

**Ryan Barbaro, M.D., M.S.**  
Assistant Professor  
Pediatric Critical Care Medicine  
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## **EDUCATION**

<i>Undergraduate</i>	BS, <i>summa cum laude</i> University of North Carolina Chapel Hill, North Carolina Major: Biology and Psychology	08/2000 - 05/2004
<i>Professional</i>	MD University of North Carolina School of Medicine Chapel Hill, North Carolina	08/2004 - 05/2008
	MS University of Michigan Rackham Graduate School Ann Arbor, Michigan Master's: Health and Health Care Research	07/2013 – 08/2014

## **TRAINING**

<i>Residency</i>	Pediatrics North Carolina Children's Hospital University of North Carolina Chapel Hill, North Carolina	06/2008 - 06/2011
<i>Fellowship</i>	Pediatric Critical Care Medicine C.S. Mott Children's Hospital University of Michigan Ann Arbor, Michigan	07/2011 – 06/2014
	Pediatric Health Services Research Child Health Evaluation and Research Unit University of Michigan Ann Arbor, Michigan	07/2013 – 06/2015

## **CERTIFICATE AND LISCENSURE**

- 2008 – Present Pediatric Advanced Life Support (PALS), Certified
- 2011 – Present Advanced Cardiovascular Life Support (ACLS), Certified
- 2011 – Present Pediatric Advanced Life Support (PALS) Instructor, Certified
- 2011 - Present State of Michigan Medical License, Permanent ID 4301098022
- 2011 – Present Diplomate of the American Board of Pediatrics  
General Pediatrics, Certificate Number 99484
- 2014 – Present Diplomate of the American Board of Pediatrics  
Pediatric Critical Care Medicine Sub-board, Certificate Number 2146

## **ACADEMIC, ADMINISTRATIVE, AND CLINICAL APPOINTMENTS**

- 10/2017 – Present Assisstan Proffessor, Department of Pediatrics, University of Michigan
- 07/2014 – 10/2017 Clinical Lecturer, Department of Pediatrics, University of Michigan
- 07/2014 – Present Attending Staff Physician, University of Michigan Health System
- 07/2015 – Present Core Faculty, Child Health Evaluation and Research (CHEAR) Unit,  
Division of General Pediatrics, University of Michigan
- 05/2016 – Present Member, Insitute for Healthcare Policy and Innovation
- 05/2016 – Present Member, Michigan Center for Integrative Research in Critical Care  
(MCIRC)

## **RESEARCH INTERESTS**

My research work focuses on understanding the drivers of practice variation and outcomes in children requiring extracorporeal membrane oxygenation (ECMO) support. As the extracorporeal life support organization registry chair, I am leading the deelopment real-time risk adjusted outcome reporting platform. My research also seeks to determine best practice for children requiring ECMO support.

## **GRANTS**

- 01/2014 – 12/2015 *Principal Investigator*, Developing and Applying an Extracorporeal Membrane Oxygenation Severity of Illness Index Score  
Extracorporeal Life Support Organization Research Grant  
Total Cost: \$4,700
- 12/2014 – 12/2016 *Co-Investigator*, Predictors of Extracorporeal Life Support Outcomes in Infant Pertussis; (PI: Domico, Michele)  
Extracorporeal Life Support Organization Research Grant  
Total Cost: \$5,000
- 07/2013 – 06/2015 *Trainee*, Training Grant for Pediatric Health Services Research  
(PI: Davis, Matthew M.)  
NICHD, NIH T32 F025206-064171 Grant
- 01/2016 – 12/2017 *Principal Investigator*, Standardized Mortality Ratio for Children Requiring Extracorporeal Membrane Oxygenation  
Extracorporeal Life Support Organization Research Grant  
Total Cost: \$10,000
- 07/2017 – 07/2018 *Principal Investigator*, Automated Diagnosis of Pediatric Acute Respiratory Distress better than Clinical Recognition?  
Charles Woodson Pilot Research Award  
Total Cost: \$15,000
- 9/2017 to 5/2022 *Co-Investigator*, Pediatric Implantable Artificial Lung  
(PI: Hirschl, Ronald),  
NICHD, NIH R01HD015434-34  
Total Cost: \$2,983,538
- 7/2018 to 6/2021 *Trainee*, Training to Advance Care Through Implementation science in Cardiac And Lung illnesses (TACTICAL) (PI: Iwashyna, Theodore)  
NHLBI, NIH K12 HL138039

## **HONORS AND AWARDS**

- 2008 David A Mayberry Award. Awarded for compassion and clinical scholarship in the care of children with cancer

2011	Evening of Scholarship Merit Award
2012	Making a Difference Award
2014	Travel Awards Program for Young Investigator's, Pediatric Academic Society
2014	Young Investigator Award, Euro Extracorporeal Life Support Organization
2017	Society of Critical Care Medicine Star Research Achievement Award

### **Membership in Professional Societies**

2008 - Present	Fellow, American Academy of Pediatrics
2011 - Present	Society of Critical Care Medicine
2012 - Present	Society of Pediatric Research
2016 - Present	Extracorporeal Life Support Organization

### **EDITORIAL POSITIONS, BOARDS, AND PEER REVIEW**

2013 - Present	Reviewer, <i>Perfusion Journal</i>
2015 – Present	Reviewer, <i>Pediatric Critical Care Medicine</i>
2017 – Present	Reviewer, <i>Critical Care Medicine</i>

### **TEACHING ACTIVITIES**

#### *Lectures*

2012 – 2017 Given monthly to resident and fellow trainees during their rotation through the PICU. Titles of lectures include:

- Extracorporeal Membrane Oxygenation
- Rescue Therapies in Acute Respiratory Distress Syndrome
- Sedation and Neuromuscular Blockade

#### *Simulation*

2013 – 2016 Twice monthly simulate mock codes with pediatric resident trainees and medical students

*Teaching Rounds*

2014 – Present As an attending physician, I supervise and actively teach during clinical rounds in the PICU for a week every month. Learners include medical students, nurse practitioner students, nurses, residents and fellows.

*ECMO Conferences*

2015 – Present Quarterly interdepartmental conference involving pediatric surgery, pediatric critical care medicine and other invitees to discuss best practice in pediatric ECMO care.

**COMMUNITY, ORGNIZATIONAL, AND VOLUTEER SERVICE**

*Departmental*

2013 – 2014 Pediatric Critical Care Medicine Representative for EPIC/MiChart Implementation. Mott Children & Women’s Hospital Quality & Safety Committee, University of Michigan

2014 – 2017 Fellowship Scholarly Oversight Committee Member, Lauren Yagiela  
2015 – Present Fellowship Scholarly Oversight Committee Member, Erin Carlton  
2016 – Present Fellowship Scholarly Oversight Committee Member, Jeffery Weatherhead

2016 – Present Clinical Competency Committee, assists the program director in deeming fellows “competent” and “progressing as expected” over the course of fellowship

*Health System*

2014 – Present Pediatric Critical Care Medicine Representative for Clinical ECMO Management, University of Michigan

2016 – Present Pediatric Medical Director ECMO, University of Michigan

*National*

2017- Present Chair, Society of Critical Care Medicine and Extracorporeal Life Support Organization White Paper Task Force on the role of critical care professionals in the management of patients on ECMO

*International*

2015 – Present Extracorporeal Life Support Organization Research Grants Committee

2016-Present Chair, Registry Committee for Extracorporeal Life Support Organization  
As chair I oversee the scholarly oversight committee which evaluates research proposals for publication; lead the development of a real-time risk adjusted outcomes reporting for our over 500 international centers,

and lead ongoing development and validation the registry of nearly 100,000 patients.

## **EXTRAMURAL INVITED PRESENTATIONS**

- 03/2014                    “Intersections of Extracorporeal Membrane Oxygenation (ECMO) and Hematopoietic Stem Cell Transplant”  
Pediatric Acute Lung Injury and Sepsis Investigators
- 09/2014                    “Hospital ECMO Volume and ECMO Mortality Rates: Analysis of the ELSO Registry”  
25<sup>th</sup> Anniversary ELSO Conference
- 02/2015                    “Outcome in Extracorporeal Membrane Oxygenation”  
31<sup>st</sup> Annual Children’s National Symposium: ECMO and the Advanced Therapies for Respiratory Failure
- 02/2015                    “When is Lung Injury Unrecoverable”  
31<sup>st</sup> Annual Children’s National Symposium: ECMO and the Advanced Therapies for Respiratory Failure
- 02/2016                    “ECMO Dilemas”  
32<sup>nd</sup> Annual Children’s National Symposium: ECMO and the Advanced Therapies for Respiratory Failure
- 09/2016                    “ECMO Outcomes”  
27<sup>th</sup> Annual ELSO Conference
- 03/2017                    “Long Term ECMO – How Long is Too Long”  
33<sup>rd</sup> Annual Children’s National Symposium: ECMO and the Advanced Therapies for Respiratory Failure
- 04/2017                    “Extracorporeal Resuscitation Consortium Registry”  
  
ECPR Research Meeting, Ottawa, Canada
- 05/2017                    “ELSO Registry: What’s New”  
6<sup>th</sup> Annual International EuroELSO Congress, Maastricht, Netherlands
- 06/2017                    “ELCS and Big Data: Driving Innovation and Outcome”  
63<sup>rd</sup> Annual ASAIO Conference, Chicago, Illinois

- 09/2017                   ELSO Let's Measure the Quality of Your ECMO  
28<sup>th</sup> Annual Conference, Baltimore, Maryland
- 09/2017                   Success: Negotiating what you need, setting a realistic timeline,  
competing priorities (how and when to say "no") PALISI Faculty Course:  
Building your clinical research career
- 11/2017                   “Data Governance, Oversight and Uses – what are the challenges,  
requirements and important next steps”  
Federal Drug Administration Cardiac Device Coordinated Research  
Network Kick-off Event, FDA White Oak Campus, Silver Spring, MD
- 02/2018                   “”  
34<sup>th</sup> Annual Children's National Symposium: ECMO and the Advanced  
Therapies for Respiratory Failure
- 02/2018                   “”  
34<sup>th</sup> Annual Children's National Symposium: ECMO and the Advanced  
Therapies for Respiratory Failure

## **INTRAMURAL PRESENTATIONS**

- 01/2012                   “Bronchiolitis and the Mechanical Ventilator: Lessons in Physiology”  
Pediatric Resident Interest Group, University of Michigan
- 03/2012                   “Postoperative Management in Liver Transplant Patients”  
Joint Critical Care Lecture Series
- 06/2012                   “Adjusting Our Humors: Part I Not Enough”  
Pediatric Critical Care Didactic Lecture Series
- 03/2013                   “Evidence for the Oscillator”  
Pediatric Critical Care Didactic Lecture Series
- 11/2013                   “Lactic Acidosis”  
Pediatric Critical Care Didactic Lecture Series
- 12/2014                   “Viral Induced Respiratory Failure”  
Pediatric Surgery Didactic Lecture Series
- 01/2015                   “The Best Path Forward in Pediatric ECMO”  
Child Health Evaluation and Research (CHEAR) Unit Health Services  
Research Seminar Series

03/2015	“A Path Forward in Pediatric ECMO” University of Michigan Pediatric Grand Rounds
05/2015	Rescue Therapies in Acute Respiratory Distress Syndrome University of Michigan Pediatric Critical Care Didactic Series
07/2015	“ECMO Physiology” University of Michigan Pediatric Critical Care Didactic Series
07/2016	“ECMO Physiology” University of Michigan Pediatric Critical Care Didactic Series
07/2017	“ECMO Physiology” University of Michigan Pediatric Critical Care Didactic Series
10/2015	“ECMO Physiology” University of Michigan Pediatric Critical Care Didactic Series
10/2017	Anticoagulation & pharmacologic management University of Michigan ECMO Specialist Training Course
10/2017	ECMO for respiratory failure & VV ECMO University of Michigan ECMO Specialist Training
11/2017	Anticoagulation and Pharmacologic management University of Michigan ECMO Specialist Training
04/2018	Anticoagulation and Pharmacologic management University of Michigan ECMO Specialist Training
04/2018	Statistics for Pediatric Fellows University of Michigan, Pediatric Fellowship Lecture Series

## **BIBLIOGRAPHY**

### *Peer-Reviewed Publications*

1. Nadler JJ, Moy SS, Dold G, Trang D, Simmons N, Perez A, Young NB, **Barbaro RP**, Piven J, Magnuson TR, Crawley JN. “Automated apparatus for quantitation of social approach behaviors in mice” *Genes, Brain and Behav* 2004; 3(5): 303–314.

2. Moy SS, Nadler JJ, Perez A, **Barbaro RP**, Johns JM, Magnuson TR, Piven J, Crawley JN. "Sociability and preference for social novelty in five inbred strains: an approach to assess autistic-like behavior in mice" *Genes, Brain and Behav.* 2004;3(5): 287-302.
3. Moy SS, Nadler JJ, Young NB, Perez A, Holloway LP, **Barbaro RP**, Barbaro JR, Wilson LM, Threadgill DW, Lauder JM, Magnuson TR, Crawley JN. Mouse behavioral tasks relevant to autism: phenotypes of 10 inbred strains. *Behav Brain Res.* 2007; 176(1): 4-20.
4. **Barbaro RP**, Odetola FO, Kidwell KM, Paden ML, Bartlett RH, Davis MM, Annich GM. Association of Hospital-Level Volume of Extracorporeal Membrane Oxygenation Cases and Mortality - Analysis of the Extracorporeal Life Support Organization Registry. *Am J Respir Crit Care Med.* 2015; 191(8): 894-901.
5. **Barbaro RP**, Bartlett RH, Chapman RL, Paden ML, Roberts LA, Gebremariam A, Annich GM, Davis MM. Development and Validation of the Neonatal Risk Estimate Score for Children Using Extracorporeal Respiratory Support. *J Pediatr.* 2016; 173:56-61.
6. **Barbaro RP**, Boonstra PS, Paden ML, Roberts LA, Annich GM, Bartlett RH, Moler FW, Davis MM. Development and Validation of the Pediatric Risk Estimate Score for Children Using Extracorporeal Respiratory Support (Ped-RESCUERS). *Intensive Care Med.* 2016; 2016; 42(5);879-888.
7. Kuo KW, **Barbaro RP**, Gadepalli SK, Davis MM, Bartlett RH, Odetola FO Should Extracorporeal Membrane Oxygenation be Offered? An International Survey. *J Pediatr.* 2017;182:107-113.
8. Thiagarajan RR, **Barbaro RP**, Rycus PT, et al. Extracorporeal Life Support Organization Registry International Report 2016. *ASAIO J.* 2017;63(1):60-67.
9. **Barbaro RP**, Boonstra PS, Moler FW, Davis MM, Prosser LA. Hospital-Level Variation in Inpatient Costs among Children Receiving Extracorporeal Membrane Oxygenation. *Perfusion* 2017;32(7): 538-546.
10. **Barbaro RP**, Paden ML, Guner YS, Raman, L, Ryerson LM, Alexander P, Nasr VG, Bembea MM, Rycus pT, Thiagarajan RR. Pediatric Extracorporeal Life Support Organization Registry International Report 2016. *ASAIO J.* 2017;63(4): 456-463.
11. Yu JS, **Barbaro RP**, Granoski DA, Mauman ME, MassiscotteMP, Lequier LL, Annich GM, Ryerson LM. Prospective Side by Side Comparison of Outcomes and Complications With a Simple Versus Intensive Anticoagulation Monitoring Strategy in Pediatric Extracorporeal Life Support Patients. *Pediatr Crit Care Med.* 2017;18(11):1055-1062.

12. Guner YS, Nguyen DV, Zhang L, Chen Y, Harting MT, Rycus P, **Barbaro RP**, Di Nardo M, Brogan TV, Cleary J, Yu PT. Development and Validation of ECMO Mortality-Risk Models for Congenital Diaphragmatic Hernia *ASAIO J*. 2018; 64(6):785-794.
13. Domico M, Ridout D, MacLaren G, **Barbaro R**, Annich G, Schlapbach LJ, Brown KL. Extracorporeal Membrane Oxygenation for Pertussis: Predictors of Outcome Including Pulmonary Hypertension and Leukodepletion. *Pediatr Crit Care Med*. 2018; 19(3):243-261.
14. **Barbaro RP**, Gaies M. Aligning Interests in Critical Care Trial Design. *Pediatr Crit Care Med*. 2018;19(2):176-177. 2018; 19(2): 176-177.
15. **Barbaro RP**, Xu Y, Borasino S, Truemper EJ, Watson RS, Thiagarajan RR, Wypij D, Curley MAQ, for the RESTORE Study Investigators. Does Extracorporeal Membrane Oxygenation Improve Survival in Pediatric Acute Respiratory Failure? *Am J Respir Crit Care Med*. 2018;197(9): 1177-1186.
16. Johnson K, Jarboe MD, Mychaliska GB, **Barbaro RP**, Rycus P, Hirschl RB, Gadepalli SK. Is there a best approach for extracorporeal life support cannulation: a review of the Extracorporeal Life Support Organization. *J Pediatr Surg*. 2018;53(7):1301-4.
17. Swol J, Brodie D, Napolitano L, Park PK, Thiagarajan R, **Barbaro RP**, Lorusso R, McMullan D, Cavarocchi N, Hssain AA, Rycus P, Zonies D. Indications and outcomes of extracorporeal life support in trauma patients. *J Trauma Acute Care Surg*. 2018;84(6):831-7.
18. Conrad SA, Broman LM, Fabio ST, Lorusso R, Malfertheiner MV, Pappalardo F, Di Nardo, M Belliato M, Grazioli L, **Barbar RP**, McMullan DM, Pellegrin V, Brodie D, Bembea MM, Fan E, Mendonca M, Diaz R, Bartlett RH. The Extracorporeal Life Support Organization Maastricht Treaty for Nomenclature in Extracorporeal Life Support: A Position Paper of the Extracorporeal Life Support Organization. *Am J Respir Crit Care Med*. 2018; 198(4):447-451.
19. **Barbaro RP**, Thiagarajan RR, Wypij D, Curley MAQ. Reply to: Do We Really Doubt ECMO Efficacy in Pediatric ARDS? *Am J Respir Crit Care Med*. 2018; 198(3):409-410.
20. **Barbaro RP**, Boonstra PS, Kuo KW, Selewski DT, Bailly DK, Stone CL, Chow CY, Annich GM, Moler FW, Paden ML. Evaluating mortality risk adjustment among children receiving extracorporeal support for respiratory failure. *ASAIO J*. 2018; [Epub ahead of print].
21. Beshish AG, Baginski MR, Johnson TJ, Deatrick BK, **Barbaro RP**, Owens GE. Functional Status Change among Children with Extracorporeal Membrane Oxygenation to Support Cardiopulmonary Resuscitation in a Pediatric Cardiac ICU: A Single Institution Report. *Pediatr Crit Care Med*. 2018; 19: 665-671.

22. Criss CN, **Barbaro RP**, Bauman KA, Folafoluwa O, Vellody R, Jarboe MD. Selective Management of Multiple Bronchopleural Fistulae in a Pediatric Patient on Extracorporeal Membrane Oxygenation: A Multidisciplinary Approach. *J Laparoendosc Adv Surg Tech A*. 2018;28(10):1271-1274.
23. **Barbaro R**, Fan E. In critically ill children, fluid overload is consistently associated with worse outcomes. *BMJ Evidence-Based Medicine*. 2018. [Epub ahead of print].
24. Nasr VG, Raman L, **Barbaro RP**, Guner Y, Tonna J, Ramanathan K, et al. Highlights from the Extracorporeal Life Support Organization Registry: 2006-2017. *ASAIO J*. 2018. [Epub ahead of print].
25. Boonstra PS and **Barbaro RP**. Incorporating historical models with adaptive Bayesian updates. *Biostatistics*. 2018. [Epub ahead of print].
26. Yagiela LM, **Barbaro RP**, Quasney MW, et al. Outcomes and Patterns of Health Care Utilization After Hospitalization for Pediatric Critical Illness Due to Respiratory Failure. *Pediatr Crit Care Med*. 2018; [Epub ahead of print].
27. Meert KL, Guerguerian AM, **Barbaro RP** et al. Extracorporeal Cardiopulmonary Resuscitation: One-Year Survival and Functional Outcome among Infants and Children with Refractory In-Hospital Cardiac Arrest. *Crit Care Med*. 2018; [Epub ahead of print].
28. **Boonstra PS**, Barbaro RP, and Sen A Default priors for the intercept in logistic regressions. *Comput Stat Data Anal*. 2019; [Epub ahead of print].
29. Bailly DK, DO, Reeder RW, Winder M, Garcia-Filion P, **Barbaro RP** et al; for the Eunice Kennedy Shriver National Institute of Child Health and Human Development (NICHD) Collaborative Pediatric Critical Care Research Network (CPCCRN). Development and Validation of the Pediatric Extracorporeal Membrane Oxygenation Prediction (PEP) Tool for Risk Adjusting Mortality. *Pediatr Crit Care Med*. 2019; [Epub ahead of print].
30. **Barbaro RP** and MacLaren G. Improving pediatric Extracorporeal Cardiopulmonary Resuscitation means delivering best care and measuring impact beyond survival. *Crit Care Med*. 2019; [Epub ahead of print].

## *Abstracts*

1. **Barbaro R**, Veit L, Munro B, and Redding-Lallinger R. “A Case of Sickle Cell Anemia, Vertebral Osteomyelitis, and a Decade of Follow Up” University of North Carolina Evening of Scholarship. March, 2011
2. **Barbaro R**, Seashore C, Bradford K, and Berkoff M. “Newborn Drug Screening at UNC: Evaluating Future Guidelines” University of North Carolina Evening of Scholarship. March, 2011
3. **Barbaro R**, OdetolaF, Kidwell K, Paden M, Bartlett R, Davis MM and Annich G. “Association of Mortality with Hospital-Level Extracorporeal Membrane Oxygenation Patient Volume” Oral Presentation at the Society of Critical Care Medicine. San Francisco, CA. January, 2014
4. **Barbaro R**, OdetolaF, Kidwell K, Bartlett R, Annich G, and Davis MM. “Mortality Association between Hospital-Level Annual Patient Volume and Respiratory Extracorporeal Membrane Oxygenation Cases” Oral Presentation at Pediatric Academic Society. Vancouver, British Columbia, Canada. May 3, 2014
5. **Barbaro R**, OdetolaF, Kidwell K, Bartlett R, Davis MM and Annich G. “Association between Hospital Extracorporeal Membrane Oxygenation (ECMO) Volume and Mortality” Oral Presentation at European Extracorporeal Life Support Organization. Paris, France. May 3, 2014
6. **Barbaro R**, A Gebremariam, Annich G, and Davis MM. “Development and Testing of an Extracorporeal Membrane Oxygenation Severity of Illness Score for Neonatal and Pediatric Patients” Oral Presentation at Extracorporeal Life Support Organization Conference. Ann Arbor, Michigan September 15, 2014.
7. **Barbaro R**, Gebremariam A, Annich G, Davis MM. “Development and Testing of an Extracorporeal Membrane Oxygenation Severity of Illness Score for Neonatal and Pediatric Patients” Oral Presentation at University of Michigan Pediatric Research Symposium. Ann Arbor, Michigan. October 7, 2014.
8. **Barbaro R**, Jarboe M, Gadepalli S, Cornell TT, Ostwani W, Custer J, Annich GM. When is Lung Injury Unrecoverable? Oral Presentation at the 31<sup>st</sup> Annual Children’s National Symposium: ECMO and the Advanced Therapies for Respiratory Failure, Keystone, CO 01/2015
9. **Barbaro R**, Gebremariam A, Annich G, and Davis MM. "Development and Testing of an Extracorporeal Membrane Oxygenation Severity of Illness Score for Neonates" Abstract Presentation at Pediatric Academic Society. San Diego, CA April 28, 2015.

10. **Barbaro R**, Prosser L, Boonstra P, Moler F, Davis MM. “Hospital Variation in Pediatric Extracorporeal Membrane Oxygenation” Abstract Presentation at Pediatric Academic Society. Baltimore, MD May 2, 2015.
11. Yagiela L, **Barbaro R**, Quasney M, Ursu D, Pfarr M, Odetola F. Patterns of health care utilization after hospitalization for pediatric critical illness. Crit Care Med. 2016 Dec;44(12 Suppl 1):324.
12. Beshish, AG, Baginski, MR ,Johnson, TJ, Deatrck,B, **Barbaro, RP**, Owens, GE. Outcomes among neonates, infants, and children after Extracorporeal Cardiopulmonary Resuscitation for refractory in-hospital cardiac arrest. Abstract Presentation at Keystone, CO, March 1, 2017.
13. **Barbaro RP**, Xu Y, Borasino S, et al. Does Extracorporeal Membrane Oxygenation Improve Survival in Pediatric Acute Respiratory Failure? Society of Crit Care Med. Feb 25, 2018.
14. **“The Utility of Flexible Bronchoscopy in Pediatric Venovenous ECMO: A Multicenter Study,” is #1236.** Society of Crit Care Med. Feb 25, 2019
15. **“Venovenous Extracorporeal Membrane Oxygenation in Children With Cancer or SCT: A Multicenter Study,” is #1222.** Society of Crit Care Med. Feb 25, 2019
16. **“Survival and Neurobehavioral Outcomes in Children One Year After ECPR for In-Hospital Cardiac Arrest” #14** Society of Crit Care Med. Feb 25, 2019