



## **2018 Annual Report**

### ***Division of Pediatric Critical Care Medicine***

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#### **DIVISION DESCRIPTION**

The Division of Pediatric Critical Care Medicine (PCCM) delivers comprehensive, state-of-the-art care to critically ill children admitted to American Family Children's Hospital. The Division also provides pediatric procedural sedation to children in the AFCH Diagnostic and Therapy Center, which includes the Pediatric Sedation Program.

Our scholarly endeavors include advocacy, medical education, clinical and basic science research, and global health.

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#### **2018 HIGHLIGHTS**

- **Pelin Cengiz, MD**, received a one-year, \$50,000 grant from the Institute for Clinical and Translational Research (ICTR) and the Waisman Center for her project, "Role of ER $\alpha$  Following Brain Injury: Ligand Dependent or Independent?" Expanding on her previous novel findings of the upregulation of estrogen receptor alpha in female neonate brains being neuroprotective, she will investigate whether this receptor activation is dependent on the sex steroid estradiol, and if it is, she will determine whether the estradiol is originating from adrenals or brain.

Dr. Cengiz also received a 2018 Star Research Achievement Award from the Society of Critical Care Medicine (SCCM) for her abstract, "Vulnerability of Male Brains to Global Hypoxic Ischemic Brain Injury and Estrogen Receptor Alpha." The award, which was presented during the SCCM Abstract-Based Awards Ceremony in February 2018, recognizes excellence in critical care research.

- **Melissa Cercone, MD**, received a 2018 UW Health Clinical Educator Excellence Award, which recognizes clinicians who show remarkable skill in teaching the next generation of physicians, interdisciplinary team members, patients and families.
- Two UW-Madison undergraduate students in the lab of **Marlowe Eldridge, MD**, Caitlin Jarrard and Rachel Harradine, received 2018 Barbara A. Horwitz and John M. Horowitz Outstanding Undergraduate Abstract Awards during the American Physiological Society's Experimental Biology meeting in April 2018. Jarrard also received the Excellence in Undergraduate Research Award based on her oral presentation.

Dr. Eldridge also received a one-year, \$70,613 Fall Competition grant from the UW-Madison Office of the Vice Chancellor for Research and Graduate Education for the project, "Skeletal muscle dysfunction in adult survivors of preterm birth."

- Graduate student **Laura Tetri, PhD** (mentors Jennifer Rehm, MD, and Aaron Carrel, MD), received a one-year, \$10,000 UW Institute for Clinical and Translational Research-Medical Scientist Training Program (ICTR-MSTP) Pilot Award for the project, "Linking Sex and Fitness with Metabolic Disease in Obese Children." This project aims to understand the role of cardiovascular fitness in indices of metabolic disease and provide a modifiable variable in children's lives that could reduce the negative effects of obesity.
- **Michael Wilhelm, MD**, received a 2018 UW Health Clinical Practice Excellence Award, which honors outstanding clinicians who demonstrate an extraordinary commitment to safety and quality patient- and family-centered care.

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## RECENT PUBLICATIONS

**Al-Subu A**, Jooste E, Hornik CP, Fleming GA, Cheifetz IM, Ofori-Amanfo G. Correlation between minute carbon dioxide elimination and pulmonary blood flow in single-ventricle patients after stage 1 palliation and 2-ventricle patients with intracardiac shunts: A pilot study. *Paediatr Anaesth*. 2018 Jul;28(7):618-624. doi: 10.1111/pan.13423. PubMed PMID: 30133920.

Barton GP, Vildberg L, Goss K, Aggarwal N, **Eldridge M**, McMillan AB. Simultaneous determination of dynamic cardiac metabolism and function using PET/MRI. *J Nucl Cardiol*. 2018 May 1. doi: 10.1007/s12350-018-1287-7. [Epub ahead of print] PubMed PMID: 29717407. \*

Bates ML, Anagnostopoulos PV, Nygard C, Torgeson J, Reichert J, Galambos C, **Eldridge MW**, Lamers LJ. Consequences of an early catheter-based intervention on pulmonary artery growth and right ventricular myocardial function in a pig model of pulmonary artery stenosis. *Catheter Cardiovasc Interv*. 2018 Mar 30. doi: 10.1002/ccd.27593. [Epub ahead of print] PubMed PMID: 29602248. \*

**Braun RK**, Broymann O, Braun FM, Brinkman JA, Clithero A, Modi D, Pegelow DF, **Eldridge M**, Teodorescu M. Chronic intermittent hypoxia worsens bleomycin-induced lung fibrosis in rats. *Respir Physiol Neurobiol*. 2018 Oct;256:97-108. doi: 10.1016/j.resp.2017.04.010. Epub 2017 Apr 27. PubMed PMID: 28456608; PubMed Central PMCID: PMC5659967. \*\*

**Braun RK**, Chetty C, Balasubramaniam V, Centanni R, Haraldsdottir K, Hematti P, **Eldridge MW**. Intraperitoneal injection of MSC-derived exosomes prevent experimental bronchopulmonary dysplasia. *Biochem Biophys Res Commun*. 2018 Sep 18;503(4):2653-2658. doi: 10.1016/j.bbrc.2018.08.019. Epub 2018 Aug 7. PubMed PMID: 30093115.

**Brazelton T**. Pediatrics. In: Mistovich JJ and Karren K, eds. *Prehospital Emergency Care*, 11th edition. Upper Saddle River, NJ: Pearson Education Inc.; 2018.

Carberry AR, **Hollman GA**. Physician Training and Perspective. In: Gooden C, Lowrie L, Jackson B, eds. *The Pediatric Procedural Sedation Handbook*. New York: Oxford University Press. 2018; 350-356.

Cashen K, Costello JM, Grimaldi LM, Narayana Gowda KM, Moser EAS, Piggott KD, **Wilhelm M**, Mastropietro CW. Multicenter validation of the vasoactive-ventilation-renal score as a predictor of prolonged mechanical ventilation after neonatal cardiac surgery. *Pediatr Crit Care Med*. 2018 Nov;19(11):1015-1023. doi: 10.1097/PCC.0000000000001694. PubMed PMID: 30095748.

Chandran R, Kim T, Mehta SL, Udho E, Chanana V, **Cengiz P**, Kim H, Kim C, Vemuganti R. A combination antioxidant therapy to inhibit NOX2 and activate Nrf2 decreases secondary brain damage and improves functional recovery after traumatic brain injury. *J Cereb Blood Flow Metab*. 2018 Oct;38(10):1818-1827. doi: 10.1177/0271678X17738701. Epub 2017 Oct 30. PubMed PMID: 29083257; PubMed Central PMCID: PMC6168911.

Goss KN, Beshish AG, Barton GP, Haraldsdottir K, Levin TS, Tetri LH, Battiola TJ, Mulchrone AM, Pegelow DF, Palta M, Lamers LJ, Watson AM, Chesler NC, **Eldridge MW**. Early pulmonary vascular disease in young adults born preterm. *Am J Respir Crit Care Med*. 2018 Jun 26. doi: 10.1164/rccm.201710-2016OC. [Epub ahead of print] PubMed PMID: 29944842. \*

Haraldsdottir K, Watson AM, Goss KN, Beshish AG, Pegelow DF, Palta M, Tetri LH, Barton GP, Brix MD, Centanni RM, **Eldridge MW**. Impaired autonomic function in adolescents born preterm. *Physiol Rep*. 2018 Mar;6(6):e13620. doi: 10.14814/phy2.13620. PubMed PMID: 29595875; PubMed Central PMCID: PMC5875539.

Hoonakker P, Hose BZ, Carayon P, Eithun B, **Brazelton T**, Dean S, Kelly M, Kohler J, Ross J, Rusy D, Gurses A. Things falling through the cracks: information loss during pediatric trauma care transitions. In: Bagnara S, Tartaglia R, Albolino S, Alexander T, Fujita Y, eds. *Proceedings of the 20th Congress of the International Ergonomics Association (IEA 2018)*. IEA 2018. *Advances in Intelligent Systems and Computing*, vol 818. Springer, Cham. [https://doi.org/10.1007/978-3-319-96098-2\\_60](https://doi.org/10.1007/978-3-319-96098-2_60).

Hose BZ, Carayon P, Wooldridge A, **Brazelton T**, Dean S, Eithun B, Kelly M, Kohler J, Ross J, Rusy D, Gurses A. Challenges of disposition decision making for pediatric trauma patients in the emergency department. In: Bagnara S, Tartaglia R, Albolino S, Alexander T, Fujita Y, eds. *Proceedings of the 20th Congress of the International Ergonomics Association (IEA 2018)*. IEA 2018. *Advances in Intelligent Systems and Computing*, vol 818. Springer, Cham. [https://doi.org/10.1007/978-3-319-96098-2\\_44](https://doi.org/10.1007/978-3-319-96098-2_44).

Kojima T, Harwayne-Gidansky I, Sheno AN, Owen EB, Napolitano N, Rehder KJ, Adu-Darko MA, Nett ST, Spear D, Meyer K, Giuliano JS Jr, Tarquinio KM, Sanders RC Jr, Lee JH, Simon DW, Vanderford PA, Lee AY, Brown CA 3rd, Skippen PW, Breuer RK, Toedt-Pingel I, Parsons SJ, et al (**AI-Subu AM**, collaborator). Cricoid pressure during induction for tracheal intubation in critically ill children: a report from national emergency airway registry for children. *Pediatr Crit Care Med*. 2018 Jun;19(6):528-537. doi: 10.1097/PCC.0000000000001531. PubMed [citation] PMID: 29863636.

Kojima T, Laverriere EK, Owen EB, Harwayne-Gidansky I, Sheno AN, Napolitano N, Rehder KJ, Adu-Darko MA, Nett ST, Spear D, Meyer K, Giuliano JS Jr, Tarquinio KM, Sanders RC Jr, Lee JH, Simon DW, Vanderford PA, Lee AY, Brown CA 3rd, Skippen PW, Breuer RK, Toedt-Pingel I, Parsons SJ, Gradidge EA, Glater LB, Culver K, Li S, Polikoff LA, Howell JD, Nuthall G, Bysani GK, Graciano AL, Emeriaud G, Saito O, Orioles A, Walson K, Jung P, **AI-Subu AM**, Ikeyama T, Shetty R, Yoder KM, Nadkarni VM, Nishisaki A; National Emergency Airway Registry for Children (NEAR4KIDS) collaborators and Pediatric Acute Lung Injury and Sepsis Investigators (PALISI). Clinical impact of external laryngeal manipulation during laryngoscopy on tracheal intubation success in critically ill children. *Pediatr Crit Care Med*. 2018 Feb;19(2):106-114. doi: 10.1097/PCC.0000000000001373. PubMed PMID: 29140970.

Miller KB, Howery AJ, Harvey RE, **Eldridge MW**, Barnes JN. Cerebrovascular reactivity and central arterial stiffness in habitually exercising healthy adults. *Front Physiol*. 2018 Aug 17;9:1096. doi: 10.3389/fphys.2018.01096. eCollection 2018. PubMed PMID: 30174609; PubMed Central PMCID: PMC6107836.

Moses KL, Seymour M, Beshish A, Baker KR, Pegelow DF, Lamers LJ, **Eldridge MW**, Bates ML. Inspiratory and expiratory resistance cause right-to-left bubble passage through the foramen ovale. *Physiol Rep*. 2018 Jun;6(12):e13719. doi: 10.14814/phy2.13719. PubMed PMID: 29952137; PubMed Central PMCID: PMC6021277.

Nellis ME, Karam O, Mauer E, Cushing MM, Davis PJ, Steiner ME, Tucci M, Stanworth SJ, Spinella PC; Pediatric Acute Lung Injury and Sepsis Investigators (PALISI) network, Pediatric Critical Care Blood Research Network (BloodNet), and the P3T Investigators (**Al-Subu AM**, **Hagen SA**, collaborators). Platelet transfusion practices in critically ill children. *Crit Care Med*. 2018 Aug;46(8):1309-1317. doi: 10.1097/CCM.0000000000003192. PubMed [citation] PMID: 29727368.

**Peters M**, Zee-Cheng J, Kuhl A, Orozco J, Lally E, Schwoerer JS. Pegylated asparaginase as cause of fatal hyperammonemia in patients with latent urea cycle disorder. *Pediatr Blood Cancer*. 2018 Sep;65(9):e27239. doi: 10.1002/pbc.27239. Epub 2018 May 18. PubMed PMID: 29775236.

Ruedinger KL, Zhou H, Trampe B, Heiser T, **Srinivasan S**, Iruretagoyena JI, Roldán-Alzate A. Modeling fetal cardiac anomalies from prenatal echocardiography with 3-dimensional printing and 4-dimensional flow magnetic resonance imaging. *Circ Cardiovasc Imaging*. 2018 Sep;11(9):e007705. doi: 10.1161/CIRCIMAGING.118.007705. PubMed PMID: 30354680.

Sarnaik A, Ferguson NM, O'Meara AMI, Agrawal S, Deep A, Buttram S, Bell MJ, Wisniewski SR, Luther JF, Hartman AL, Vavilala MS; Investigators of the ADAPT Trial (**Ferrazzano P**, collaborator). Age and mortality in pediatric severe traumatic brain injury: results from an international study. *Neurocrit Care*. 2018 Jun;28(3):302-313. doi: 10.1007/s12028-017-0480-x. PubMed PMID: 29476389.

Skeith L, Ridinger H, **Srinivasan S**, Givi B, Youssef N, Harris I. Exploring the thesis experience of Master of Health professions education graduates: a qualitative study. *Int J Med Educ*. 2018 Apr 27;9:113-121. doi: 10.5116/ijme.5abe.2209. PubMed PMID: 29705774; PubMed Central PMCID: PMC5951784.

Slusher TM, Kiragu AW, Day LT, Bjorklund AR, Shirk A, Johannsen C, **Hagen SA**. Pediatric critical care in resource-limited settings-overview and lessons learned. *Front Pediatr*. 2018 Mar 16;6:49. doi: 10.3389/fped.2018.00049. eCollection 2018. Review. PubMed PMID: 29616202; PubMed Central PMCID: PMC5864848.

**Srinivasan S**, Howley LW, Cuneo BF, Chatfield KC. In-utero idiopathic ductal constriction: a prenatal manifestation of Alagille and Williams syndrome arteriopathy. *J Perinatol*. 2018 Nov;38(11):1453-1456. doi: 10.1038/s41372-018-0221-9. Epub 2018 Sep 10. PubMed PMID: 30202046.

Talukdar AM, Bilen-Rosas G, **Wilhelm M**, **Al-Subu A**. The novel early use of dexmedetomidine in the management of tetanus. *J Clin Anesth*. 2018 Nov;50:18-19. doi: 10.1016/j.jclinane.2018.05.013. Epub 2018 Jun 22. PubMed PMID: 29940468.

Tetri LH, Diffie GM, Barton GP, **Braun RK**, Yoder HE, Haraldsdottir K, **Eldridge MW**, Goss KN. Sex-specific skeletal muscle fatigability and decreased mitochondrial oxidative capacity in adult rats exposed to postnatal hyperoxia. *Front Physiol*. 2018 Mar 29;9:326. doi: 10.3389/fphys.2018.00326. eCollection 2018. PubMed PMID: 29651255; PubMed Central PMCID: PMC5884929.

Tobias JD, **Hollman GA**. Credentialing and Re-credentialing for Pediatric Sedation. In: Gooden C, Lowrie L, Jackson B, eds. *The Pediatric Procedural Sedation Handbook*. New York: Oxford University Press. 2018; 407-424.

Vijayan M, Kumar S, Yin X, Zafer D, Chanana V, **Cengiz P**, Reddy PH. Identification of novel circulatory microRNA signatures linked to patients with ischemic stroke. *Hum Mol Genet.* 2018 Jul 1;27(13):2318-2329. doi: 10.1093/hmg/ddy136. PubMed PMID: 29701837; PubMed Central PMCID: PMC6005038.

Watson AM, Coutinho C, Haraldsdottir K, Brickson S, Dunn W, **Eldridge M**. In-season changes in ventricular morphology and systolic function in adolescent female athletes. *Eur J Sport Sci.* 2018 May;18(4):534-540. doi: 10.1080/17461391.2018.1435725. Epub 2018 Feb 12. PubMed PMID: 29431592.

Zaitoun IS, Cikla U, Zafer D, Udho E, Almomani R, Suscha A, **Cengiz P**, Sorenson CM, Sheibani N. Attenuation of retinal vascular development in neonatal mice subjected to hypoxic-ischemic encephalopathy. *Sci Rep.* 2018 Jun 15;8(1):9166. doi: 10.1038/s41598-018-27525-8. PubMed PMID: 29907863; PubMed Central PMCID: PMC6003906.

*\*ePub only; no print citation available when report was compiled*

*\*\* Publication had previously appeared in 2017 report as an ePub*

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## GRANT SUPPORT

Principal Investigator	Sponsor	Title	Co-Investigators
Al-Subu, Awni	Philips Healthcare	High flow nasal cannula interface clinical evaluation	
Carayon, Pascale (UW Department of Industrial and Systems Engineering)	Health Resources & Services Administration (HRSA)	Teamwork and care transitions in pediatric trauma: Implications for HIT design	Critical Care: Tom Brazelton  Hospital Medicine: Shannon Dean, Michelle Kelly
Cengiz, Pelin	National Institutes of Health (NIH)	Estrogen receptors and TrkB mediated neuroprotection in neonatal hypoxia-ischemia	
Cengiz, Pelin	UW - Institute for Clinical & Translational Research	Role of ER alpha following brain injury: Ligand dependent or independent?	
Eldridge, Marlowe	DOD, Navy	Improving safety of submarine escape and rescue from shallow depth	
Eldridge, Marlowe	William S. Middleton VA Medical Center	Pegelow IPA	
Schrage, William G (UW Department of Kinesiology)	National Institutes of Health (NIH)	Peripheral vasodilation in obese humans	Critical Care: Marlowe Eldridge
Ferrazzano, Peter A	National Institutes of Health (NIH)	MRI markers of functional outcome after severe pediatric TBI	

Ferrazzano, Peter A	National Institutes of Health (NIH)	Age-dependent microglial responses in hypoxia-ischemia	
Ferrazzano, Peter A	National Institutes of Health (NIH) & Cincinnati Children's Hospital Medical Center	Genetic and environmental influences on recovery of severe pediatric brain injury	