Research in Pediatric Critical Care Medicine

With the imminent arrival of Dr. Nikki Miller Ferguson, the Division of Pediatric Critical Care Medicine will have seven faculty members. Along with improving the care for the sickest children in Central Virginia, there is a new buzz of research activity. Under the leadership of Douglas Willson, MD, the inaugural John Mickell Chair in Pediatric Critical Care, the division has moved into a wide range of studies that will mean improved care, and increased support for research at CHoR at VCU.

Dr. Willson is involved in a number of funded studies. Upon his arrival, the Division joined the Pediatric Acute Lung Injury and Sepsis Investigators consortium. Currently, Dr. Willson is the PI for the Ventilator-associated Infections point prevalence study, which involves > 50 PICUs in US, Canada, and Australia/NZ, and the site PI for another consortium point prevalence study, the Plasma TV, to evaluate the use of FFP, indications given, and its effect on coagulation. He is the site PI on an NIH-sponsored project, the ABC Blood Study, which is a randomized controlled trial of transfusing fresh blood < 5 days old versus usual care. He received one of the first Children’s Hospital Foundation Research Fund grants to evaluate the microbiome from airway samples cultured from a previous study to determine if changes in diversity are associated with development of ventilator associated infections. Finally, he is analyzing data from an existing project, the CRISIS Study to determine variability in care and the impact (if any) of lower respiratory infection on outcomes.

Dr. Norma Maxvold, Associate Professor, has been working in the lab for the last year or so and is preparing a manuscript on her work comparing new models of endotracheal tubes for their ability to prevent aspiration of upper airway secretions, which could lower the risk of acquired pneumonia in ventilated children.

Dr. Duane Williams came to CHoR a year ago, after finishing his fellowship at Duke, and with help from Dr. Tim Bunchman from Pediatric Nephrology, is the site PI for a funded study called AWARE, a multicenter observational protocol of acute renal injury in patients admitted to the PICU.

Dr. Jesse Bain also came from Duke a year ago and has also quickly launched his research pursuits. His studies include a Sedation Protocol Quality Study to evaluate a newly introduced sedation policy, specifically looking at the use of dexametomidine, and he is preparing a Dexmedetomidine Pharmacokinetic Study to evaluate the immediate and longer-term pharmacokinetics of dexametomidine.

Dr. Alia O’Meara came from a fellowship at Pittsburgh Children’s Hospital and is pursuing her interest in CNS injury and therapy along multiple tracks. She is the site PI for an NIH-funded project called ADAPT which is a prospective, observational study of therapies and outcomes in Traumatic Brain Injury. She also received CHF Research funding to help start the Development and Characterization of a Novel Experimental Model of Pediatric Sedative-Related Neurotoxicity, in collaboration with the Department of Neuroanatomy.

In a little over a year, the research efforts of the Division have risen exponentially. Several projects are part of funded multi-center studies. Investigator-initiated ones are mostly in their early phases. It is very likely, therefore, that the growth trajectory of research activity and funding in Pediatric Critical Care will be steep and positive as they move forward.
CHF Research Fund Awards for 2014

In its inaugural year, the Fund, generously supported by the Children’s Hospital Foundation, received 23 applications. There majority were exactly in line with the Fund goals, to provide support for early research, i.e. good ideas needing preliminary data. In the end, the review committee found that the top 8 applications cumulated used up all the available funds, although many others were of similar quality. Congratulations to the awardees. The deadline for the next round of funding is February 27, 2015.

Bean, Melanie - Healthy Lifestyles/Endocrinology—Development of a Home-Based Pediatric Obesity Intervention for Low Income Families $5000


Gupta, Anshu - Endocrinology— Role of Receptor of Advanced Glycation End products in Obesity $6210

O’Meara, Alia M. – Critical Care Medicine - Development and characterization of a Novel Experimental Model of Pediatric Sedative-Related Neurotoxicity in Juvenile Rats $10000

Rozycki, Henry – Neonatal Medicine - Innate Immune Function Differences in Newborn Type I Alveolar Epithelial Cells $5000

Wijesooriya, N. Romesh – Academic General Pediatrics—Preventing obesity through early education: Informing mothers about healthy lifestyle practices for their new infants in the primary care setting $7500

Willson, Douglas – Critical Care Medicine—Loss of Bacterial Diversity in the Airway Microbiome Predates Ventilator-Associated Infection $8900

Zheng, Shuo – Pulmonology - Genome wide Dnase Hypersensitivity site profiling in different cells $5000
## New Grants & Contracts Awarded

1/1/14—6/30/14

<table>
<thead>
<tr>
<th>PI</th>
<th>Division</th>
<th>Title</th>
<th>Sponsor</th>
<th>Total Costs</th>
</tr>
</thead>
<tbody>
<tr>
<td>Voynow, Judy</td>
<td>Pulmonary</td>
<td>Inhaled 2-O, 3-O Desulfated Heparin is a Multi-functional Anti-Inflammatory Therapy for Cystic Fibrosis Lung Disease</td>
<td>CHRB Virginia</td>
<td>200,000</td>
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<td>Rubin, Bruce</td>
<td>Pulmonary</td>
<td>Aztreonam aerosol to treat cystic fibrosis nasal disease.</td>
<td>Gilead Sciences</td>
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<td>Pulmonary</td>
<td>Denny Hamlin Foundation</td>
<td>CF Foundation</td>
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<td>Schechter, Michael</td>
<td>Pulmonary</td>
<td>Tobramycin Inhalation Powder (TIP) Administered Once Daily Continuously Versus TIP Administered BID in 28 Day on / 28 Day Off Cycles</td>
<td>Novartis</td>
<td>74,720</td>
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<td>Rubin, Bruce</td>
<td>Pulmonary</td>
<td>Secretion Clearance in Chronic Obstructive Lung Disease</td>
<td>Philips Respironics</td>
<td>11,841</td>
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<tr>
<td>Schmidt, Joel</td>
<td>Pulmonary</td>
<td>An Ocular Safety Study of Ivacaflor-Treated Pediatric Patients 11 Years of Age or Younger With Cystic Fibrosis</td>
<td>Vertex</td>
<td>22,544</td>
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<tr>
<td>Meloy, Linda</td>
<td>General Peds</td>
<td>Study Evaluating the Safety and Efficacy of Two Doses of Stannsoporfin in Combination With Phototherapy in Neonates With Hyperbilirubinemia</td>
<td>Infacare</td>
<td>87,306</td>
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<tr>
<td>Meloy, Linda</td>
<td>General Peds</td>
<td>Follow up Study of Patients Having Participated in Clinical Trial of Two Doses of Stannsoporfin in Combination With Phototherapy in Neonates With Hyperbilirubinemia</td>
<td>Infacare</td>
<td>47,799</td>
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<tr>
<td>Willson, Doug</td>
<td>Critical Care</td>
<td>Age of Blood in Children in Pediatric Intensive Care Units (ABC PICU)</td>
<td>U Washington</td>
<td>89,192</td>
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<td>Rubin, Bruce</td>
<td>Pulmonary</td>
<td>The effect of dapsone aerosol in the inflamed ferret airway using a novel formulation and delivery device</td>
<td>InspirX</td>
<td>129,074</td>
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<td>Schmidt, Joel</td>
<td>Pulmonary</td>
<td>The Cystic Fibrosis Therapeutics Development Network</td>
<td>CF Foundation</td>
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<td>Kumar</td>
<td>A/I</td>
<td>Effect of Long Acting Antihistime on Opioid-Induced Pruritus: A Double-Blind Placebo Controlled Study</td>
<td>McNeil</td>
<td>87,351</td>
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<tr>
<td>Voynow, Judy</td>
<td>Pulmonary</td>
<td>Gastrin-Releasing Peptide and Bronchopulmonary Dysplasia</td>
<td>Duke U</td>
<td>275,000</td>
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<td>O’Meara, Alia</td>
<td>Critical Care</td>
<td>Approaches and Decisions in Acute Pediatric TBI Trial (ADAPT)</td>
<td>U Pittsburgh</td>
<td>15,000</td>
</tr>
</tbody>
</table>


Publications First Half 2014


Hoffer-Schaefer A, Rozycki HJ, Yopp MA, Rubin BK. Guaifenesin has no effect on sputum volume or sputum properties in adolescents and adults with acute respiratory tract infections. Respir Care. 2014 May;59(5):631-6. doi: 10.4187/respcare.02640


The Division of Nephrology at the Children’s Hospital of Richmond at VCU saw its ranking in the US News and World Report of the 2014-15 Best Children’s Hospitals rise from 50th to 28th. In the country Congratulations to Drs. Timothy Bunchman John Hurley and Megan Lo on their achievement!

Dr. Bruce Rubin, Jesse Ball Dupont Distinguished Professor and Chairman of Pediatrics was guest speaker at the following:

- Richmond Heart Institute CME speaker 22 January 2014. What do when asthma medication doesn’t work
- 14th Triad Respiratory Conference at Forsyth North Carolina. I was the Clay Adams Keynote Speaker 9 April 2014. “What every Respiratory Therapist should know”
- 10th International Course in Pediatric Pulmonology. Lisbon, Portugal April 10-13. Lectures: Beyond the guidelines: fatal and near fatal asthma and Pediatric case presentations. Also taught a pediatric magic workshop.
- Co-Director of the 53th AARC Journal Conference in St Petersburg, FL. 6-7 June 2014. Also gave a lecture on Mucocative aerosols
- 3th International Conference of Pediatric Pulmonology, 26-29 June in Bruges, BE. Directed a Meet the Professor session, gave a lecture on Treating the Small Airways in Asthma, and taught a Magic Workshop

Dr. Michael Schechter, Chair of Pediatric Pulmonology was appointed head of 2 Data Safety and Monitoring Boards for AstraZeneca clinical trials

"A Multicentre, Randomized, Double blind, parallel Group, Placebo controlled, Phase III Efficacy and Safety Study of Benralizumab (MEDI-563) Added to High-dose Inhaled Corticosteroid Plus Long-Acting Beta2 Agonist in Patients with Uncontrolled Asthma (CALIMA)."

"A Multicentre, Randomized, Double-blind, parallel Group, Placebo controlled, Phase III Efficacy and Safety Study of Benralizumab (MEDI-563) Added to High-dose Inhaled Corticosteroid Plus Long-Acting Beta2Agonist in Patients with Uncontrolled Asthma (SIROCCO)."

Dr. Michael McVoy from the Division of Pediatric Infectious Diseases was Guest Associate Editor of a special issue on Dendritic cells in herpesvirus infections in Frontiers in Microbiology.

Dr. McVoy gave the following presentations:

**Cytomegalovirus Antibodies and Vaccine Development.** Invited seminar, Hookipa Biotech, Vienna Austria– March 2014

**Cytomegalovirus Vaccines and Immunotherapeutics.** Invited seminar, PLA Institute for Infectious Diseases, Southwest Hospital, Third Military Medical University, Chongqing, China—April 2014

**Cytomegalovirus Antibodies and Vaccine Development.** Invited seminar, Virus laboratory, Affiliated Shenyang Hospital, China Medical University, Shenyang China.— April 2014

**Cytomegalovirus Antibodies and Vaccine Development.** Invited seminar, Wuhan Institute of Virology, Wuhan China.—April 2014

**Neutralizing Antibodies and Cytomegalovirus Vaccines.** Pfizer Vaccine Research & Early Development, Pearl River NY.- May 2014.


Dr. Henry Rozycki, Vice-Chair for Research, was appointed to be an Associate Editor of Frontiers in Neonatology.

At the ATS International Meeting, San Diego, CA May 17—22, the following CHoR personnel presented their research:


Tokita E, Tanabe T, Rubin BK. Mucin Secretion Stimulated By IL-13 Or Poly I:C In Differentiated Upper Compared With Lower Airway Epithelial Cells In Culture.

Tanabe T, Webb-Parker SR, Rubin BK. Inflammasome Profiling In Airway Goblet Cells Cultured With Azithromycin Or Dexamethasone

Rozycki HJ, Bradley JL. Newborn Mouse Type I Alveolar Epithelial Cells Produce Increased Chemokines Compared To Adult Cells In The First 24 Hours In Culture

Dr. Timothy Bunchman, Chair of the Division of Pediatric Nephrology gave the following presentations:

Delhi India, Feb 2014—3 talks on CRRT in children; SLED vs CRRT; Access options for RRT

5th Annual Veterinary Medicine Renal Week Conference, New York, NY, April 2014—2 talks on AKI in children and RRT in small animals

7th International Conference on Pediatric Intensive and Critical Care, Istanbul, Turkey, May 2014. Co-Chaired CRRT symposium and gave 5 talks on:
- Vascular access in RRT; Anticoagulation in RRT; Prescription in RRT; Nutrition needs in AKI; Nephrolgie complications and prevention in the post operative cardiac surgery infant
The number of papers published by CHoR faculty has steadily zoomed! The graph above shows the number of papers in 6 month epochs, from the first half of 2012 (22 papers) to the first half of 2014 (74 papers). This is important. Research support gravitates to places known for their research. Data are from PubMed searches 7/6-

Grants and Contract Dollars Leap Ahead in 2014

Total Sponsored Programs Funding for the Department of Pediatrics went up from fiscal year 2013 to 2014 by $751,480 an increase of 20.6%! As of July 1, 2014, there were 42 active grants and contracts, including clinical trials. This is fantastic progress and effort and it looks like it is only going to grow.