

The University of North Carolina at Chapel Hill

**Department of Anesthesiology
Annual Research Report
2011-12**



UNC
SCHOOL OF MEDICINE



THE UNIVERSITY
of NORTH CAROLINA
at CHAPEL HILL

101 Manning Drive T: 919.966.5136
CAMPUS BOX 7010 F: 919.966.7193
CHAPEL HILL, NC 27599

DEPARTMENT of ANESTHESIOLOGY

SAMUEL A. MCLEAN, MD, MPH
Vice Chair for Research

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,

Samuel McLean, MD, MPH
Vice Chair, Research, Department of Anesthesiology
Attending Physician, Department of Emergency Medicine
University of North Carolina, Chapel Hill, NC 27599-7010
email: smclean@aims.unc.edu

Table of Contents

Areas of Departmental Research Focus

1. Pain and Related Health Outcomes (TRYUMPH Program)	2
A. European American CRASH	2
B. African American CRASH	4
C. Older Adult CRASH	5
D. Osprey Study.....	6
E. The Burn HELP Trial	6
F. Burn Experiences.....	8
G. The HELP PAIN Trial	8
2. N.C. Children's Center for Clinical Excellence	9
A. Project TICKER	9
B. 2010-2011 Dance Marathon Grant	9
3. Cardiovascular Research	10
4. Collaborative Research Efforts.....	11
A. POISE II Study	11
5. Industry-Sponsored Clinical Trials	12
A. 3M Study.....	12
B. Cumberland 015 Study	13
C. Cumberland 016 Study	13
6. Faculty Projects	14
A. Sedation Chart Review Study	14
B. Surgical Communications Study	14
C. Dexmedetomidine Recovery Study	14

Department Research Products

1. Abstracts	15
2. Journals	18
3. Books.....	21
4. Grants.....	22

Areas of Departmental Research Focus

1. TRYUMPH Program:

Trauma **R**ecover**Y**: **U**nderstanding **M**echanism and **P**romoting **H**ealing

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.



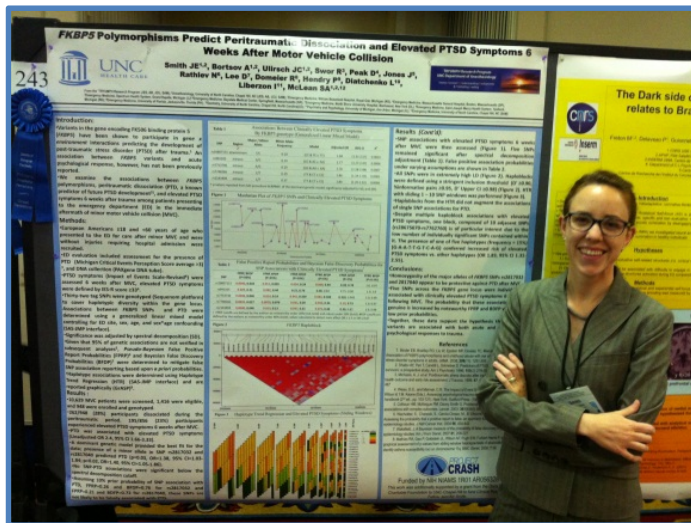
Related Abstracts 2011-2012

1. Ballina L, Diatchenko L, Ulirsch J, Bortsov A, Swor R, Peak D, Jones J, Rathlev N, Lee D, Domieir R, Hendry P, Liberzon I, McLean SA. Sexually Dimorphic Influence of COMT on Distress in the Immediate Aftermath of Trauma. *Presented at the Annual Meeting of the Society of Biological Psychiatry, Philadelphia, PA, May 2012*
2. Bortsov A, Soward A, Diatchenko L, Ulirsch J, Swor R, Peak D, Jones J, Rathlev N, Lee D, Domieir R, Hendry P, Liberzon I, McLean SA. Tryptophan Hydroxylase 2 Synonymous Polymorphism rs7305115 is Associated with Acute Psychological Response after Motor Vehicle Collision. *Presented at the Annual Meeting of the Society of Biological Psychiatry, Philadelphia, PA, May 2012*
3. Smith J, Bortsov A, Ulirsch J, Swor R, Peak D, Jones J, Rathlev N, Lee D, Domieir R, Hendry P, Liberzon I, McLean SA. FKBP5 Polymorphism Predicts Peritraumatic Dissociation after Motor Vehicle Collision. Presented at the Annual Meeting of the Society of Biological Psychiatry, Philadelphia, PA, May 2012 **Scored in the top 1% of all abstracts submitted to conference and received a Top Poster Finalist award.
4. Ulirsch J, Bortsov A, Smith J, Diatchenko L, Bortsov A, Swor R, Peak D, Jones J, Rathlev N, Lee D, Domieir R, Hendry P, Liberzon I, McLean SA. ADRA2A Variants Predict Peritraumatic Dissociation After Motor Vehicle Collision. *Presented at the Annual Meeting of the Society of Biological Psychiatry, Philadelphia, PA, May 2012*

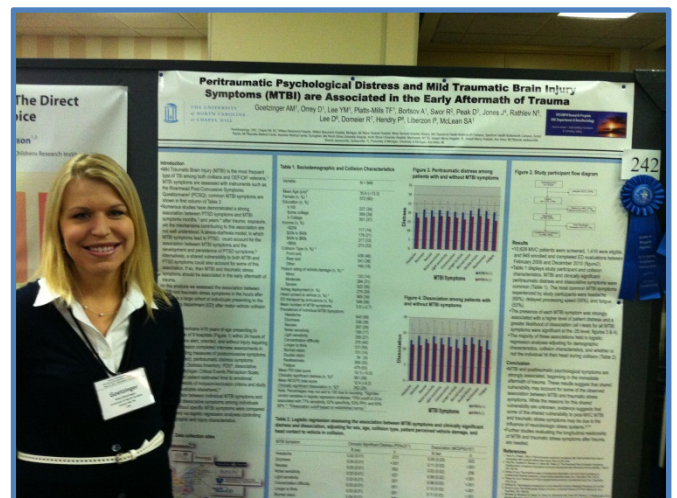
5. Goetzinger A, Orrey D, Lee Y, Platts-Mills T, Bortsov A, Swor R, Peak D, Jones J, Rathlev N, Lee D, Domieir R, Hendry P, Liberzon I, McLean SA. Peritraumatic Psychological Distress and Mild Traumatic Brain Injury Symptoms (MTBI) are Associated in the Early Aftermath of Trauma. Presented at the Annual Meeting of the Society of Biological Psychiatry, Philadelphia, PA, May 2012. **** Scored in the top 1% of all abstracts submitted to conference and received a Top Poster Finalist award.**
6. Platts-Mills T, Ballina L, Diatchenko L, Bortsov A, Swor R, Peak D, Jones J, Rathlev N, Lee D, Domieir R, Hendry P, Liberzon I, McLean SA. Influence of COMT HPS Haplotype on Peritraumatic Distress Severity among Women Experiencing Motor Vehicle Collision: Report of an Age x Gene Interaction. Presented at the Annual Meeting of the Society of Biological Psychiatry, Philadelphia, PA, May 2012.

Related Publications 2011-2012

1. Platts-Mills TF, Ballina L, Bortsov AV, Soward A, Swor RA, Jones JS, Lee DC, Peak DA, Domeier RM, Rathlev NK, Hendry PL, McLean SA. Using Emergency Department-Based Inception Cohorts to Determine Genetic Characteristics Associated with Long Term Patient Outcomes: Methodology of the CRASH Study. *BMC Emergency Medicine* 2011.
2. Platts-Mills TF, Hunold K, Ballina L, Bortsov AV, Peak DA, Jones JS, Swor RA, Lee DC, Domeier RM, Hendry PL, Rathlev NK, McLean SA. More Educated Emergency Department Patients are Less Likely to Receive Opioids for Acute Pain. *Pain* 153(5):941-2, 2012.
3. McLean SA. The Potential Contribution of Stress System Responses to the Transition to Chronic Whiplash-Associated Disorders. *Spine* 36:S226-32, 2011.
4. Sterling M, McLean SA, Sullivan MJ, Elliott J, Butenhuis J, Kamper SJ. Potential processes involved in the initiation and maintenance of Whiplash Associated Disorders (WAD). *Spine* 36:S322-9, 2011.



Jennifer Smith, Doris Duke Fellow, Society of Biological Psychiatry Meeting, Philadelphia, PA. Jennifer's abstract was selected as one of the top 5% of over 800 abstracts submitted.



Dr. Amy Goetzinger, Faculty, Biological Psychiatry Meeting, Philadelphia, PA. Dr. Goetzinger's abstract was selected as one of the top 5% of over 800 abstracts submitted.

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

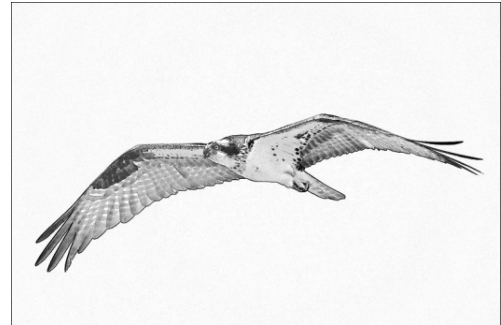
1. Platts-Mills TF, Esserman DA, Brown DL, Bortsov AV, Sloane PD, McLean SA. Older US Emergency Department Patients are Less Likely to Receive Pain Medication than Younger Patients: Results from a National Survey. *Ann Emerg Med*. 2011 (in press).
2. Platts-Mills T, Hunold K, Esserman D, Sloane P, McLean SA. Motor Vehicle Collision-Related Emergency Department Visits by Older Adults in the United States. Accepted *Academic Emergency Medicine* 2012.
3. Platts-Mills TF, Lee YM, Swor RA, Zaleski EZ, Clauw DJ, McLean SA. Pain and interference of pain with function and mood in older adults involved in a motor vehicle collision: a pilot study. *Exp Aging Res* 2011 (in press).



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.



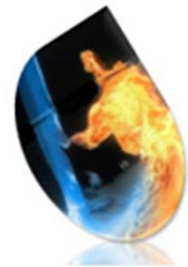
Related Abstracts 2011-2012

1. Isaacs CG, Kistler C, Hunold K, Pereira G, Buchbinder M, McLean SA, Platts-Mills TF. Shared decision making in the selection of outpatient analgesics for older emergency department patients. Presented at the Society for Academic Emergency Medicine; Chicago, IL; May 2012.
2. Isaacs CG, Kistler C, Hunold K, Pereira G, Buchbinder M, McLean SA, Platts-Mills TF. Shared decision making in the selection of outpatient analgesics for older emergency department patients. Presented at the American Geriatrics annual meeting; Seattle, WA; May 2012.

F. BURN HELP Study

(UNC CTSA & Jaycee Burn Center Foundation, PI McLean)

The BURN HELP Trial is a phase IIB 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

1. Orrey DC, Zhao S, Bair E, Bortsov AV, Shupp JW, Jones SW, Hwang J, Jordan MH, Holmes JH, Haith LR, Cairns BA, McLean, SA. Smokers Experience Increased Pain and Itch After Major Burn Injury. Presented at the annual meeting of the American Burn Association, Seattle, WA, 2012.
2. Orrey DC, Shupp J, Jones SW, Cicuto B, Jordan M, Holmes J, Haith L, Cairns B, McLean SA. Results of a Pilot Multi-centered RCT of Propranolol to Decrease Pain in Admitted Burn Patients. Presented at the Annual Meeting of the American Society of Anesthesiologists, Chicago, IL, 2011.
3. Orrey DC, Bortsov A, Shupp J, Cicuto B, Jordan M, Holmes J, Haith L, Cairns B, McLean SA. Catechol-O-methyltransferase genotype predicts pain severity in hospitalized burn patients. Presented at the Annual Meeting of the American Society of Anesthesiologists, Chicago, IL, 2011.
4. Orrey D, Bortsov A, Shupp J, Jones S, Hwang J, Jordan M, Holmes J, Haith L, Cairns B, Liberzon I, McLean SA. Individuals with Elevated PTSD Symptoms Experience Increased Itch Symptom

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

5. Orrey D, Bortsov A, Liberzon I, Shupp JW, Jones S, Hwang J, Jordan MH, Holmes J, Haith L, Cairns B, McLean SA. Failure of propranolol to decrease anxiety and PTSD symptoms in a genotype-based RCT of patients with major thermal burn injury. *Presented at the Annual Meeting of the Society of Biological Psychiatry, Philadelphia, PA, May 2012*
6. Tomecka M, Orrey D, Bortsov A, Shupp J, Jordan M, Jones S, Holmes J, Haith L, Cairns B, McLean SA. Itch Symptoms are Strongly Associated with Pain Symptoms in Patients with Major Thermal Burn Injury. *Presented at the Annual Meeting of the American Society of Anesthesiologists, Chicago, IL, 2011.*

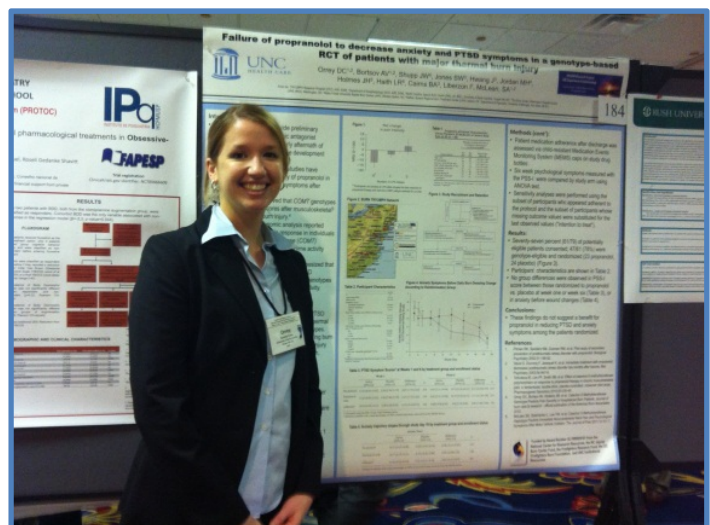
Related Publications 2011-2012

1. Orrey DC, Bortsov AV, Hoskins JM, Shupp JW, Jones SW, Cicuto BJ, Hwang J, Jordan MH, Holmes JH, Haith LR, Roane BM, Diatchenko L, Cairns BA, McLean SA. Catechol-O-methyltransferase genotype predicts pain severity in hospitalized burn patients. *Journal of Burn Care and Research.* 2012 Jul;33(4):518-523



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

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.



Nisha Verma, Medical Student, Lauren Ballina, Study Coordinator, and Claire Pauley, Undergraduate Research Assistant

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.



The HELP PAIN Trial

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 ventricular 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

1. Willis T, Mayer C, Purdy A, Burgess E, Massie S, Brown K, Yip T, Christy C, Buck S, McNaull P, Valley R, Mill M. Improved Teamwork in a Pediatric Cardiac Surgery Operating Suite. Presented at the International Forum on Quality and Safety in Healthcare, Paris, 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.

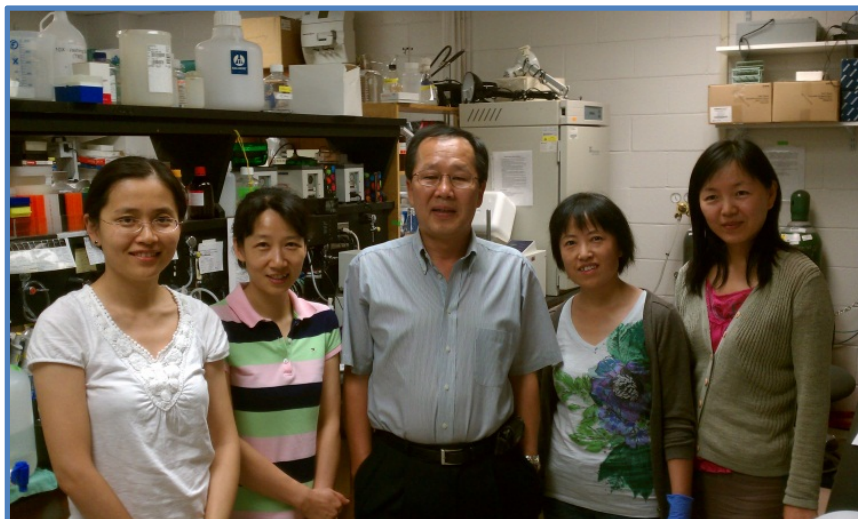
Related Abstracts 2011-12

1. Huh J, Zhou J, Zvara DA, Xu Z. Morphine attenuates mitochondria oxidative stress by modulating complex I activity upon reperfusion via mitochondrial Src tyrosine kinase and reduces infarct size in rat hearts. Presented at the 2011 AHA Scientific Sessions, Orlando, November, 2011
2. Huh, J, Zhou J, David A. Zvara, Zhelong Xu. Morphine attenuates mitochondria oxidative stress by modulating complex I activity upon reperfusion via mitochondrial Src tyrosine kinase and reduces infarct size in rat hearts. Presented at AHA Basic Cardiovascular Sciences 201 Scientific Sessions, New Orleans LA, 2011.
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

1. Chanoit G, Zhou J, Lee S, McIntosh R, Shen X., Zvara DA, Xu Z. Inhibition of phosphodiesterases leads to prevention of the mitochondrial permeability transition pore opening and reperfusion injury in cardiac H9c2 cells. *Cardiovascular Drugs and Therapy* 25: 299-306, 2011

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!!!



Huihua MD, PhD, Juan Zhou MD PhD, Dr. Zhelong Xu MD PhD, Jun He PhD, Liyan Chen MD PhD

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.



Dr. Priya Kumar

Out of 14 sites
nationwide, Dr.
Kumar's team was 2nd
in number of patients
recruited in 2011-12

Out of 106 recruiting
sites worldwide, Dr
Kumar's team was 5th
in number of patients
recruited in 2011-12.



POISE II Study Coordinators Josh Knight
and Josh Gant

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.



Industry Clinical Trials Team: Abbey Whittington, Felisha Westbrook, Josh Gant, Natalie Miller and Josh Knight

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

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



Dr. Randall Coombs

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).



Dr. Richard Boortz-Marx

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.



Dr. Richard Boortz-Marx

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.



Dr. Peggy McNaull

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.



Dr. Cherissa Hanson

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.



Dr. Janey Phelps

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.

Ballina L, Diatchenko L, Ulirsch J, Bortsov A, Swor R, Peak D, Jones J, Rathlev N, Lee D, Domieir R, Hendry P, Liberzon I, McLean SA. Sexually Dimorphic Influence of COMT on Distress in the Immediate Aftermath of Trauma. Presented at the Annual Meeting of the Society of Biological Psychiatry, Philadelphia, PA, May 2012

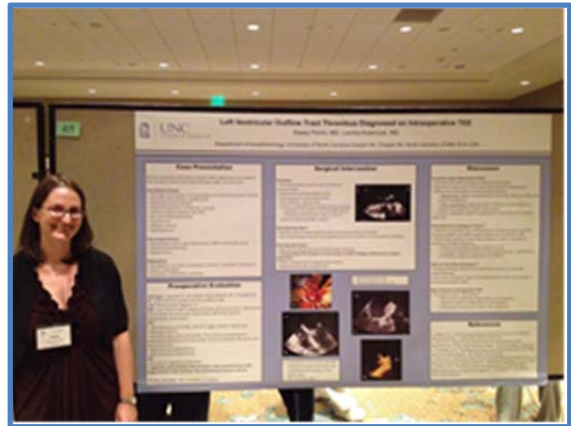
Bortsov A, Soward A, Diatchenko L, Ulirsch J, Swor R, Peak D, Jones J, Rathlev N, Lee D, Domieir R, Hendry P, Liberzon I, McLean SA. Tryptophan Hydroxylase 2 Synonymous Polymorphism rs7305115 is Associated with Acute Psychological Response after Motor Vehicle Collision. Presented at the Annual Meeting of the Society of Biological Psychiatry, Philadelphia, PA, May 2012

Bortsov AV, Millikan R, Diatchenko L, Belfer I, Boortz-Marx, Arora H, McLean SA. μ -Opioid Receptor Gene Polymorphism A118G is Associated with Breast Cancer Survival. Presented at the Annual Meeting of the American Society of Anesthesiologists, Chicago, IL, October 2011.

Duffield, AT, Kumar PA, Arora H. An Unexpected Presentation of A Retroperitoneal Mass. Presented at the Annual Meeting of the American Society of Anesthesiologists, Chicago, IL, October 2011.

Duffield, AT, Kumar PA, Arora H. An Unexpected Presentation of A Retroperitoneal Mass. Presented at the Annual Meeting of the North Carolina Society of Anesthesiologists, Asheville, NC, September 2011.

Duffield AT, Smith KA. Anesthetic Management for Cesarean Delivery of a Parturient with Impetigo Herpetiformis. Presented at the Annual Meeting of the Society for Obstetric and Perinatology, Montrey, CA, May 2012.



Dr. Kasey Fiorini

Fiorini K, Kolarczyk L. Left Ventricular Outflow Tract Thrombus Diagnosed on Intraoperative TEE. Presented at the Annual Meeting & Workshops of The Society of Cardiovascular Anesthesiologist, Boston, MA. April 2012.

Gardner R, Kopp, VJ-, Conversion Disorder Reaction Resulting in an ICU Admission in a Pediatric Patient. Presented at the Annual Meeting of the American Society of Anesthesiologists, Chicago, IL, 2011.

Huh, J, Zhou J, David A. Zvara, Zhelong Xu. Morphine attenuates mitochondria oxidative stress by modulating complex I activity upon reperfusion via mitochondrial Src tyrosine kinase and reduces infarct size in rat hearts. Presented at AHA Basic Cardiovascular Sciences 201 Scientific Sessions, New Orleans LA, 2011.

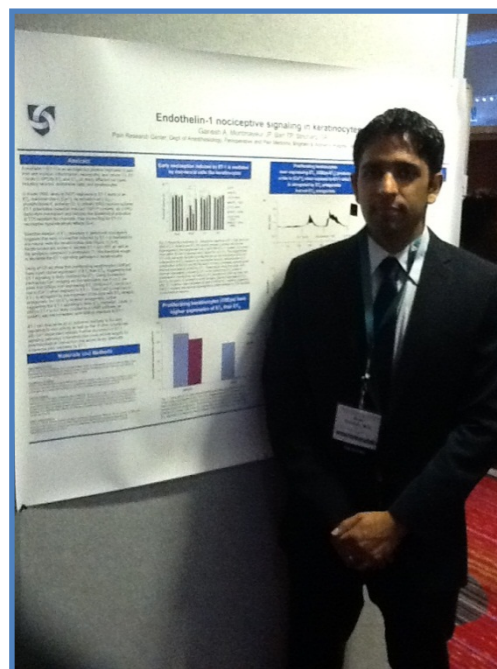
Huh J, Zhou J, Zvara DA, Xu Z. Morphine attenuates mitochondria oxidative stress by modulating complex I activity upon reperfusion via mitochondrial Src tyrosine kinase and reduces infarct size in rat hearts. Presented at the 2011 AHA Scientific Sessions, Orlando, November, 2011

Kopp VJ, Gardner R, Judge A, Boortz-Marx R Yopp J. Postoperative Conversion Disorder Reactions: Diagnostic and Therapeutic Conundrums. Presented at the World Psychiatric Association, 15th World Congress, Buenos Aires, Argentina, 2011

Kumar P, Arora H, Fiorini K, Lai S. Microstructure of human airway mucus in smokers vs. non-smokers. Left Ventricular Outflow Tract Thrombus Diagnosed on Intraoperative TEE. Presented at the World Congress of Anesthesia 2012, Buenos Aires, 2012

Ganesh, A., Montmayeur, JP., Barr, T., Strichartz, G. Endothelin-1 nociceptive signaling in keratinocytes. Poster presented at Annual Meeting of the New York State Society of Anesthesiologists 65th Post Graduate Assembly; New York, NY, December, 2011

Ganesh, A., Hraky, F. A case of peripartum amniotic fluid embolism. Poster presented at the American College of Physicians Mulholland-Mohler Associates Meeting, Baltimore, MD. May, 2012



Dr. Arun Ganesh

Goetzinger A, Orrey D, Lee Y, Platts-Mills T, Bortsov A, Swor R, Peak D, Jones J, Rathlev N, Lee D, Domieir R, Hendry P, Liberzon I, McLean SA. Peritraumatic Psychological Distress and Mild Traumatic Brain Injury Symptoms (MTBI) are Associated in the Early Aftermath of Trauma Presented at the Annual Meeting of the Society of Biological Psychiatry, Philadelphia, PA, May 2012

Isaacs CG, Kistler C, Hunold K, Pereira G, Buchbinder M, McLean SA, Platts-Mills TF. Shared decision making in the selection of outpatient analgesics for older emergency department patients. Presented at the Society for Academic Emergency Medicine; Chicago, IL; May 2012.

Isaacs CG, Kistler C, Hunold K, Pereira G, Buchbinder M, McLean SA, Platts-Mills TF. Shared decision making in the selection of outpatient analgesics for older emergency department patients. Presented at the American Geriatrics annual meeting; Seattle, WA; May 2012.

Orrey DC, Shupp J, Jones SW, Cicuto B, Jordan M, Holmes J, Haith L, Cairns B, McLean SA. Results of a Pilot Multi-centered RCT of Propranolol to Decrease Pain in Admitted Burn Patients. Presented at the Annual Meeting of the American Society of Anesthesiologists, Chicago, IL, 2011.

Orrey DC, Bortsov A, Shupp J, Cicuto B, Jordan M, Holmes J, Haith L, Cairns B, McLean SA. Catechol-O-methyltransferase genotype predicts pain severity in hospitalized burn patients. Presented at the Annual Meeting of the American Society of Anesthesiologists, Chicago, IL, 2011.

Orrey D, Bortsov A, Liberzon I, Shupp JW, Jones S, Hwang J, Jordan MH, Holmes J, Haith L, Cairns B, McLean SA. Failure of propranolol to decrease anxiety and PTSD symptoms in a genotype-based RCT of patients with major thermal burn injury. Presented at the Annual Meeting of the Society of Biological Psychiatry, Philadelphia, PA, May 2012

Orrey D, Bortsov A, Shupp J, Jones S, Hwang J, Jordan M, Holmes J, Haith L, Cairns B, Liberzon I, McLean SA. Individuals with Elevated PTSD Symptoms Experience Increased Itch Symptom Morbidity after Major Burn Injury. *Presented at the Annual Meeting of the Society of Biological Psychiatry, Philadelphia, PA, May 2012.*

Orrey DC, Zhao S, Bair E, Bortsov AV, Shupp JW, Jones SW, Hwang J, Jordan MH, Holmes JH, Haith LR, Cairns BA, McLean, SA. Smokers Experience Increased Pain and Itch After Major Burn Injury. Presented at the annual meeting of the American Burn Association, Seattle, WA, 2012.

Platts-Mills T, Ballina L, Diatchenko L, Bortsov A, Swor R, Peak D, Jones J, Rathlev N, Lee D, Domieir R, Hendry P, Liberzon I, McLean SA. Influence of COMT HPS Haplotype on Peritraumatic Distress Severity among Women Experiencing Motor Vehicle Collision: Report of an Age x Gene Interaction. Presented at the Annual Meeting of the Society of Biological Psychiatry, Philadelphia, PA, May 2012.

Powell AS, Tielborg MC. Anesthetic Implications of Undiagnosed Ehlers Danlos Type IV in a Parturient with Gestational Hypertension Presented at the Annual Meeting of the Society of Biological Psychiatry, Philadelphia, PA, May 2012

Smith J, Bortsov A, Ulirsch J, Swor R, Peak D, Jones J, Rathlev N, Lee D, Domieir R, Hendry P, Liberzon I, McLean SA. FKBP5 Polymorphism Predicts Peritraumatic Dissociation after Motor Vehicle Collision. Presented at the Annual Meeting of the Society of Biological Psychiatry, Philadelphia, PA, May 2012

Soward A, Ulirsch J, Liberzon I, Rossi C, Rotolo S, Wheeler R, Batts J, Casto T, Collette R, Holbrook D, Goodman E, Csontos E, Rausch SAM, Diatchenko L, McLean SA. Catechol O-Methyltransferase Haplotype Predicts Posttraumatic Stress Disorder Symptom Severity Six Weeks after Sexual Assault. Presented at the Annual Meeting of the Society of Biological Psychiatry, Philadelphia, PA, May 2012

Tomecka M, Orrey D, Bortsov A, Shupp J, Jordan M, Jones S, Holmes J, Haith L, Cairns B, McLean SA. Itch Symptoms are Strongly Associated with Pain Symptoms in Patients with Major Thermal Burn Injury. Presented at the Annual Meeting of the American Society of Anesthesiologists, Chicago, IL, 2011.

Ulirsch J, Bortsov A, Smith J, Diatchenko L, Bortsov A, Swor R, Peak D, Jones J, Rathlev N, Lee D, Domieir R, Hendry P, Liberzon I, McLean SA. ADRA2A Variants Predict Peritraumatic Dissociation After Motor Vehicle Collision. Presented at the Annual Meeting of the Society of Biological Psychiatry, Philadelphia, PA, May 2012

Wang X, Xie H, Tamburrino M, Cotton A, Smirnoff J, Dennis M, Biehn T, Contractor A, Brickman, McLean SA, Elhai J, Liberzon I. Alteration of negative emotional processing during the initial weeks after trauma. Presented at the Annual Meeting of the Organization for Human Brain Mapping, Beijing, China, 2012.

Willis T, Mayer C, Purdy A, Burgess E, Massie S, Brown K, Yip T, Christy C, Buck S, McNaull P, Valley R, Mill M. Improved Teamwork in a Pediatric Cardiac Surgery Operating Suite. Presented at the International Forum on Quality and Safety in Healthcare, Paris, 2012

Wunnavu B, Low Thoracic Epidural Blood Patch (EBP) for the Treatment of Chronic Post Dural Puncture Headache from Mid-Thoracic Dural Tear. Presented at the Regional Anesthesia and Pain Medicine Annual Meeting, San Diego, CA, 2012.

Xie H, Tamburrino M, Dennis M, Elhai J, Brickman K, Liberzon I, McLean S, Wall J, Bauer W, Wang X. Relationships Between Brain Structural Properties and Acute Pain and Stress After a Motor Vehicle Accident. Presented at the Annual Meeting of the Society for Neuroscience, Washington, DC, 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

Balfanz G, Arora H, Sheridan B, Katz J, Kumar PA. Dynamic Mitral Regurgitation without Regional Wall Motion Abnormality. *Journal of Cardiothoracic and Vascular Anesthesia*, 2012 Aug;26(4):753-5

Bradford W, Arora H, Sheridan B, Sileshi B and Kumar PA, A Left Atrial Mass in a Middle Aged Woman: Just Another Myxoma?. *Journal of Cardiothoracic and Vascular Anesthesia*. In Print

Bortsov AV, Millikan RC, Belfer I, Boortz-Marx RL, Arora H, McLean SA. Mu-opioid receptor gene A118G polymorphism predicts survival in patients with breast cancer. *Anesthesiology* 116(4):896-902, 2012.

Chanoit G, Zhou J, Lee S, McIntosh R, Shen X, Zvara DA, Xu Z. Inhibition of phosphodiesterases leads to prevention of the mitochondrial permeability transition pore opening and reperfusion injury in cardiac H9c2 cells. *Cardiovascular Drugs and Therapy* 25: 299-306, 2011

Clement KC, Thurman TL, Holt SJ, Heulitt MJ. Neurally triggered breaths reduce trigger delay and improve ventilator response times in ventilated infants with bronchiolitis. *Intensive Care Med* 2011; 37:1826-1832. Submitted May 19, 2011, Accepted August 29, 2011, Published online September 23, 2011, printed in the November, 2011 issue of the journal.

Fan Z, Kocis K, Valley R, Howard JF, Chopra M, An H, Lin W, Muenzer J, Powers W. Safety and feasibility of high-pressure transvenous limb perfusion with 0.9% saline in human muscular dystrophy. *Mol Ther*. 2012 Feb;20(2):456-61

Goetzinger AM, Blumenthal JA, O'Hayer CV, Babyak MA, Hoffman BM, Ong L, Davis RD, Smith SR, Rogers JG, Milano CA, Smith AD, Kuo PC, Palmer SM. Stress and coping in caregivers of patients awaiting solid organ transplantation. *Clin Transplant*. 2012 Jan-Feb;26(1):97-104.

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

Jones LW, Hornsby WE, Goetzinger A, Forbes LM, Sherrard EL, Quist M, Lane AT, West M, Eves ND, Gradison M, Coan A, Herndon JE, Abernethy AP. Prognostic significance of functional capacity and exercise behavior in patients with metastatic non-small cell lung cancer. *Lung Cancer*. 2012 May;76(2):248-52

Joyner, B. L., Jr., J. M. Boyd, Kocis KC. (2011). "Mortality after fluid bolus in African children with sepsis." *N Engl J Med* 365(14): 1349-1350; author reply 1351-1343. Submitted: June 16, 2011. Accepted: August 10, 2011. Published: Oct 6 2011.

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

Kumar PA, Graybill M, Chidgey B, Martinelli SM, Arora H. An incidental discovery or an impending disaster in a patient with coronary artery disease? *J Cardiothorac Vasc Anesth*. 2012 Apr;26(2):349-51

Kumar PA, Brandon MW, Kyle RW, Arora H. Unusual finding in a patient for sinus of valsalva aneurysm repair. *J Cardiothorac Vasc Anesth*. 2012 Apr;26(2):352-3

Kumar PA, Sale S, Arora H, Petterson G. Acquired "Gerbode-like" defect in aortic valve endocarditis: an imposter for tricuspid regurgitation? *J Cardiothorac Vasc Anesth*. 2011 Aug;25(4):751-2

McLean SA. The Potential Contribution of Stress System Responses to the Transition to Chronic Whiplash-Associated Disorders. *Spine* 36:S226-32, 2011

Orrey DC, Bortsov AV, Hoskins JM, Shupp JW, Jones SW, Cicuto BJ, Hwang J, Jordan MH, Holmes JH, Haith LR, Roane BM, Diatchenko L, Cairns BA, McLean SA. Catechol-O-methyltransferase genotype predicts pain severity in hospitalized burn patients. *Journal of Burn Care and Research*. 2012 Jul;33(4):518-523

Pastuszko P, Schears GJ, Pirzadeh A, Kubin J, Greeley WJ, Wilson DF, Pastuszko A. Effect of granulocyte-colony stimulating factor on expression of selected proteins involved in regulation of apoptosis in the brain of newborn piglets after cardiopulmonary bypass and deep hypothermic circulatory arrest. *J Thorac Cardiovasc Surg*. 2012 Jun;143(6):1436-42

Platts-Mills TF, Esserman DA, Brown DL, Bortsov AV, Sloane PD, McLean SA. Older US Emergency Department Patients are Less Likely to Receive Pain Medication than Younger Patients: Results from a National Survey. *Ann Emerg Med*. 2011

Platts-Mills T, Hunold K, Esserman D, Sloane P, McLean SA. Motor Vehicle Collision-Related Emergency Department Visits by Older Adults in the United States. *Accepted Academic Emergency Medicine* 2012.

Platts-Mills TF, Ballina L, Bortsov AV, Soward A, Swor RA, Jones JS, Lee DC, Peak DA, Domeier RM, Rathlev NK, Hendry PL, McLean SA. Using Emergency Department-Based Inception Cohorts to Determine Genetic Characteristics Associated with Long Term Patient Outcomes: Methodology of the CRASH Study. *BMC Emergency Medicine* 2011

Platts-Mills TF, Lee YM, Swor RA, Zaleski EZ, Clauw DJ, McLean SA. Pain and interference of pain with function and mood in older adults involved in a motor vehicle collision: a pilot study. *Exp Aging Res* 2012;38(3):330-43

Platts-Mills TF, Hunold K, Ballina L, Bortsov AV, Peak DA, Jones JS, Swor RA, Lee DC, Domeier RM, Hendry PL, Rathlev NK, McLean SA. More Educated Emergency Department Patients are Less Likely to Receive Opioids for Acute Pain. *Pain*. 2012 May;153(5):967-73

Qadri YJ, Cormet-Boyaka E, Rooj AK, Lee W, Parpura V, Fuller CM, Berdiev BK. Low temperature and chemical rescue affect the molecular proximity of [Delta]F508-CFTR and ENaC. *J Biol Chem*. 2012 Mar 22.

Stander S, Haithcock B, Arora H, Kumar PA,. Acute Onset Dyspnea and Superior Vena Cava Syndrome During Dialysis. *Journal of Cardiothoracic and Vascular Anesthesia*. In Print

Sterling M, McLean SA, Sullivan MJ, Elliott J, Butenhuis J, Kamper SJ. Potential processes involved in the initiation and maintenance of Whiplash Associated Disorders (WAD). *Spine* 2011

Smith KA, Ray AP. Epidural anesthesia for repeat cesarean delivery in a parturient with Klippel-Feil syndrome. *J Anaesthesiol Clin Pharmacol*. 2011 Jul-Sep; 27(3): 377–379.

Tomecka M, Bortsov A, Miller N, Solano N, Narron J, McNaull P, Ricketts M, Lupa MC, McLean SA. Substantial Postoperative Pain is Common Among Children Undergoing Laparoscopic Appendectomy. *Pediatric Anesthesia*, 2012 22(2):130-135

Winstead KB, Arora H, Kumar PA. An Unusual Finding After a Cardiac Transplantation. *J Cardiothorac and Vasc Anesth*. Accepted December 2011.

Zipes DP, Svorkdal N, Berman D, Boortz-Marx RL, Henry T, Lerman A, Ross E, Turner M and Irwin C. Spinal Cord Stimulation Therapy for Patients With Refractory Angina Who Are Not Candidates for Revascularization. Article first published online: 11 APR 2012 | DOI: 10.1111/j.1525-1403.2012.00452.x

3. Books

Bortsov A, Millikan R, Belfer I, Boortz-Marx R, Arora H, McLean SA. Genetic polymorphisms in the μ -opioid receptor gene and breast cancer survival. In: *Morphine and Metastases* (Ed. Dr. Parat). Springer.

Boyd JM, Stroehler B, McNaull P, Fuchs C. “Delirium: A Source of Confusion in Critically Ill Children”. In: *Current Concepts in Pediatric Critical Care*. Ed. Nakagawa T. Society of Critical Care Medicine. February 2012.

Chaney MA, Cheung AT, Troianos CA, Willert JL, Zvara DA, Shernan SK “Cardiac Anesthesia”, Chapter 52 In: *Anesthesiology, second edition*, edited by Longnecker DE; Brown DL; Newman MF, Zapol WM., 898-927

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

Project Dates: 09/15/2011 – 08/31/2016

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

The University of North Carolina at Chapel Hill
Anesthesiology Research
101 Manning Drive CB# 7010
Chapel Hill, NC 27599

www.med.unc.edu/anesthesiology/research