Dear reader:

Thank you for taking the time to review our UNC Department of Anesthesiology Annual Research Report for the 2011-2012 academic year. I hope that this annual summary of our projects and products provides you with a better understanding of our work and gives you some sense of our research environment.

The research success summarized in this report is achieved by three main factors. First, we are fortunate to have gathered together an incredible group of faculty and staff in the department. Second, these individuals excel at working together in collaborative, multidisciplinary teams. Research is truly a team sport. The effective collaboration of individuals in each of the projects described in this report accounts for our success, and we are fortunate that our numbers continue to grow. Finally, we have a Chair who fully embraces the mission and commitment of the university to provide service to our citizens through excellence as one of the world’s great research universities. Dr. Zvara has provided the infrastructure and leadership necessary for transformative research, even during very challenging economic times.

I would encourage you to check back often and keep up with our Department research activities via monthly updates at http://www.med.unc.edu/anesthesiology/research. Also, if you have any questions regarding our research or work, don't hesitate to email me any time at smclean@aims.unc.edu.

Sincerely,

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Areas of Departmental Research Focus

1. **TRYUMPH Program:**
   **Trauma RecoverY: Understanding Mechanism and Promoting Healing**

   A. **European American CRASH**
   **Genetic Predictors of Acute and Chronic Musculoskeletal Pain After Minor MVC**
   (R01AR056328, PI McLean)
   Project CRASH is a prospective cohort study examining genotypic and phenotypic characteristics associated with the development of acute and persistent pain and related outcomes after motor vehicle collision. This study is funded by the National Institute of Arthritis and Musculoskeletal and Skin Diseases. Patients involved in motor vehicle collision are enrolled in the study at one of nine emergency department study sites in Michigan, Massachusetts, New York, and Florida. Over 900 patients have been enrolled in this study to date, and follow-up assessments are nearing completion. Study participants complete a baseline assessment in the ED as well as a follow-up interview 6 weeks, 6 months, and 1 year following the motor vehicle collision.

Related Abstracts 2011-2012


Related Publications 2011-2012


B. African American CRASH:
Applying Biopsychosocial Model to Post-MVC Pain Development in African Americans (R01AR060852, PI McLean)

The goal of this study is to examine genotypic and phenotypic characteristics associated with the development of pain and related outcomes in African Americans experiencing motor vehicle collision. This study is supported by the National Institute of Arthritis and Musculoskeletal and Skin Diseases of the National Institutes of Health (R01AR056328), and will enroll 1,000 African Americans experiencing motor vehicle collision. This study is in its first year of NIH funding.

Study investigators at the first annual African American CRASH Conference, Chapel Hill, NC

Jacob Ulirsch, Data Manager, Dr. Andrey Bortsov, Faculty, and Lauren Ballina, BURN Experiences Study Coordinator, at the African American CRASH Conference
C. Older Adult CRASH

Persistent Pain in Older Adults after Motor Vehicle Collision
(KL2 RR025746-03, PI Platts-Mills)

The Older Adult CRASH study is the first prospective study to examine the incidence, predictors, and etiology of persistent pain among independently living older adults who come to the emergency department for care after motor vehicle collision and are discharged to home. The study enrolls patients 65 and older at eight study sites. This study has enrolled over 50 patients and will soon be adding two additional sites. This project is supported by Dr. Platts-Mills' KL2 career development award funded by the National Center for Research Resources through UNC's Translational and Clinical Sciences Institute.

Related Publications 2011-2012


Dr. Platts-Mills Research Group: Ryan Dickey, Gregory Pereira, Dr. Timothy Platts-Mills, Natalie Richmond, Alison Rittenberg and Katherine Hunald
D. OSPREY: Observational Studies of Pain medication Response in the Elderly
(KL2 RR025746-03, PI Platts-Mills)
The OSPREY study is an observational study of pain and pain treatment side effects in adults age 65 and older seen in the UNC Emergency Department with acute musculoskeletal pain. Information is collected via patient telephone interview and data extraction from the medical record. During the phone call, patients are asked about the pain medications they have taken, the side effects they have experienced, and their overall satisfaction with their pain management. This study will provide valuable information about the frequency of side effects among older adults receiving pain medication treatment for acute pain conditions.

Related Abstracts 2011-2012

F. BURN HELP Study
(UNC CTSA & Jaycee Burn Center Foundation, PI McLean)
The BURN HELP Trial is a phase IIIB pilot randomized multi-centered genotype-guided double-blind trial of propranolol to reduce pain after major thermal burn injury. Results of the study indicate that genotype-based multisite trials in patients with thermal burn injury are feasible. The study also identified a genotype associated with increased pain during initial hospitalization, and established an outstanding team of collaborators.

Related Abstracts 2011-2012
Morbidity after Major Burn Injury. *Presented at the Annual Meeting of the Society of Biological Psychiatry, Philadelphia, PA, May 2012*


**Related Publications 2011-2012**


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Dr. Magdalena Tomecka, Resident and Danielle Orrey, BURN HELP Coordinator, American Society of Anesthesiologists Conference, Chicago, IL

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Danielle Orrey,
BURN HELP Coordinator,
American Society of Anesthesiologists Conference, Chicago, IL
E. The BURN Experiences Study  
(Jaycee Burn Center Foundation, PI McLean)  
The BURN Experiences study is a prospective longitudinal pilot study examining the recovery process after major thermal burn injury. This study is being conducted at burn centers within the Burn TRYUMPH Research Network. Data collected is be used to demonstrate study feasibility and collect pilot data for a large scale trial.

G. The HELP PAIN Trial  
(Mayday Fund, PI McLean)  
The HELP PAIN Trial is an Emergency Department-based randomized controlled trial. The goal of this pilot study is to assess the feasibility of implementing an intervention to improve recovery after motor vehicle collision. Patients who present to the Emergency Department after motor vehicle collision will be recruited, and will be randomized to receive either a pharmacologic intervention or placebo.
2. N.C. Children's Center for Clinical Excellence

A. Project TICKER
(Agency for Healthcare Research and Quality 1R18HS019638, PI Willis)
Project TICKER is a collaboration between various service units within UNC Health Care. The specific aims are: (1) to implement a robust communication and teamwork foundation for the general care of the inpatient pediatric congenital heart disease service line using a tailored training program, TeamSTEPPS™ and (2) to design and implement Integrated Clinical Pathways (ICP) for two of the most common congenital heart disease diagnoses, using the specific teamwork tools of TeamSTEPPS and evidence-based standardized care throughout the entire hospital stay.

During the past year, the study team reached their goal of having more than 85% of the clinical personnel throughout the entire pediatric congenital heart disease service line trained in TeamSTEPPS. With this teamwork foundation, the study team implemented standardized handoffs for cardiac patients from the operating room to the PICU and from the NCCC to the PICU. The study team is currently in the final implementation phase of the ICP for ventrical septal defect and in the testing phase of the ICP for tetralogy of Fallot. The study team has also drafted an implementation toolkit, which is currently under review and will be published at the end of the project in October.

Related Abstracts 2011-2012

B. N.C. Children’s Hospital Pediatric Sedation Excellence Program
(Dance Marathon 2011-12, PI Willis)
With a Dance Marathon grant, the study team created the Pediatric Sedation Excellence program, which aims to provide a coordinated approach to improving the quality and safety of pediatric sedations at UNC Hospitals. The Pediatric Sedation Committee brings together all clinical areas that provide procedural sedation for pediatric patients and also includes a family advisor. Goals of the program are to decrease adverse events related to procedural sedation, to eliminate unplanned admissions, and to eliminate pediatric rapid response calls related to sedation. With the Dance Marathon grant, the study team also purchased an MRI-compatible A/V system, which allows patients to watch a movie or listen to music while in the MRI scanner. This distraction technology allows more children to avoid being sedated for an MRI scan, which can be risky for their health.
3. Cardiovascular Research Program (NHLBI R01HL083362, PI Xu)

The goal of the cardiovascular research program is to contribute new knowledge which will lead to novel interventions to prevent or limit myocardial ischemia/reperfusion injury. Focus areas within the research program include investigating the roles of zinc and zinc transporters in reperfusion/reoxygenation injury. Experimental approaches include rat heart perfusion, molecular and cell biology, and RT-PCR.

Related Abstracts 2011-12


3. Xu Z, Kim S, Zhou J, Huh J, Zvara DA. Maintenance of intracellular zinc homeostasis contributes to the mechanism by which postconditioning protects the heart from ischemia/reperfusion injury. Presented at the AHA Basic Cardiovascular Sciences Annual meeting, New Orleans, July, 2011

Related Publications 2011-12

Dr. Xu was recruited to be a Distinguished Professor in the Department of Physiology & Pathophysiology at Tianjin Medical University in Tianjin, China. We thank him for his outstanding research and contribution to the UNC Department of Anesthesiology over the past decade!!!
4. Academic Clinical Trials
   A. PeriOperative ISchemic Evaluation-2 Trial (POISE-2)
      (Population Health Research Institute, Site PIs Kumar/Arora)

Major surgeries not involving the heart are common, and major heart problems during or after such surgeries represent a large population health problem. Few treatments to prevent heart problems around the time of surgery have been tested. There is encouraging data suggesting that small doses of two medications, Acetyl-Salicylic Acid (ASA) and Clonidine, given individually for a short period before and after major surgeries, may prevent major heart problems. The POISE-2 Trial is a large international study to test if ASA and Clonidine can prevent heart attacks and deaths from heart problems around the time of surgery.
5. Industry Clinical Trials
The Anesthesiology Clinical Trials team works with Department of Anesthesiology faculty to manage and conduct both industry-sponsored clinical trials and investigator-initiated studies. Their track record is a testament to this outstanding team: UNC is currently a national and international leader in the recruitment and retention of individuals for several clinical trials. Individual faculty studies performed in collaboration with the clinical trials team are described below.

Out of 8 recruiting sites nationwide, Dr Coomb’s team was 1st in number of patients recruited in 2011-12.

A. Peripheral Intravenous Catheter Complication Rate Comparison of Two Different Catheter-Stabilization Systems (PIV Secural)
(The 3M Company, Site PI Coombs)
Approximately 300 million short peripheral intravascular catheters (PIVs) were sold in the U.S. in 2009. These short (< 3 inches) peripherally inserted IV catheters are vital for providing patients with needed: 1) fluid, electrolyte, nutrient and blood product replacement, 2) medicines and 3) diagnostic solutions (dyes). However, these IV catheters have inherent risks or potential complications which may result from poor catheter securement or stabilization. One way to reduce the incidence of PIV catheter-associated complications is to use technologies that help reduce catheter movement thereby improving
catheter stabilization. In addition to stabilization platforms added to the peripheral IV catheter design, catheter stabilization devices and modified transparent film dressings also help to reduce catheter movement and could possibly eliminate the need for routine catheter site changes. The purpose of the 3M Study was to: 1) compare the number of PIV securement-related complications and PIV catheter restarts of one stabilization system to another stabilization system and 2) determine which system provides a cost savings.

B. Surveillance Trial to Evaluate a Shortened Infusion Time of Intravenous Ibuprofen (Cumberland Pharmaceuticals, Site PI Boortz-Marx)

Caldolor (ibuprofen) Injection (intravenous ibuprofen) was developed by Cumberland Pharmaceuticals Inc. (CPI) and approved by the US Food and Drug Administration (FDA) in June 2009. Caldolor is indicated in adults for the management of mild to moderate pain, management of moderate to severe pain as an adjunct to opioid analgesics, and for the reduction of fever. The current prescribing information recommends that the infusion time for Caldolor administration be no less than 30 minutes. This phase IV multi-center, open-label, single-dose surveillance clinical study will assess the safety and efficacy of ibuprofen administered intravenously over five to ten minutes to adult patients in the hospital setting with fever (temperature >101°F) and/or pain (visual analog scale (VAS) assessment >3).

C. Surgical Surveillance Trial to Evaluate a Shortened Infusion Time of Intravenous Ibuprofen (Cumberland Pharmaceuticals, Site PI Boortz-Marx)

Caldolor (ibuprofen) Injection (intravenous ibuprofen) was developed by Cumberland Pharmaceuticals Inc. (CPI) and approved by the US Food and Drug Administration (FDA) in June 2009. Caldolor is indicated in adults for the management of mild to moderate pain, management of moderate to severe pain as an adjunct to opioid analgesics and for the reduction of fever. The current prescribing information recommends that the infusion time for Caldolor administration be no less than 30 minutes. This phase IV multi-center, open-label, single or multiple-dose surveillance clinical study will assess the safety of ibuprofen administered intravenously over five to ten minutes to adult patients undergoing surgical procedures.
6. Faculty and Resident Research Projects

A. Sedation Chart Review Study
   (Anesthesiology Research Fund, PI McNaull)
   In August of 2011, after approval from the University of North Carolina Pharmacy and Therapeutics committee, the Pediatric Pain, Sedation, and Consult service began using intranasal dexmedetomidine and midazolam for moderate sedations in appropriate pediatric patients presenting for non-painful diagnostic studies. The objective of this study is to report our institutional experience with intranasal dexmedetomidine and midazolam for pediatric sedations.

B. Families and Pediatric Cardiac Surgery Teams: How Well Do We Communicate?
   (Anesthesiology Research Fund, PI Hanson)
   Clinicians face challenges when attempting to negotiate their way through dialogues with families whose children require surgical intervention in the near future. The area of clinician-patient communication with pediatric families is under-researched. There are no studies that examine communication between nurses, physicians and pediatric patient’s families at the time of cardiac surgery. This research will provide insight into what patient’s families value in their communications with the medical team and will assist the medical community in better meeting our children’s family’s needs.

C. Retrospective Study Protocol: High Dose Dexmedetomidine Recovery Time for Noninvasive Procedures in Pediatric Patients
   (Anesthesiology Research Fund, PI Phelps)
   Pediatric patients often require sedation in order to perform noninvasive procedures such as imaging studies (e.g. CT, MRI). In January 2011, UNC’s Pediatric Sedation Service adopted a procedural sedation protocol for noninvasive procedures. The protocol uses high dose dexmedetomidine in children in order to achieve sedation for procedures like radiological imaging studies, specifically Magnetic Resonance Imaging (MRI). The protocol is modeled after the high dose dexmedetomidine protocol used by Boston Children’s Hospital and discussed in multiple publications by Dr. Keira Mason. This study aims to compare measured dexmedetomidine recovery times achieved through the Pediatric Sedation Service at UNC with the recovery times previously published.
Departmental Research Products

1. Published Abstracts

Bailey A, Ongoing Professional Practice Evaluations (OPPE); Meaningful Data from Electronic Evaluations. Presented at the Annual Meeting of the American Society of Anesthesiologists, Chicago, IL, 2011.


Xu Z, Kim S, Zhou J, Huh J, Zvara DA. Maintenance of intracellular zinc homeostasis contributes to the mechanism by which postconditioning protects the heart from ischemia/reperfusion injury. Presented at the AHA Basic Cardiovascular Sciences Annual meeting, New Orleans, July, 2011

2. Journal Articles


Hanson CC and Barach PR. Improving cardiac care quality and safety through partnerships with patients and their families. Progress in Pediatric Cardiology. 2012; 33; p73-79.

Harris BD, Hanson C, Christy C, Adams T, Banks A, Schade Willis T, Maciejewski ML. Strict Hand Hygiene Practices Shortened Stays And Cut Costs And Mortality In A Pediatric Intensive Care Unit. Health Affairs. 2010;30(9):1751-1760


Kang, Jina, Vann, William, Anderson, Jay, Lee, Jessica. Sedation for Overweight/Obese Children in the Outpatient Dental Setting. Pediatric Dentistry. Accepted for publication November 2011


3. Books


4. Grants

Title: Genetic Predictors of Acute and Chronic Musculoskeletal Pain After Minor MVC
Award Number: R01AR056328
Sponsor: National Institute of Arthritis Musculoskeletal Skin Disease
Project Dates: 9/19/2008 - 8/31/2012
Principal Investigator: Samuel McLean

Title: Applying Biopsychosocial Model to Post-MVC Pain Development in African Americans
Award Number: R01AR060852
Sponsor: National Institute of Arthritis Musculoskeletal Skin Disease
Principal Investigator: Samuel McLean

Title: Effect of Adenosine A2 receptor activation on the mitochondrial death pathway
Award Number: R01HL083362
Sponsor: National Heart, Lung and Blood Institute
Project Dates: 8/1/2006-7/31/2012
Principal Investigator: Zhelong Xu

Title: Improving Patient Safety in a Pediatric Service Line
Award Number: R18HS019638
Sponsor: Agency for Healthcare Research and Quality
Project Dates: 9/30/2010-9/29/2012
Principal Investigator: Tina Willis

Title: Pain Help: Venlafaxine to reduce the development of persistent pain
Sponsor: Mayday Fund
Project Dates: 12/8/2010-12/7/2012
Principal Investigator: Samuel McLean

Title: Partnering with Families to Implement Family-Centered Care in the PICU
Sponsor: UNC Dance Marathon
Project Dates: 7/1/2010-6/30/2011
Principal Investigator: Tina Willis
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