Biostatistics and Epidemiology

Division Photo

L to R: J. Khoury, E. King, L. Martin, M. Kim, M. Altaye, B. Huang, A. Morrow, S. Salisbury, J. Woo, J. Meinzen-Derr, R. Ittenbach

Division Data Summary

<table>
<thead>
<tr>
<th>Research and Training Details</th>
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</tr>
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<tbody>
<tr>
<td>Number of Faculty</td>
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<tr>
<td>Number of Joint Appointment Faculty</td>
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<td>Peer Reviewed Publications</td>
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Significant Publications


The timing of puberty is known to have a major impact on growth and psychosocial outcomes. Multiple methods have been used to determine pubertal timing, but all of the current methods have important limitations. This publication proposed a method of deriving relative timing of puberty utilizing statistical modeling. The proposed method is easy to implement, and has good validity and reliability.


This research publication reviews the literature regarding to medication treatment adherence for children with congenital and acquired heart disease. Clinical outcomes associated with nonadherence for children undergoing transplantation included mortality, acute episodes of rejection, lower levels of Cyclosporine A, and lower values for
the International Normalised Ratio of prothrombin. Recommendations are provided in this publication to maximize the impact and scientific rigor of future studies, including obtaining quantitative and qualitative measures of adherence, identifying primary and secondary endpoints, and more rigorous planning of studies.

Martin, L. J., Gao, G., Kang, G., Fang, Y., & Woo, J. G. (2009). Improving the signal-to-noise ratio in genome-wide association studies. Genet Epidemiol, 33 Suppl 1, S29-32, PMID: 19924719, PMC. Genome-wide association studies employ hundreds of thousands of statistical tests to determine which regions of the genome may likely harbor disease-causing alleles. Such large-scale testing simultaneously requires stringent control over type I error and maintenance of sufficient power to detect true associations. Thus, the challenge is to develop methods to improve the detection of a few true effects in the presence of many unassociated loci. This paper reviews cutting edge statistical methods to adjust for multiple tests while simultaneously using information about the structure of the genome to improve the detection of true positives.


Dr. Meinzen-Derr is currently conducting a longitudinal language study on children with developmental disabilities who have received cochlear implants for their hearing loss. For many children who are deaf, a cochlear implant offers an opportunity for auditory stimulation and subsequent oral communication. However, very little evidence exists regarding the effectiveness of cochlear implants among children who have a disability in addition to hearing loss. Dr. Meinzen-Derr’s team has been spearheading this research, providing the first solid evidence that this special group of children make significant language progress post-implant. Her team has also quantified the “gap” in language relative to their hearing and cognitively-matched peers, which is a first and necessary step in addressing appropriate expectations for this cohort of children.


Determining the most promising single-nucleotide polymorphisms (SNPs) presents a challenge in genome-wide association studies, when hundreds of thousands of association tests are conducted. Further there is concern that rare SNPs may be more likely to be false positive associations than common SNPs. We found that rare SNPs did not have higher than expected false positive rates. However, we also found that for common SNPs there were fewer than expected false positives, suggesting the typical Bonferroni correction for genome wide association is too conservative.

**Division Highlights**

**Dr. Jessica Woo**

Early nutrition affects lifelong risk of obesity, type 2 diabetes and cardiovascular disease. Dr. Jessica Woo is researching the methylation of DNA as a compelling new paradigm for how early infant nutrition can impact later obesity. DNA methylation is repeatedly proposed as a mechanism for nutritional programming of obesity, but few studies have been conducted of its role in human obesity. Dr. Woo has conducted a preliminary study of DNA methylation across the genome using DNA from 24 children and adults, comparing methylation status in obese and lean individuals. These results highlighted some promising genes for further exploration, including some sites previously associated with intrauterine growth, obesity, and metabolic regulation. Planned future studies will focus on the relationship between blood and adipose tissue methylation and the role of infant feeding on methylation status. Breastfeeding is a prime candidate for early nutrition influencing obesity. Breastfed infants are 20-30% less likely to develop obesity than formula-fed infants later in life, providing an epidemiological link between early nutrition and later obesity. Evidence from animal models suggests that breastfeeding may plausibly lower obesity risk by altering methylation of obesity-related genes. Dr. Woo is using data and samples from several Cincinnati cohort studies to pursue this novel and important line of investigation.

**Dr. Mi-Ok Kim**

Dr. Kim was awarded a National Science Foundation grant and a Center for Clinical and Translational Science and Training (CCTST) Methods Pilot grant from CCHMC. On the NSF grant, Dr. Kim will investigate novel methods to incorporate high throughput data such as genetic profile data in building a better statistical model to more accurately predict a patient survival. Instead of predicting only an "average" person’s survival, the type of models to be investigated will allow prediction for "top 10%, or "bottom 10%", while allowing the survivals can be very differently impacted by the gene profile. On the CCTST grant, Dr. Kim will investigate the impact of surrogacy on the benefits of a response adaptive randomization (RAR) clinical study design, a new invention that is known to maximize patient benefits in the course of a clinical trial while maintaining the scientific rigor of the trial. RAR requires a readily assessable response, which may not always be available. In cases where a readily assessable surrogate endpoint is used instead, Dr. Kim will investigate the efficiency of a RAR design under the surrogacy. Dr. Kim continued her R03 on Bayesian statistical modeling of censored outcomes. The primary publication from this study was submitted for publication.

**Dr. Jareen Meinzen-Derr**

Dr. Meinzen-Derr led the statistical analysis for a systematic review and meta-analysis on anetanatal use of betamethasone for fetal lung development. Betamethasone, an antenatal corticosteroid, is standard of care for pregnant women with imminent preterm labor. However, like many older drugs used for pediatric (or fetal) indications, the Food and Drug Administration (FDA)-approved labeling does not reflect current consensus. This Best Pharmaceuticals for
Children’s Act Project, conducted by the Lewin Group and in collaboration with NICHD, was geared towards obtaining scientific evidence supporting the addition of pediatric indications for betamethasone on the FDA label. Results from this work are consistent with previous studies and current consensus, affirming the efficacy of antenatal betamethasone in reducing incidence of RDS and mortality in preterm infants. A final report is currently being submitted to the FDA for review. Manuscripts for publication are in the final stages of editing.

Dr. Eileen King

Dr. Eileen King joined the biostatistics faculty at the rank of Associate Professor in November, 2009 after a distinguished history of biostatistics leadership at Procter & Gamble. Dr. King brought to Children’s depth of expertise in clinical trials, multi-site studies, and experience in integrating data management into the clinical research pathway leading to data analysis. Since joining the faculty, she has been working closely with investigators in comparative effectiveness research, the CCTST, the Heart Institute, the Digestive Health Center, and pharmacology. She ably leads the data management unit of the division, oversees several biostatistics staff, and teaches biostatistics in the UC College of Pharmacy. Nationally, Dr. King achieved several major distinctions this year, serving as Chair-Elect of the American Statistical Assoc. (ASA) Council of Sections Governing Board, and the Associate Editor of the Journal of Statistics Education. Dr. King has been, in short, an outstanding addition and we are proud to have her as a member of our faculty.

Division Collaboration

Collaboration with Adolescent Medicine
Collaborating Faculty: Dr. Frank Biro; Dr. Jessica Kahn; Dr. Jill Huppert
Statistical support by Dr. Bin Huang

Collaboration with Allergy and Immunology
Collaborating Faculty: Dr. Marc Rothenberg; Dr. James Franciosi; Dr. Charles DeBrosse
Statistical support by Dr. Lisa J. Martin; Dr. Eileen King

Research with Dr. Lisa J. Martin

Collaboration with Anesthesiology
Collaborating Faculty: Dr. Dean Kurth; Dr. Joel Gunter; Dr. Mohamed Mahmoud; Dr. John McAuliffe; Dr. Mario Patino; Dr. Senthikumar Sadhasivam; Dr. Thomas Sheckleford; Dr. Alexandra Szabova; Dr. Fay Jou; Dr. Judy Margolis; Dr. Mark Meyer; Dr. Paul Samuels; Dr. Jon Tomasson; Dr. Junzheng Wu
Statistical support by Dr. Shelia Salisbury

Collaboration with Asthma Research and Personalized & Predictive Medicine
Collaborating Faculty: Dr. Neeru Hershey; Dr. Melinda Butsch-Kovacic
Statistical support by Dr. Shelia Salisbury

Research by Dr. Melinda Butsch-Kovacic and Dr. Lisa J. Martin

Collaboration with Behavioral Medicine and Clinical Psychology
Collaborating Faculty: Dr. Lori Stark; Dr. Scott Powers; Dr. Dennis Drotar; Dr. Avani Modi; Dr. Korey Hood; Dr. Kevin Hommel; Dr. Ahna Pai; Dr. Christina Ramey; Dr. Robert Ammerman; Dr. Jeffrey Epstein; Dr. Joshua Langberg; Dr. Kelly Byars
Statistical support by Dr. Judy Bean; Dr. Richard Ittenbach; Dr. Eileen King; Dr. Jessica Woo; Dr. Mekibib Altaye

Collaboration with Biomedical Informatics
Collaborating Faculty: Dr. Jun Ma; Dr. Michael Wagner; Dr. Jarek Meller
Statistical support by Dr. Rhonda VanDyke; Dr. Jane Khoury; Dr. Lisa J. Martin; Dr. Ardythe L. Morrow

Informatics consultation provided by BMI to Dr. Lisa J. Martin; Dr. Ardythe L. Morrow; Dr. Jessica Woo

Collaboration with Bone Marrow Transplantation
Collaborating Faculty: Dr. Alexandra Flipovich; Dr. Chu Ri
Statistical support by Dr. Mi-Ok Kim

Collaboration with Center for Clinical and Translational Science and Training
Collaborating Faculty: Dr. James Heubi et al.
Study design, review, and analysis support by Dr. Ardythe L. Morrow; Dr. Jane Khoury; Dr. Mekibib Altaye; Dr. Bin Huang; Dr. Eileen King

Collaboration with Center for Professional Excellence Research and Evidence-Based Practices
Collaborating Faculty: Dr. Myra Huth; Dr. Nancy Daraiseh
Statistical support by Dr. Shelia Salisbury

Collaboration with Critical Care Medicine
Collaborating Faculty: Dr. Hector Wong
Statistical support by Dr. Shelia Salisbury

Collaboration with Dermatology
Collaborating Faculty: Dr. Anne Lucky
Collaborating Faculty: Dr. Tanya Froehlich; Dr. Patty Manning; Dr. Donna Murray; Dr. Susan Wiley; Dr. Sandra Grether; Dr. Bonnie Patterson; Dr. Michelle Zimmer; Dr. Heidi Castillo

Collaboration with Developmental Disabilities & Behavioral Pediatrics
Statistical support by Dr. Shelia Salisbury

Hearing and deafness research collaboration with Dr. Jareen Meinzen-Derr

Collaboration with Emergency Medicine
Collaborating Faculty: Dr. Melinda Mahabee-Gittens
Statistical support by Dr. Bin Huang and Dr. Jane Khoury

Collaboration with Endocrinology
Collaborating Faculty: Dr. Larry Doland; Dr. Nancy Crimmins; Dr. Debra Elder; Dr. Philippe Backeljauw; Dr. Meilan Rutter; Dr. Susan Rose; Dr. Iris Little; Dr. Amy Shah
Research with Dr. Jessica Woo; Dr. Lisa J. Martin

Statistical support by Dr. Jane Khoury

Collaboration with Every Child Succeeds
Collaborating Faculty: Dr. Robert Ammerman
Statistical collaboration with Dr. Mekibib Altaye

Collaboration with Experimental Hematology and Cancer Biology
Collaborating Faculty: Dr. Punam Malik; Dr. Yi Zheng; Dr. Nancy Ratner
Statistical support by Dr. Mi-Ok Kim

Collaboration with Gastroenterology, Hepatology & Nutrition
Collaborating Faculty: Dr. Lee Denson; Dr. Kathleen Campbell; Dr. Ajay Kaul
Research collaboration with Dr. Ardythe L. Morrow; Dr. Lisa J. Martin; Dr. Eileen King; Dr. Mi-Ok Kim

Collaboration with General and Community Pediatrics
Collaborating Faculty: Dr. Robert Kahn; Dr. Kieran Phelan; Dr. Kim Yolton; Dr. Sheela Geraghty; Dr. Richard Hornung; Dr. Jeffrey Simmons
Statistical support by Dr. Mekibib Altaye; Dr. Bin Huang; Dr. Jane Khoury;

Research with Dr. Ardythe L. Morrow

Collaboration with Global Child Health
Collaborating Faculty: Dr. Adekunle Dawodu; Dr. Mark Steinhoff
Statistical support by Dr. Mekibib Altaye; Dr. Jareen Meinzen-Derr

Research with Dr. Ardythe L. Morrow

Collaboration with Health Policy and Clinical Effectiveness
Collaborating Faculty: Dr. Jacqueline Grupp-Phelan; Dr. Ed Donovan; Dr. Peter Margolis; Dr. Carole Lannan
Statistical support by Dr. Eileen King; Dr. Rhonda VanDyke

Research with Dr. Jareen Meinzen-Derr

Collaboration with Heart Institute Research Core
Collaborating Faculty: Dr. Woody Benson; Dr. Thomas Kulik; Dr. Brad Marino; Dr. William Gottliebson; Dr. Kan Hor; Dr. Erik Michelfelder; Dr. Jeanne James; Dr. Elaine Urbina; Dr. John Morrison; Dr. Shelly Kirk; Dr. Bob Siegel; Dr. Karen Uzark; Dr. Jeffrey Anderson; Dr. Thomas Kimball; Dr. James Cnota; Dr. Richard Czosek; Dr. Jeffrey Shuhaiber; Dr. Peter Manning; Dr. Stephanie Ware; Dr. Catherine Krawczeski
Study Design and Analysis Unit: Director - Dr. Jessica Woo; Dr. Eileen King; Dr. Richard Ittenbach; Dr. Rhonda VanDyke

Genetic research with Dr. Lisa J. Martin

Collaboration with Hematology-Oncology
Collaborating Faculty: Dr. Frank Smith; Dr. Tim Cripe; Dr. Clinton Joiner; Dr. Susanne Wells; Dr. Karen Kalinyak
Statistical support by Dr. Mi-Ok Kim

Collaboration with Human Genetics
Collaborating Faculty: Dr. Greg Grabowski; Dr. Cindy Prows; Dr. Dan Prows; Dr. Brad Tinkle; Dr. Min Xin Guan; Dr. Mehdi Keddache; Dr. Qi Xiaoyang; Dr. Kejian Zhang; Dr. Bill Nichols; Dr. Betty Schorry; Dr. Nancy
Research collaborations with Dr. Lisa J. Martin

Collaboration with Immunobiology
Collaborating Faculty: Dr. Marsha Wills-Karp; Dr. Lee Grimes
Statistical support by Dr. Mi-Ok Kim

Collaboration with Infectious Disease
Collaborating Faculty: Dr. Xi Jiang; Dr. Mary Staat; Dr. David Bernstein; Dr. Beverly Connelly
Statistical support by Dr. Mekibib Altaye; Dr. Shelia Salisbury

Collaboration with Molecular Immunology
Collaborating Faculty: Dr. Clare Chougnet
Statistical support by Dr. Bin Huang

Collaboration with Nephrology and Hypertension
Collaborating Faculty: Dr. John Bissler; Dr. Jens Goebel; Dr. David Hooper; Dr. Mark Mitsnefes
Statistical support by Dr. Shelia Salisbury

Collaboration with Neurology
Collaborating Faculty: Dr. Tracy Glauser; Dr. Douglas Rose; Dr. Diego Morita; Dr. Andrew Hershey; Dr. Brenda Wong; Dr. Jennifer Vannest; Dr. Cynthia Molloy
Statistical support by Dr. Mekibib Altaye; Dr. Rhonda VanDyke; Dr. Lisa J. Martin

Collaboration with Orthopaedics
Collaborating Faculty: Dr. Shital Parikh
Statistical support by Dr. Shelia Salisbury

Collaboration with Otolaryngology
Collaborating Faculty: Dr. David Brown; Dr. Dan Choo; Dr. John Greinwald; Dr. Ellis Arjmand; Dr. Lisa Hunter; Dr. Sally Shott
Statistical support by Dr. Shelia Salisbury

Collaboration with Pediatric General and Thoracic Surgery
Collaborating Faculty: Dr. Thomas Inge; Dr. Gregory Tiao; Dr. Timothy Crombleholme; Dr. Jose Vuletin; Dr. Mounira Habli
Statistical support by Dr. Judy Bean; Dr. Shelia Salisbury; Dr. Mi-Ok Kim

Collaboration with Pediatric Ophthalmology
Collaborating Faculty: Dr. Walker Motley; Dr. Michael Yang
Statistical support by Dr. Shelia Salisbury

Collaboration with Pediatric Physical Medicine and Rehabilitation
Collaborating Faculty: Dr. Shari Wade; Dr. Jilda Vargus-Adams
Statistical support by Dr. Shelia Salisbury; Dr. Lisa J. Martin; Dr. Judy Bean

Collaboration with Pulmonary Medicine
Collaborating Faculty: Dr. Michael Seid; Dr. Raouf Samy Amin; Dr. Daniel Grossoehme; Dr. Jamie Woolridge
Statistical support by Dr. Bin Huang; Dr. Rhonda VanDyke; Dr. Shelia Salisbury; Dr. Eileen King

Collaboration with Radiology
Collaboration Faculty: Dr. Scott Holland; Dr. Robert Fleck; Dr. Alan Brody; Dr. Lane Donnelly; Dr. Kathleen Emery; Dr. Michael Gelfand; Dr. Marilyn Goske; Dr. Gary Halverson; Dr. Steven Kraus; Dr. Tal Laor; Dr. David Larson; Dr. Jennifer Nicholas; Dr. Dan Podberesky; Dr. Brenton Reading; Dr. Susan Sharp; Dr. Alexander Tobin; Dr. Norma S. Costa; Dr. Charles Dumoulin
Statistical support by Dr. Mekibib Altaye

Collaboration with Rheumatology
Collaborating Faculty: Dr. Ed Giannini; Dr. Dan Lovell; Dr. Hermina Brunner
Statistical support by Dr. Bin Huang

Collaboration with Section of Neonatology, Perinatal and Pulmonary Biology
Collaborating Faculty: Dr. Kurt Schibler; Dr. Tanya Cahill; Dr. James Greenberg; Dr. Andrew South; Dr. Henry Akinbi; Dr. Heather Kaplan; Dr. Vivek Narenderan
Statistical and teaching support by Dr. Mekibib Altaye

Research with Dr. Ardythe L. Morrow; Dr. Jareen Meinzen-Derr

Collaboration with Sports Medicine
Collaborating Faculty: Dr. Timothy Hewett; Dr. Gregory Myer; Dr. Mark Paterno
Statistical support by Dr. Jane Khoury

Faculty Members

Ardythe L. Morrow, PhD, Professor; Division Director
Research Interests: Molecular epidemiology of human milk, epidemiologic methods, prevention of infectious disease, predictive biomarkers of neonatal outcomes

Mekibib Altaye, PhD, Research Assistant Professor
Research Interests: Design and analysis of correlated, clustered and longitudinal data. Design and analysis of functional brain image data Inference procedures for reliability data.

Judy A. Bean, PhD, Professor Emeritus
Research Interests: General biostatistics consulting

Bin Huang, PhD, Research Assistant Professor
Research Interests: Application motivated statistics development include statistical modeling of mediation or surrogacy effect, censored outcome and measurement errors, statistics evaluation of gene by environment interac
tions.

Richard F. Ittenbach, PhD, Research Associate Professor
Research Interests: Scale development and analysis; Rausch analysis

Jane C. Khoury, PhD, Research Assistant Professor
Research Interests: Experimental design of cohort studies and trials

Mi-Ok Kim, PhD, Assistant Professor
Research Interests: Cancer Biostatistics: Advancing statistical methods frequently applied in clinical and preclinical cancer studies.

Lisa J. Martin, PhD, Research Associate Professor
Research Interests: Genetic Epidemiology, Obesity, Heart Malformations

Jareen Meinzen-Derr, PhD, Research Assistant Professor
Research Interests: Hearing and deafness, neonatal outcomes

Todd G. Nick, PhD, Professor
Research Interests: Development of reliable statistical models with particular emphasis in statistical genetics and pharmacogenetics

Shelia R. Salisbury, PhD, Research Assistant Professor
Research Interests: Cancer research: Design and analysis of correlated longitudinal data

Rhonda VanDyke, PhD, Research Assistant Professor
Research Interests: Mixture Models and Functional Data Analysis, integration of fMRI and MEG modalities; classification of arterial pressure waveform data from children through Bayesian statistics

Jessica G. Woo, PhD, Research Assistant Professor
Research Interests: Molecular epidemiology, with a particular research interest in pediatric obesity

Joint Appointment Faculty Members

Melinda Butsch-Kovacic, PhD, Assistant Professor
Personalized & Predictive Medicine
Epidemiologic methods

Adekunle Dawodu, MD, Professor
Center for Global Child Health
Vitamin D and child health

Sheela Geraghty, MD, Associate Professor
This year the division launched five designated research units to advance the work and capacity of existing research programs and the academic focus and leadership of DBE faculty. The leading academic unit is the Genetic Epidemiology and Statistics Unit headed by Lisa J. Martin, PhD, whose growing group studies genetic factors that influence health. In FY10, this program established the capacity to conduct genome-wide association studies (GWAS). In the past year, Martin collaborated with Marc Rothenberg, MD, and Children’s Hospital of Pennsylvania to conduct a GWAS study, published in Nature Genetics that identified a novel susceptibility locus for eosinophilic esophagitis. To follow-up these exciting findings, Martin will lead the statistical analysis for an NIH grant to identify additional susceptibility loci. Funded by NIH, Martin and Jessica Woo, MHSA, PhD, have collaborated to perform GWAS analysis in stroke. Martin also performed a GWAS study of autism in collaboration with Cynthia Molloy, MD, MS. This project focuses on detailed characterization of autism cases, thereby improving identification of genetic susceptibility. These studies are breaking new ground, and have could lead to better strategies for preventing or treating severe diseases.

Another new research unit is the Scales Development and Validation Unit directed by Richard Ittenbach, PhD, which uses powerful new statistical methods for clinical studies. Three more research units were initiated to strengthen partnerships with new institutes at Cincinnati Children’s: The Heart Institute Biostatistics and Epidemiology Unit, directed by Woo; the Perinatal Institute Biostatistics and Epidemiology Unit, directed by Jareen Meinzen-Derr, PhD; and the Cancer and Blood Diseases Institute Biostatistics Unit, directed by Mi-Ok Kim, PhD. These collaborations will provide a strong accountability and matrix research design to enable the growth of these institutes and our mission to improve child health.

Data Management Center
Our Division will lead the way this year to develop Cincinnati Children’s new Data Management Initiative. The Initiative is an institution-wide effort to develop state-of-the-art data management services to medical center investigators. DBE faculty and staff - Richard Ittenbach, Eileen King, Ardythe Morrow, and Rachel Akers - worked with colleagues throughout Cincinnati Children’s this past year to evaluate existing operations and make recommendations to medical center leadership that will enable Cincinnati Children’s to become the national leader in this domain of clinical and translational research. The overall plan will establish good clinical data management policies and practices in the overall institution. Planning for this initiative occurred in FY10, while roll-out of new data management policies and practices are
scheduled to begin in FY11.

Student Programs

The Graduate Biostatistics Internship Program at Cincinnati Children’s, launched in 2007, is a collaboration with the University of Cincinnati’s department of mathematical sciences. This year, the institutions agreed to include five students per year on an ongoing basis. The program allows students to work on biomedical research projects as well as in statistical methodology development, under the close supervision of faculty statisticians. Students are involved in research in rheumatology, imaging, adolescent medicine, pulmonary medicine, and cancer. The program is led by Bin Huang, PhD, Division of Biostatistics and Epidemiology, and professors Siva Sivaganesan and James Deddens from UC.

The division also has launched two new award mechanisms for students and staff:

• The Frank C. Woodside, Dinsmore & Shohl fellowship is for pre-doctoral students. This was the second year of the pre-doctoral fellowship, which was awarded to Yan Ren. She is conducting her dissertation on a clustering method using a Bayesian approach for high dimensional multilevel time series data.

• The W. William Luxion travel trainee award is directed towards staff and students who are being mentored by a DBE faculty member. This award was given to Resmi Gupta, a doctoral student in biostatistics working under the supervision of Richard Ittenbach. Gupta’s work is on statistical methods for zero-inflated clinical data. Her paper was accepted for presentation at the Joint Statistical Meeting in August.

Division Publications

1.

Grants, Contracts, and Industry Agreements

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<th>Grant and Contract Awards</th>
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| **Bean, J**               | Recanalization Therapies and Markers of Outcomes in Acute Ischemic Stroke  
University of Cincinnati (National Institutes of Health)  
P50 NS 044283  
08/01/08 - 04/30/13  
$229,242 / $325,998 |
| **Khoury, J**             | Hemorrhagic & Ischemic Stroke Among Blacks and Whites  
University of Cincinnati (National Institutes of Health)  
R01 NS 030678  
07/01/09 - 06/30/14  
$38,660 / $38,660 |
| **Kim, M**                | Risk Stratification and Identification of Immunogenetic and Microbial Markers of Complicated Disease Course in Pediatric Crohn’s Disease  
Emory University (Crohn’s & Colitis Foundation of America)  
07/01/09 - 06/30/13  
$12,115 / $12,115 |
| **Empirical Bayes Analysis of Quantile Regression Model**  
National Institutes of Health  
R03 CA 133944  
07/01/09 - 06/30/11  
$55,413 / $111,042 |
| **Martin, L**             | Epithelial Genes in Allergic Inflammation - Scientific Core  
National Institutes of Health  
U19 AI 070235  
09/15/06 - 08/31/11  
$87,474 / $87,474 |
| **Morrow, A**             | Cincinnati Center for Clinical & Translational Sciences and Training - Design/Biostatistics/Ethics  
University of Cincinnati (National Institutes of Health)  
UL1 RR 026314  
04/03/09 - 03/31/14  
$37,010 / $70,861 |
| **Woo, J**                | Genetic and Environmental Risk Factors for Hemorrhagic Stroke  
University of Cincinnati (National Institutes of Health)  
R01 NS 036695  
09/30/08 - 06/30/13  
$43,342 / $79,849 |
## Industry Contracts

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<td>Woo, J</td>
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## Current Year Direct

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## Funded Collaborative Efforts

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<td>Altaye, M</td>
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<td>Holland, S</td>
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<td><strong>High Prevalence of Rickets and Subclinical Maternal Health</strong></td>
<td>Dawodu, A</td>
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<td>Holland, S</td>
<td>National Institutes of Health</td>
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<td><strong>Neurobehavior Effects of Insecticide Exposure in Pregnancy</strong></td>
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<td>National Institutes of Health</td>
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<td><strong>Pediatric Functional Neuroimaging Research Network</strong></td>
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<td><strong>The Role of Human Milk in Infant Nutrition and Health</strong></td>
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<td>Bean, J</td>
<td><strong>Behavioral and Nutrition Therapies to Help CF Preschoolers Grow</strong></td>
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<td>Powers, S</td>
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<td><strong>Improving Mental Health Outcomes of Child Brain Injury</strong></td>
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<td><strong>Drug and Non-drug Treatment of Pediatric Chronic Headache</strong></td>
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<td><strong>A Randomized Clinical Trial in Juvenile Fibromyalgia</strong></td>
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<td>Huang, B</td>
<td><strong>Early Aggressive Therapy in Juvenile Idiopathic Arthritis</strong></td>
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<td>Children's Hospital &amp; Regional Medical Center - Seattle</td>
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<td><strong>Impact of Peripubertal Exposure to Xenohormones on Fat Distribution and Cytokines</strong></td>
<td>Biro, F</td>
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<td>04/01/10 - 03/31/12</td>
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<td>09/30/09 - 07/31/13</td>
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<td>08/18/08 - 07/30/13</td>
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<td>IL-1 Trap for Treatment of Familial Mediterranean Fever</td>
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<td>Improving Parent/Adolescent Communication about Tobacco</td>
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<td>Self-Management of Type 1 Diabetes During Adolescence</td>
<td>Drotar, D</td>
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<td>Exploring the Role of Race/Ethnicity &amp; Family Influences to Reduce Youth Smoking</td>
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<td>Neurobehavior Effects of Insecticide Exposure in Pregnancy</td>
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<td>Neuromuscular Intervention Targeted to Mechanisms of ACL Load in Female Athletes</td>
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<td>Martin, L</td>
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<td>Genetic Mechanisms of Cardiac Disease in the Young</td>
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<td>Genetic Studies of Food Allergies Research Program</td>
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<td>Meinzen-Derr, J</td>
<td>Wideband Clinical Diagnosis and Monitoring of Middle-Ear and Cochlear Function</td>
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<td>The Role of Human Milk in Infant Nutrition and Health</td>
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<td>Cardiac Structure and Function in Early Familial Cardiomyopathy</td>
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**Total** $525,802