-2000
Physical Therapy Association of Georgia, student member 1995-1997

Society for Research in Child Development, member, 2000-2007
Center for Neurobehavioral Development, University of Minnesota,
Member, 2001-2005; alumni member 2005-present
Center for Cognitive Sciences, University of Minnesota, Pre-doctoral Affiliate Member, 2002-2005
Cognitive Neuroscience Society, member, 2003-2005
International Society of Exercise Immunology, member 1997-2000

Consultative and Advisory Positions Held

Consultant: STEP IN SMA (Spinal Muscular Atrophy Teaching and Excellence for Physiotherapists: An International Network) <https://www.stepinsma.org/>. Advisory board and physical therapy training team. August 2021 – present.

Consultant: Biogen Global SMA SPINRAZA Physical Therapy Training Team and Advisory Board. MGH IHP contract for \$79,240, June 2020-May 2024.

Consultant: Aspa Therapeutics (BridgeBio)

A Phase 1/2 Open-Label Study of the Safety and Clinical Activity of Gene Therapy for Canavan Disease Through Administration of an Adeno-Associated Virus (AAV) Serotype-9 Based Recombinant Vector Encoding the Human ASPA Gene (CVN-102). Jan 2020 – present.

A Combination Retrospective Medical History and Prospective Observational Study of Patients with Canavan Disease for Assessment of Natural History of Canavan Disease (CVN-101). January 2019 – present.

Consultant: Biogen. Medical Advisory Board for Functional Outcome Measures in Teen/Adult Spinal Muscular Atrophy (SMA). June 2018.

Consultant: Casimir, LLC. Development of home-based video outcomes for Duchenne Muscular Dystrophy (DMD). May 2018.

Host committee member: “Tackling Duchenne” Annual Fundraiser for JB’s Keys to DMD. Non-profit organization that aims to raise awareness and support quality care, treatments and research for Duchenne muscular dystrophy.
March 2012 - May 2018

Consultant: Infant and toddler shoe development studies for Stride Rite, Wolverine Worldwide
January - November 2013

Professional Service

Global Leukodystrophy Initiative Clinical Trials Network (GLIA-CTN) Data Governance/Data Standards Committee, Jan 2021 – present.

Reviewer: Education session proposals for 2021 Academy of Pediatric Physical Therapy Annual Conference, April – May 2021.

Ad hoc Reviewer:

Archives of Physical Medicine and Rehabilitation, March 2020 – present

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Physical Therapy Journal, January 2020 – present
Pediatric Physical Therapy, 2011- present
Child Neurology, 2018 - present
Neurology, 2017- present
Physiotherapy Theory and Practice, 2015 – present
PLOS One, 2017 – present

Item Writer: American Board of Physical Therapy Specialties (ABPTS), Specialization Academy of Content Experts (SACE) in Pediatrics, January 2016 – Dec 2017 (two terms).

Reviewer (Textbook): Feters and Tilson, 2nd Edition. Evidence Based Physical Therapy. FA Davis. Summer 2017

Proposal reviewer for Academy of Pediatric Physical Therapy (APPTAC), 2017

Scientific Abstract Reviewer: 2016 APTA IV STEP Conference. International summer institute for clinicians, educators and researchers in neurologic and pediatric physical therapy, Summer 2015

Reviewer/Contributor: Rothstein JM, Roy, SH & Wolf SL (2013). Rehabilitation Specialist's Handbook, 4th Ed. Pediatric, Muscular Dystrophy and Juvenile Rheumatoid Arthritis sections. FA Davis.

National Institute of Neurological Disorders and Stroke (NINDS)/NIH working group to develop common data elements (CDEs) for *Duchenne muscular dystrophy*, 2012-2013.

National Institute of Neurological Disorders and Stroke (NINDS)/NIH working group to develop common data elements (CDEs) for *Neuromuscular diseases*, 2011-2013.

Grant Reviewer: MGH Center for Integration of Medicine and Innovative Technology (CIMIT), 2011-2013.

Item Writer: National Physical Therapy Examination, Federation of State Boards of Physical Therapy (FSBPT), 2010-2011.

Reviewer (Textbook): JS Tecklin (2008). Pediatric Physical Therapy, 4th Ed. LWW.

Reviewer (Textbook): M Dranch (2008). The Clinical Practice of Pediatric Physical Therapy, 1st Ed. LWW.

Service to the University/College/School on Committees/Councils/Commissions

Institute Wide/School of Health and Rehabilitation Sciences

Associate Director, PhD Program in Rehabilitation Sciences, Aug. 2018 - present

New Faculty Mentor for Catherine Leslie (OT), June 2020-Dec 2021

Search Committee for OT pediatric faculty position, March 2019 – June 2020

Search Committee for Dean of Enrollment Services, Spring/Summer 2019

Faculty Senate: Faculty Appointments and Promotion Committee, 2013 - 2019

Chair 2015-2016

Search Committee for SHRS Dean, 2017 - 2018

Search Committee for PT Chair, 2016 - 2017

Mentor to new SRHS faculty (for Provost's Office)

Diane Smith (OT), 2015 - 2016

Emily Zeman (OT), 2016 - 2017

Chris Clock (PT), 2017 - 2018

Search Committee for OT pediatric faculty position, 2014 - 2015

Research and Scholarship Committee, 2009 - 2013

Interdisciplinary Seminar Planning Committee, 2006 - 2009

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Course and Curriculum Review Committee, 2006 - 2009

Department of Physical Therapy

DPT Admissions committee, 2005 - present

Chair 2016 – 2020; 2021 - 2022

PT Faculty Search Committees, 2008-2014; 2016 - 2018

Neuroscience/Motor Control Faculty Search, 2016 – 2018

Cardiovascularpulmonary Faculty Search, 2017

Project lead, Needs assessment for PT continuing education, 2015-2016.

Advisory Board, PT Center for Clinical Education and Health Promotion, 2009-2015

CAPTE Self-study Committee, 2013 - 2014

tDPT Admissions committee, 2007-2013

Committee on Academic Policy and Procedure (CAPP), 2010 – 2012

Entry-level DPT Curriculum Committee, 2005-2010

- Clinical decision-making task force, 2005-2009

- Chair: ELPT Professional Development Plan redesign task force, 2009-2010

IONTA Grant Award Review Committee, 2007-2008

Human Patient Simulation Task Force, 2005-2006

Honors and Awards

2018 APTA Academy of Pediatric Physical Therapy CSM Outstanding Research Abstract Award
2009 Partners in Excellence Team Award for ‘ELPT Admissions Leadership’
2007 Partners in Excellence Team Award for ‘Improving Clinical Decision Making’ Task Force
2003-2004 Doctoral Dissertation Fellowship, University of Minnesota, Graduate School
2002-2004 NIMH National Research Service Award
2001 Honorable Mention, National Science Foundation Graduate Research Fellowship
1997 Commencement Marshall, Emory University School of Medicine
1994 Phi Beta Kappa, University of Virginia
1992-1994 Distinguished Majors Program, University of Virginia

Continuing Education

Basic Biostatistics for Clinical Research. MGH Biostatistics Center. Jan – Feb 2021, 7.5 contact hours.

Instructor: Dr. Brian Healy, PhD

Applied Biostatistics for Clinical Trials. MGH Biostatistics Center. Feb – March 2021, 6 contact hours. Instructor: Dr. Brian Healy, PhD

Interpreting and Presenting Results – Qualitative and Mixed Methods. MGH Division of Clinical Research. March 16, 2021, 1 contact hour. Instructor: Laura Traeger, PhD

Cure SMA Annual Conference, June: 2021 (virtual), 2020 (virtual), 2019, 2018, 2017, 2016, 2015

MGH IHP Faculty Lunch Bites: What Are Inclusive Teaching Practices? February 4, 2020

<https://www.lifescied.org/doi/full/10.1187/cbe.19-01-0021>

APTA Combined Sections Meetings, Feb: 2018, 2017, 2016, 2012, 2011, 2008, 2007, 2006

Cultural Considerations for CDM in Diverse Patient/Client populations. APTA Online Learning Center: August 2017

Compassion in Practice: Achieving Better Outcomes by Maximizing Communication, Relationships and Resilience. Harvard Medical School course: October, 2016.

APTA STEP Conference, July: 2016 (IV), 2005 (III)

Parent Project Muscular Dystrophy Annual Conference, June: 2014, 2013, 2010, 2009, 2008

27th International Seating Symposium (ISS), 2011

Annual Meeting of the Massachusetts Chapter of APTA, 2010

11th Annual Advanced Clinical Practice in Pediatric Physical Therapy Meeting, 2008

Current/Recent Teaching Responsibilities:

Instructor, PT 850 (DPT) Capstone Project: 2017-2020, 2022

Instructor, PT 880-01 (DPT) Pediatrics Special Topics Seminar, Summer 2018 - 2020, 2022

Co-Instructor, PT 712/713 (DPT) PT Management of Developmental and Degenerative Conditions Across the Lifespan, Fall 2017 - 2020

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Instructor, Pediatrics thread (DPT) including session in PT604, 605, 606, 607, 608, 709, 710 for 2016 - 2022

Academic/Research Advising:

- Research Mentor, PhD-RS student Michael Kiefer 2019 - present
- Academic advisor, PhD RS student, Stephen Grist, 2022 - present
- Academic advisor, PhD RS student, Meredith (Rogazzo) Young, 2022 - present
- Academic advisor, PhD RS student Brenda Lovette, 2022 – present
- Academic advisor, PhD RS student Zaina Muqbel, 2022- present
- Academic advisor, PhD-RS student Amber Lamarca, 2021-present
- Academic advisor, PhD-RS student Ben Farmer, 2019 - 2022
- Academic advisor, PhD-RS student Danielle Kline, 2018 – 2021
- Dissertation committee, PhD-RS student Julie Shulman, 2019 – 2020
- Qualls Committee, PhD-RS student Catherine Lesley, 2019
- Academic advisor, 8-10 Y1/Y2/Y3 DPT students annually, 2006 - 2022