

2014 Research Annual Report

Critical Care Medicine



Division Summary

RESEARCH AND TRAINING DETAILS

Number of Faculty	11
Number of Support Personnel	20
Direct Annual Grant Support	\$1,121,948
Peer Reviewed Publications	22

CLINICAL ACTIVITIES AND TRAINING

Number of Clinical Staff	10
Number of Clinical Fellows	14
Number of Other Students	1
Inpatient Encounters	8,819

Division Photo



Row 1: J Kaplan, B Zingarelli, E Stalets
Row 2: B Varisco, S Poynter Wong, D Wheeler, H Wong
Row 3: K Tegtmeyer, R Basu

Significant Accomplishments

The Divisional Teaching Award

Critical Care Medicine received the Divisional Teaching Award from the senior pediatric residents at Cincinnati Children's. This award is given annually to the division that has contributed the most to pediatric residency education.

The Heartpedia Interactive App

Our Critical Care Media Lab developed the Heartpedia interactive app, which was released to the public in 2014. The Media Lab also released a series of animated illustrations of congenital heart defects. The Media Lab team members are **Ken Tegtmeyer, MD**, and medical animators Jeff Cimprich and Ren Wilkey.

Nearly 60% reduction in Serious Harm Events

Critical Care Medicine and the entire PICU team collaborated to reduce incidents of preventable serious harm in FY14, including ventilator-associated pneumonia (VAP), catheter-associated urinary tract infections (CAUTI), central line-associated bloodstream infections (CLABSI), and pressure ulcers. The focus was on daily multidisciplinary Safety Leadership Rounds and Prevention Standards compliance, including daily discussion of each patient's risks for harm. Events of harm decreased from 27 in FY 2013 to 11 in FY 2014, the lowest for the PICU in four years.

Division Publications

1. Abulebda K, Cvijanovich NZ, Thomas NJ, Allen GL, Anas N, Bigham MT, Hall M, Freishtat RJ, Sen A,

- Meyer K, Checchia PA, Shanley TP, Nowak J, Quasney M, Weiss SL, Chopra A, Banschbach S, Beckman E, Lindsell CJ, Wong HR. **Post-ICU admission fluid balance and pediatric septic shock outcomes: a risk-stratified analysis.** *Crit Care Med.* 2014; 42:397-403.
2. Basu RK. **Adding more fuel to the acute kidney injury fire: delay in initiation of continuous renal replacement therapy is associated with poor outcome*.** *Crit Care Med.* 2014; 42:1004-5.
 3. Basu RK, Wang Y, Wong HR, Chawla LS, Wheeler DS, Goldstein SL. **Incorporation of biomarkers with the renal angina index for prediction of severe AKI in critically ill children.** *Clin J Am Soc Nephrol.* 2014; 9:654-62.
 4. Basu RK, Zappitelli M, Brunner L, Wang Y, Wong HR, Chawla LS, Wheeler DS, Goldstein SL. **Derivation and validation of the renal angina index to improve the prediction of acute kidney injury in critically ill children.** *Kidney Int.* 2014; 85:659-67.
 5. Brady PW, Wheeler DS, Muething SE, Kotagal UR. **Situation awareness: a new model for predicting and preventing patient deterioration.** *Hosp Pediatr.* 2014; 4:143-6.
 6. Dandoy CE, Hirsch R, Chima R, Davies SM, Jodele S. **Pulmonary hypertension after hematopoietic stem cell transplantation.** *Biol Blood Marrow Transplant.* 2013; 19:1546-56.
 7. Davison D, Basu RK, Goldstein SL, Chawla LS. **Fluid management in adults and children: core curriculum 2014.** *Am J Kidney Dis.* 2014; 63:700-12.
 8. Gist KM, Chima RS. **The landscape of thromboprophylaxis utilization in critically ill children: sparse and variable.** *Crit Care Med.* 2014; 42:1317-8.
 9. Kirkendall ES, Goldenhar LM, Simon JL, Wheeler DS, Andrew Spooner S. **Transitioning from a computerized provider order entry and paper documentation system to an electronic health record: expectations and experiences of hospital staff.** *Int J Med Inform.* 2013; 82:1037-45.
 10. Liu S, Parameswaran H, Young SM, Varisco BM. **JNK suppresses pulmonary fibroblast elastogenesis during alveolar development.** *Respir Res.* 2014; 15:34.
 11. Liu S, Young SM, Varisco BM. **Dynamic expression of chymotrypsin-like elastase 1 over the course of murine lung development.** *Am J Physiol Lung Cell Mol Physiol.* 2014; 306:L1104-16.
 12. Maslove DM, Wong HR. **Gene expression profiling in sepsis: timing, tissue, and translational considerations.** *Trends Mol Med.* 2014; 20:204-13.
 13. Mickiewicz B, Vogel HJ, Wong HR, Winston BW. **Metabolomics as a novel approach for early diagnosis of pediatric septic shock and its mortality.** *Am J Respir Crit Care Med.* 2013; 187:967-76.
 14. Samraj RS, Zingarelli B, Wong HR. **Role of biomarkers in sepsis care.** *Shock.* 2013; 40:358-65.
 15. Schumacher DJ, Spector ND, Calaman S, West DC, Cruz M, Frohna JG, Gonzalez Del Rey J, Gustafson KK, Poynter SE, Rosenbluth G, Southgate WM, Vinci RJ, Sectish TC. **Putting the Pediatrics Milestones Into Practice: A Consensus Roadmap and Resource Analysis.** *Pediatrics.* 2014; .
 16. Slinko S, Piraino G, Hake PW, Ledford JR, O'Connor M, Lahni P, Solan PD, Wong HR, Zingarelli B. **Combined zinc supplementation with proinsulin C-peptide treatment decreases the inflammatory response and mortality in murine polymicrobial sepsis.** *Shock.* 2014; 41:292-300.
 17. Webster DL, Gardner AH, Dye TJ, Chima RS. **Status epilepticus: a possible association with human metapneumovirus infection.** *Pediatrics.* 2014; 133:e747-50.
 18. Wong HR, Cvijanovich NZ, Allen GL, Thomas NJ, Freishtat RJ, Anas N, Meyer K, Checchia PA, Weiss SL, Shanley TP, Bigham MT, Banschbach S, Beckman E, Harmon K, Zimmerman JJ. **Corticosteroids are associated with repression of adaptive immunity gene programs in pediatric septic shock.** *Am J Respir Crit Care Med.* 2014; 189:940-6.
 19. Wong HR, Lindsell CJ, Lahni P, Hart KW, Gibot S. **Interleukin 27 as a sepsis diagnostic biomarker in critically ill adults.** *Shock.* 2013; 40:382-6.

20. Wong HR, Lindsell CJ, Pettila V, Meyer NJ, Thair SA, Karlsson S, Russell JA, Fjell CD, Boyd JH, Ruokonen E, Shashaty MG, Christie JD, Hart KW, Lahni P, Walley KR. **A multibiomarker-based outcome risk stratification model for adult septic shock***. *Crit Care Med*. 2014; 42:781-9.
21. Wong HR, Weiss SL, Giuliano JS, Jr., Wainwright MS, Cvijanovich NZ, Thomas NJ, Allen GL, Anas N, Bigham MT, Hall M, Freishtat RJ, Sen A, Meyer K, Checchia PA, Shanley TP, Nowak J, Quasney M, Chopra A, Fitzgerald JC, Gedeit R, Banschbach S, Beckman E, Harmon K, Lahni P, Lindsell CJ. **The temporal version of the pediatric sepsis biomarker risk model**. *PLoS One*. 2014; 9:e92121.
22. Wong HR, Weiss SL, Giuliano JS, Jr., Wainwright MS, Cvijanovich NZ, Thomas NJ, Allen GL, Anas N, Bigham MT, Hall M, Freishtat RJ, Sen A, Meyer K, Checchia PA, Shanley TP, Nowak J, Quasney M, Chopra A, Fitzgerald JC, Gedeit R, Banschbach S, Beckman E, Lahni P, Hart K, Lindsell CJ. **Testing the prognostic accuracy of the updated pediatric sepsis biomarker risk model**. *PLoS One*. 2014; 9:e86242.

Faculty, Staff, and Trainees

Faculty Members

Hector Wong, MD, Professor

Leadership Director

Research Interests Septic shock, Genomics, Biomarkers

Ranjit Chima, MD, Assistant Professor

Research Interests Bone Marrow Transplantation-Associated Critical Illness ECLS Glucose Homeostasis

Lesley Doughty, MD, Associate Professor

Leadership Fellowship Director

Research Interests Sepsis, viral infections & mechanical ventilation

Jennifer Kaplan, MD, MS, Associate Professor

Research Interests Sepsis, obesity and inflammation

Sue E. Poynter, MD, Assistant Professor

Leadership Medical Director Division of Respiratory Care; Associate Director Pediatric Residency Training Program

Research Interests Medical education, residency & fellowship training

Erika Stalets, MD, Assistant Professor

Leadership Medical Director

Research Interests Quality improvement, patient safety and sepsis

Ken Tegtmeyer, MD, Professor

Leadership Chair Code Committee

Research Interests Multimedia Medical Education

Rajit Basu, MD, Assistant Professor

Research Interests Phenotype and recognition of kidney injury, end of life care

Derek S. Wheeler, MD, Associate Professor

Leadership Associate Chief of Staff

Research Interests Patient safety, healthcare administration

Basilia Zingarelli, MD, Ph.D., Associate Professor

Leadership Director of Basic Science Research

Research Interests Sepsis, hemorrhage and ischemia and reperfusion injury

Brian Varisco, MD, Assistant Professor

Research Interests Mechanisms of lung development, repair and regeneration

Joint Appointment Faculty Members

Bradley Marino, MD, Associate Professor (Cardiology)

Research Interests Long-term outcomes in children and adolescents with CHD, Resuscitation of children with CHD

Trainees

- **William Hanna, MD**, PL-7, University of Kentucky College of Medicine
- **Danielle Webster, MD**, PL-7, University of Missouri - Kansas City
- **Matthew Alder, MD**, PL-6, University of Alabama School of Medicine
- **Theodore DeMartini, MD**, PL-6, University of Texas Medical Branch
- **Hammad Ganatra, MD**, PL-5, Aga Khan Medical College
- **Yu Inata, MD**, PL-5, Osaka City University
- **Laura Kitzmiller, MD**, PL-5, Wayne State University School of Medicine
- **Travis Langner, MD**, PL-6, University of Kansas School of Medicine
- **Mary Sandquist, MD**, PL-5, Ohio State University College of Medicine
- **Claire Stewart, MD**, PL-5, Ohio State University College of Medicine
- **Kamal Abulebda, MD**, PL-7, University of Aleppo, Syrian Republic
- **Aaron Gardner, MD**, PL-8, St. George's University
- **Shilpa Shah, MD**, PL-8, The University of Texas Medical Branch
- **Katja Gist, MD**, PL-9, University of New England College of Osteopathic Medicine

Grants, Contracts, and Industry Agreements

Grant and Contract Awards	Annual Direct
---------------------------	---------------

CHIMA, R

Approaches and Decisions for Acute Pediatric TBI (ADAPT)

National Institutes of Health(University of Pittsburgh)

U01 NS 081041

07/01/13-09/28/14

\$2,310

GIST, K

Use of Acute Kidney Injury Biomarkers to Predict Impaired Milrinone Pharmacokinetics in Children

Thrasher Research Fund

10/01/13-09/30/14

\$25,000

POYNTER, S

Multi-Center Trial of Limiting PGY 2&3 Resident Work Hours in the PICU

National Institutes of Health(Brigham & Women's Hospital)

U01 HL 111478	09/15/12-05/31/17	\$87,382
WONG, H		
MMP-8 as a Novel Therapeutic Target in Sepsis		
National Institutes of Health		
R01 GM 096994	04/01/11-03/31/15	\$190,000
Novel Diagnostic and Stratification Tools for Septic Shock		
National Institutes of Health		
R01 GM 108025	05/01/14-02/28/18	\$330,281
Stratification of Pediatric Septic Shock		
National Institutes of Health		
R01 GM 099773	08/07/12-06/30/16	\$219,475
ZINGARELLI, B		
PPARgamma and PPARgamma Agonists in Septic Shock		
National Institutes of Health		
R01 GM 067202	09/14/12-06/30/16	\$245,372
Role of Eicosanoids in Shock		
National Institutes of Health(Medical University of South Carolina)		
R01 GM 027673	07/01/12-03/31/16	\$22,128
Current Year Direct		\$1,121,948
Total		\$1,121,948