



# Carolinas Medical Center

## Emergency Medicine Residency Program





# **Carolinan Medical Center**

## **Emergency Medicine Residency Program**

### **Table of Contents**

Table of Contents.....	2
Emergency Department.....	3
Carolinan HealthCare System & CMC-Main.....	6
EMS.....	7
Education.....	8
Resident Requirements.....	8
Didactics.....	9
Fellowship Programs.....	10
Academic Pursuits.....	11
Research and Scholarly Activity.....	12
Recent Presentations at National SAEM Conference .....	13
Published Resident Academic Projects.....	15
2012-13 Email Address List.....	16

## Carolinas Medical Center



### Emergency Department

There are four treatment areas (55 beds total) within our emergency department:

- \* **Major Treatment** – High acuity medical and trauma patients, 18 beds, open 24/7.
- \* **Diagnostics** – Medium acuity medical, ob/gyn, EENT patients, 15 beds, open 24/7.
- \* **Ambulatory Emergency Center** – Lower acuity medical and ob/gyn, lacerations, abscesses, sprains, strains, simple fractures, 10 beds, open 9a-1a.
- \* **Children’s Emergency Department** - Patients under 18 that do not meet requirements for a trauma code activation, 12 beds, open 24/7.



Children’s ED



Trauma Room

**Physician Coverage**

Major Treatment: single attending 24/7; double attending coverage from 11am-11pm.  
 PGY3 from 7a-7a; PGY2 from 9a-5a; PGY1 from 1p-11p tiered learning and teaching

Diagnostics: single attending 24/7, PGY 2/3 from 9a-5a, MLP from 7a-3a, PGY1 from 1a-7a

AEC: single attending during all hours of operation  
 PGY1 11a-9p, 3p-1a, 9p-1a, PGY3 teaching shift 5p-1a weekdays

Children's ED: single attending coverage 24 day  
 PGY1: 9a-7p, 7p-5a, PGY2/3 or Peds PGY2/3: 7a-7a, MLP 11a-9p

Observation unit: evaluation of suspected ACS, TIA, overnight stays, staffed by MLP 9a-5p

**Ancillary Equipment:**

Radiology: 24/7 in-house interventional radiology, C-arm fluoroscopy in ED, bedside US (5 machines)

Point of Care Testing: electrolytes, troponin, hemoglobin, cardiac BNP, d-dimer, INR, lactate

Electronic Medical Record, Cerner FirstNet (patient tracking), PowerChart (EMR), computerized physician order entry, 100% electronic documentation via PowerNotes and Dragon voice recognition software.

**Ancillary Support:** Interpreters, Techs, Respiratory Therapists, MSW, Patient Rep, Child Life, Unit Secretaries

MD V/S	Bed	Status	Age	Name	Aller Reason for Visit	EP	FEL	2nd EP	MD	CPNED	Events	Lab	Rad	Dis	Bed #	Comment	Consult	PCP (STAR)	PCP (Triage)	
ED40, ED41, ED42, ED43, ED44, ED45, ED46, ED47	4	1	6:49	JONATHAN	2 year	1:Facial droop	Bronn	CHIA											NORTH CHAR	NORTH CHAR F
ED43, ED44, ED45, ED46, ED47	4	1	1:53	NICOLAI	15 year	1:Nose bleed	Chaz	Ash	Sarah	Neil									CHARLOTTE, P	
ED40, ED43, ED45, ED51	3	1/0	5:12	BLAYD	2 mon	1:D - Diarrhea, 2:Rectal	Pat	Bronn	Chia	Neil									TONKOWICZ, I	ROCK HILL PEI
ED43, ED45, ED51	3	1/0	3:47	JAYLA ELLA	4 year	1:Cough, 2:Cough	Chaz	Bronn	Chia	Neil									FREEMAN, KEV	FREEMAN, KEV
ED51	3	1/0	2:47	DEANSA LAND	9 year	1:Shortness of breath, 2:Chest TB	Chaz	Neil											GRACE, PEDA	GRACE, PEDA

Figure 1: Cerner FirstNet Patient Tracking Board

The image shows a complex grid of medical orders. The top section is titled '90% Order Form' and '90% Newsflash'. The grid is organized into several columns and rows, each representing a different medical system or category. The categories include:

- Labs:** Hematology (CBC, Hgb, Hct, etc.), Chemistry (Glucose, Creatinine, etc.), and Toxicology (Alcohol, Salicylate, etc.).
- Respiratory:** Oxygen therapy (O2 via NC, Blow By O2), CPAP/BiPAP, and various medications (Albuterol, Salmeterol, etc.).
- EKG:** ECG New, AMI, PPE-Op, etc.
- X-Rays:** Chest X-Ray, CT Head, CT Spine, CT Chest, CT Abdomen/Pelvis, etc.
- IV Fluids:** PRN Adaptor, NS 1 Liter Bolus, NS 250ml Bolus, etc.
- Misc/Diet:** Bed Request, Nursing Task, etc.
- Procedures:** CP, AMS, SOB, etc.
- Ext X-Rays:** Clavicle, Shoulder, Rib, etc.

Each cell in the grid contains specific order details, including drug names, dosages, frequencies, and checkboxes for completion or status.

Figure 2: 90% Page created by CMC emergency physician, incorporated by Cerner

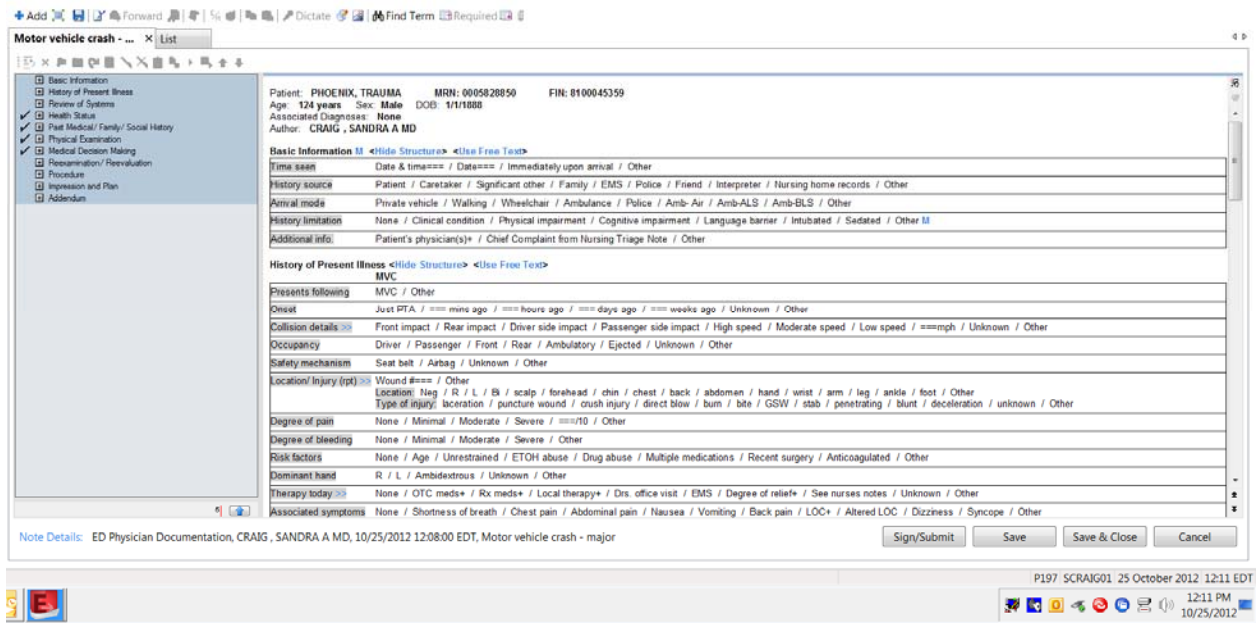


Figure 3 Cerner PowerNote Template



Figure 4: JB and his dragon

## Carolinas Healthcare System



Ninth largest non-profit healthcare system in the country

Owns, leases and manages 33 hospitals in North and South Carolina, nursing homes, physician practices, home health agencies, radiation therapy facilities, physical therapy facilities, managed care companies and other healthcare related operations, comprising more than 6,200 licensed beds and approximately 48,000 employees.

### CMC-Main



Flagship hospital of the system with an annual budget of over \$2.4 billion

874-bed (including 234 LCH), community-based teaching hospital, Level 1 trauma center

8 ICU's: coronary, medical, surgical, trauma, neurosurgical, cardiovascular, pediatrics, and newborn

The [Children's Emergency Department](#) was a cornerstone to the launching of the 234-bed Levine Children's Hospital which was completed in October 2007. It is the first ED in the region open 24 hours a day and dedicated to the care of children in a family-centered environment. [www.levinechildrenshospital.org](http://www.levinechildrenshospital.org)

### Patient Volume

~115,000 annually or ~315/day (85,000 Adult and 30,000 Pediatric)

### Patient Acuity

27% are admitted, ~1/4 of these go to an ICU

- 70% from Major Treatment
- 22% from Diagnostics
- 8% from Children's ED

### Payor Mix

Commercial 2%	Medicaid 23%	Other 2%
Managed Care 24%	Medicare 17%	Self Pay 32%

### Patient Mix

Medical 30%    Surgical/Trauma 27%    Pediatrics 25%    Ob/Gyn 25%    Psych/Tox 3%

### Annual Trauma Registry

4300 trauma code activations (89% blunt; 9% penetrating; 1% burns; Other – includes hangings, drownings <1%)

## EMS



CMC EM faculty member Dr. Doug Swanson serves as the **Medical Director** for EMS in Mecklenburg County:

- Ground services provided by Mecklenburg EMS Agency (MEDIC) ~ 115,000 responses with 86,535 transports (largest volume EMS system in North Carolina) during fiscal year 2012
- Aeromedical services provided by MedCenter Air

The **Center for Prehospital Medicine** is a Division of the Department of Emergency Medicine, and serves as a regional center for prehospital medical oversight, paramedic/prehospital education, disaster and preparedness planning, mass gathering medical support, and other EMS-related activities.

CMC provides on-line medical control for Medic and MedCenter Air ground and flight services.

- PGY1: orientation, meet the providers, ride with Medic and fly with MedCenter Air (voluntary) as an observer
- PGY2: dedicated EMS month includes political and administrative responsibility, on-line and direct medical control, MEDIC shifts, coverage at Bank of America Stadium (Carolina Panthers), Lowe's Motor Speedway (NASCAR), interaction with Charlotte Fire Department, EMS Dispatch, Operations Supervisors, EMS Fellow, and the Medical Director, teaching opportunity for initial and continuing education courses at EMT and paramedic levels, including experience working with in a high-fidelity medical simulation and human gross anatomy labs
- PGY3: elective rotation can include experience with Carolinas MED-1 (as available), ride-along with MCA, on-scene medical control, life-flight as the second crew member

### MedCenter Air Ground & Air Transport

- 4 rotor wing aircraft, EC135 helicopters (March 2010) provide latest in medical and aviation technology (collision avoidance, satellite tracking, environmental control, NVG's)
- 3 fixed wing aircraft (equipped with all current and proposed State / Federal safety recommendations)
- Multiple critical care ground trucks positioned throughout the region

### Carolinas Med-1 - <http://www.carolinasmed-1.org/>

- Two 53 foot tractor trailers, one for patient care and one for support and storage
- Nearly 1,000 square feet of indoor treatment space, deployable tent system adds 250 additional beds
- Six critical care beds, seven general treatment beds, one dental/ENT chair
- Full pharmacy, point of care labs, radiology, ultrasound, environment HEPA filtered to 0.3 microns
- Mobile Level 1 trauma center capabilities, telemedicine uplinks

## Education

Academically, serves as the Charlotte campus of UNC-Chapel Hill. PGY 1-2-3 program with 14 residents per year.

### PGY 1

CMC CPC

#### Curriculum

1 month ED orientation  
3 months ED  
1 month Internal Medicine  
1 month MICU  
1 month Peds  
1 month Trauma  
1 month OB/Gyn  
1 month Cardiology  
1 month US/Anesthesia  
1 month Surgery (EGS)

#### Responsibilities

20-21 10 hour shifts  
Q 5<sup>th</sup> day long call (7a-11p or 7p-11A)  
5 nights (9p – 9a/month)  
6 nights per month  
9-10 nights/month (7p-9a)  
5-7 night shifts per month  
No call  
No call  
One week of night float/crossover

### PGY 2

2 lectures

#### Curriculum

5 months in ED  
1 month Peds EM  
1 month in Ortho  
1 month CCU  
1 month MICU  
1 month TICU  
1 month Toxicology  
1 month EMS

#### Responsibilities

19-20 10H shifts  
16 8H shifts  
ED consults  
No night calls. Leave everyday by 8-9pm.  
Every 3-4<sup>th</sup> night call  
Every 3- 4<sup>th</sup> night call  
Tox – 15 home call nights, no WS\*, tox presentation  
WS\*, no call

### PGY 3

1 lecture

#### Curriculum

8 months ED  
1 month PICU  
  
3 months electives

#### Responsibilities

8,9,10 hour shifts (peds shifts are only 8 hours)  
Weekdays: alternating Long call (6a-7p);  
Short call (6a-1p)  
- 10x night shifts the entire month (7p-9a)  
- 2 full weekends off  
International, US, Critical Care, Med Student Teaching, Research, Radiology, Forensics, Administration, Infectious Disease, Simulation Medicine, Cardiology, Community EM (\*WS, no call)

WS\* = weekend shifts in the ED (one Saturday and Sunday)

ACLS, PALS and ATLS are offered during the Intern Orientation week as well as other times throughout the year.

## Resident Requirements

- \* All residents are required to submit one manuscript of publishable quality before graduation.
- \* All residents are required to take the yearly in-service exam in February.
- \* All residents are required to take USMLE part III during their intern year.
- \* All residents are required to complete an exit interview with the Program Director before graduation.



## Didactics

### General Topics

Core Content every 24 months  
M&M weekly  
Toxicology conference monthly  
Peds – EM conferences 2/month  
Residents' conference – monthly  
Master Class

### Dedicated Symposia

Airway  
Wound Care  
EKG  
How to Find a Job  
Risk Management  
Administrative, QA, Patient Outcomes  
Shock  
Bioterrorism

**Simulation Lab** (The only facility in the region to be both an American College of Surgeons accredited Level I Education Institute and a Society for Simulation in Healthcare accredited simulation center.)



## Journal Club:

Monthly at faculty member's home, single topic, 2-3 articles focusing on landmark EM papers

## **Fellowship Programs**

- Research: Michael Runyon, MD; John Watts, Ph.D.
- Toxicology: Russ Kerns, MD
- EMS: Douglas Swanson, MD
- Ultrasound: Tony Weekes, MD
- Pediatric EM: Stacy Reynolds, MD
- Disaster Preparedness / Operational Medicine: Dave Callaway, MD

## **Graduate Statistics**

The residency program began in 1976. As of June 30, 2012 CMC has graduated 300 emergency physicians. Of these 82 are in academic practice (~27%), and 218 are in private practice (~73%). Over the past 5 years, approximately 34% academic practice; 66% private practice.

## **ABEM Performance since 1991**

Written: 99.5% pass rate vs. 90% nationally  
Oral: 99% pass rate vs. 95% nationally

## **Faculty** (See separate biographical section)

All are board certified in Emergency Medicine or Pediatric EM, and several are dual and triple boarded in other specialties

35 Emergency Medicine residency-trained, 2 Internal Medicine trained, & 4 Pediatric EM trained:

- 17 Carolinas Medical Center – Antoniazzi, Batts, Bullard, Cook, Craig, Garvey, Hawkins, Heffner, Leuck, Musey, Patel, Runyon, Salzman, Sullivan, Swanson, Tayal, Wares, Woodson,
- 1 Cook County Hospital - McBryde
- 1 Denver Health Med Center - Pearson
- 1 Columbia University – Colucciello
- 1 Henry Ford Hospital – Asimos
- 1 George Washington – Georgetown University - Pelucio
- 2 Indianapolis – MacNeill, Cordle
- 1 Penn State - Kerns
- 1 North Shore – Beuhler
- 1 Jacobi Medical Center -Weekes
- 1 Maryland - Fox
- 2 Pittsburgh – Gibbs, Reynolds
- 1 Beth Israel – Callaway
- 1 Brigham & Women’s – Listwa
- 1 MUSC – Lewis
- 1 Baystate Med Center/Tufts – Patel
- 1 Christiana Health Care System - Walsh

## "Can I get into academics if I go to a 3 year program?"

- Chris Thomson – class of 1999 - Chairman and Medical Director, Department of Emergency Medicine, Lynchburg General Hospital, Lynchburg VA
- D. Mark Courtney – class of 2001, Assistant Professor, Department of Emergency Medicine, Northwestern University, Feinberg School of Medicine
- Dave Caro – class of 1997, Program Director, University of Florida at Jacksonville
- Joanna Oakes – class of 1999, Associate Professor of EM, U of TX - @ Houston
- Andy Perron – class of 1999, Program Director, Maine Medical Center
- Alan Jones – class of 2002, Research Director, University of Mississippi, President-Elect, SAEM
- Jeff Kline – class of 1993, Vice Chair of Research Department of Emergency Medicine, Professor, Department of Cellular and Integrative Physiology Indiana University School of Medicine, past President, SAEM
- Alice Mitchell, class of 2004, Associate Professor of Research, Indiana University
- Elizabeth Rosenman – class of 2010, faculty member, Harborview Medical Center, Seattle WA
- Jeff VanderMark – class of 1992, Assoc. Prof. Surgery, UT Southwestern
- Bret Nicks – class of 2004, Associate Dean, Office of Global Health, Associate Professor, Emergency Medicine Wake Forest Med
- Rawle 'Tony' Seupaul – class of 2000, Associate Professor of clinical Emergency Medicine, Wishard (Indiana U)
- Mike Fitch – class of 2004, Associate Professor, Emergency Medicine Wake Forest
- Jen Hannum – class of 2005, Assistant Professor, Emergency Medicine Wake Forest
- Manoj Pariyadath – class of 2005, Assistant Professor, Emergency Medicine Wake Forest
- Mike Harrigan – class of 1996, Assistant Professor Emergency Medicine UNC-Chapel Hill
- Anne Daul – class of 2009, Assistant Professor of Emergency Medicine Emory University
- Bijal Shah – class of 2009, Assistant Professor of Emergency Medicine Emory University
- Dustin Calhoun – class of 2011, Assistant Professor of Emergency Medicine University of Cincinnati
- Michael Puskarich – class of 2010, Assistant Professor, Associate Research Director Mississippi University
- Shiloh Gilbert – class of 2010, Surgery - Adjunct Assistant Professor, Emergency Medicine University of Utah
- Harland Hayes – class of 2009, Surgery - Adjunct Assistant Professor, Emergency Medicine University of Utah
- Malika Fair – class of 2009, Assistant Professor of Emergency Medicine George Washington University
- Ross 'Marty' Vander Noot – class of 2008, Assistant Professor of Emergency Medicine, Director International Emergency Medicine Fellowship University of Alabama – Birmingham
- Danielle Turner-Lawrence – class of 2008, Associate Professor, Oakland University-William Beaumont School of Medicine
- Michael Marchick – class of 2008, faculty member, researcher University of Florida Academic Health Ctr.
- Greg Snead – class of 2006, Methodist/IU faculty in 2007 - focus in Emergency Ultrasound teaching
- Jim Fiechtl – class of 2005, Assistant Professor of Emergency Medicine Vanderbilt University
- Christopher Moore – class of 2001, Associate Professor, Department of Emergency Medicine Yale University School of Medicine
- Joel Moll – class of 1997, Assistant Professor of Emergency Medicine, Emory University
- Manish Patel, MD, MSc – class of 1999, Medical Epidemiologist, Centers for Disease Control

## Research and Scholarly Activity



### Physical Plant:

#### **Cannon Research Center**

Opened in 1991

60,000 square ft. facility for small and large animal investigations

Close proximity to ED facilitates processing of lab samples

### Departmental Personnel:

1 full time Ph.D. physiologist

4 full-time research coordinators

2 full-time lab technicians

Undergraduate research associate program

## **Research Summary**

The Mission of the division of Emergency Medicine Research at Carolinas Medical Center is "to research ways to diagnose and treat life threatening illnesses." As a result, the scope of interests ranges from social science to cell physiology. Clinicians in the department tend to research disease entities or organ systems relevant to acute care. The individuals who were able to provide a description of their research activities are listed below.

### Areas of Interest

Michael Runyon, MD – Diagnosis and management of sepsis as well as utilization of diagnostic imaging and diagnosis and treatment of emergency conditions in resource-limited settings

Lee Garvey, MD – Diagnosis and treatment of acute coronary syndromes

John Watts, PhD – Cardiac function in experimental massive pulmonary embolism

Vivek Tayal, MD – Ultrasound diagnostic methods

Andrew Asimos, MD – Stroke and traumatic brain injury

Matthew Sullivan, MD – Infectious disease surveillance

Stacy Reynolds, MD – Pediatric EM

Emily MacNeill, MD – Pediatric Trauma

Tony Weekes, MD – Ultrasound applications

Recent Presentations at National SAEM Conference  
2013 SAEM Annual Meeting  
Atlanta Georgia  
May 15-18, 2013

SAEM's 14<sup>th</sup> Annual AEM Consensus Conference

Wednesday, May 15, 2013

- 9:00 – 10:00 am      Abstract: Hemorrhagic Shock/Presentation #19-22/Atlanta G  
Moderator: Michael Gibbs, MD
- Abstract: Emergency Medical Services/Presentation #35-40/Roswell 1  
Moderator: Michael Runyon, MD
- 9:00 – 11:00 am      Ultrasound–OralPresentation – Atlanta E & F
14.    Prospective Evaluation of Bedside Soft-Tissue Ultrasound Measurement Threshold to Yield Positive Purulence on ED Drainage Procedure.  
                             Carrie Fales, MD
- 1:00 – 2:00 pm      CriticalCare–OralPresentation – Atlanta E & F
117.   Assessment of One-year Mortality Following Hospital Discharge Among Survivors of Cardiac Arrest Who Receive Pre-hospital Fluids.  
                             David A. Pearson, MD
- 1:00 – 2:00 pm      ImaginginTrauma–LightningOralPresentation – Atlanta B
132.   Is Cervical Spine Imaging Required in Patients with Femur Fractures?  
                             Robert T. Dahlquist, MD
- 1:40 – 3:40 pm      GlobalHealthandEmergencyCare:AResearchAgenda – Plaza Ballrooms A, B and C (Level 10) Concurrent  
Breakout Session 2: Practical Issues in Implementing and Sustaining Emergency Care Research in the  
Global Environment: 6: Clinical/Translational Research: Defining goals, priorities, and metrics when  
integrating research in a developing emergency care system.  
Michael Runyon, MD, and Hendry Sawe, MD (Tanzanian Resident)

Thursday, May 16, 2013

- 8:00 – 10:00 am      TherapeuticHypothermia–OralPresentation – Atlanta E & F
316.   Emergency Department Prediction of Survival and Neurologic Outcome in Comatose Cardiac Arrest Patients Undergoing Therapeutic Hypothermia is Unreliable. Catherine M. Wares, MD
- 3:30 – 5:00 pm      PlenaryPresentation – Plaza Ballroom ABC
6.      Randomized Trial of Tenecteplase or Placebo with Low Molecular Weight Heparin for Acute Submassive Pulmonary Embolism: Assessment of Patient-Oriented Cardiopulmonary Outcomes at Three Months.  
                             Jeffrey A. Kline, MD
- 5:30 – 7:00 pm      SocialEvents:OpeningReception&GalleryofExcellence – The Grand Atrium.  
The following Abstracts were judged to be the very best and thus will be presented in poster format in the Gallery of Excellence:
316.   Emergency Department Prediction of Survival and Neurologic Outcome in Comatose Cardiac Arrest Patients Undergoing Therapeutic Hypothermia is Unreliable. Catherine M. Wares, MD
722.   A Soluble Guanylate Cyclase Stimulator, Bay 41-8543, Preserves Pulmonary Artery Endothelial Function in Experimental Pulmonary Embolism.  
                             John A. Watts, PhD
797.   Physicians' Diagnostic Accuracy in Using Simple Clinical Signs for Detecting Anemia and Its Severity in Patients Seen at the Emergency Department of a Tertiary Referral Hospital in Tanzania.  
                             Hendry R. Sawe, MD (Tanzanian Resident, Mentored by Michael Runyon, MD)

814. Emergent CT Does Not Delay Cooling in Patients After Cardiac Arrest.  
David A. Pearson, MD

Friday, May 17, 2013

8:00 – 12:00 pm

PosterPresentations – 200 Gallery (Level 6) - Posters attended by authors from 10:00 – 12:00 am

617. Lactate Clearance Is Not Prognostic in Cardiac Arrest Patients.  
David A. Pearson, MD
624. Factors Associated with Delayed Cooling in Cardiac Arrest Patients.  
David A. Pearson, MD
715. Efficacy and Safety of Eight Centimeter Catheters for Needle Chest Decompression – A Radiographic Analysis.  
Samuel J. Chang, MD

9:00 – 9:50 am

DidacticSession: Mapping the Path for Current and Future Research for Safe, Effective, and Appropriate Trauma Imaging – International B  
Kaushal Shah, MD, Michael Gibbs, MD, Ian Stiell, MD, Eric Legome, MD, Ali Raja, MD, MPH, MBA

1:00 – 2:00 pm

CardiovascularBasicSciences–OralPresentations – Atlanta C & D

722. A Soluble Guanylate Cyclase Stimulator, Bay 41-8543, Preserves Pulmonary Artery Endothelial Function in Experimental Pulmonary Embolism.  
John A. Watts, PhD

Saturday, May 18, 2013

8:00 – 11:30 am

InternationalEmergency–OralPresentations – Atlanta E & F

797. Physicians' Diagnostic Accuracy in Using Simple Clinical Signs for Detecting Anemia and Its Severity in Patients Seen at the Emergency Department of a Tertiary Referral Hospital in Tanzania.  
Hendry R. Sawe, MD (Tanzanian Resident, Mentored by Michael Runyon, MD)

805. Trends in ED and Hospital Mortality Associated with Opening of a Full Capacity Emergency Department in a Tertiary Level Hospital in Sub-Saharan Africa. Hendry R. Sawe, MD (Tanzanian Resident, Mentored by Michael Runyon, MD)

8:00 – 9:00 am

Post-CardiacArrestCare–LightningOralPresentations – Atlanta A

814. Emergent CT Does Not Delay Cooling in Patients After Cardiac Arrest.  
David A. Pearson, MD

8:00 – 9:00 am

SimulationinEmergencyMedicine–LightningOralPresentations – Atlanta C & D

819. A Comparison of Evaluation Metrics for High-Fidelity ACLS-based Simulation Cases for PGY-1 and PGY-3 Level Learners.  
JoAnna Leuck, MD

11:00 – 11:50 am

DidacticSession: Superstars of Social Media: How to Incorporate Social Media Into Teaching and Education, DS072 - International C  
James Miner, MD, Michelle Lin, MD, Scott Joing, MD, Sean Fox, MD

## Published Resident Academic Projects

Jason Ballew (2006 Grad)	<b>Prospective comparative</b> trial of endovaginal sonographic bimanual examination versus traditional digital bimanual examination in nonpregnant women with lower abdominal pain with regard to body mass index classification
Christopher Crean (2006 Grad)	<b>Ocular surface distribution</b> and pharmacokinetics of a novel ophthalmic 1% azithromycin formulation.
Angel Rochester (2006 Grad)	<b>Needle thoracostomy for</b> tension pneumothorax: failure predicted by chest computed tomography
Gregory Snead (2006 Grad)	<b>Emergency clinician-performed</b> compression ultrasonography for deep venous thrombosis of the lower extremity.
Matthew Leonard (2007 Grad)	<b>Determination of the</b> effect of in vitro time, temperature, and tourniquet use on whole blood venous point-of-care lactate concentrations
Patrick O'Malley (2007 Grad)	<b>Emergency clinician-performed</b> compression ultrasonography for deep venous thrombosis of the lower extremity
Kristen Saak (2007 Grad)	<b>Performance of the</b> Mortality in Emergency Department Sepsis score for predicting hospital mortality among patients with severe sepsis and septic shock.
Michael Marchick (2008 Grad)	<b>One year mortality</b> of patients treated with an emergency department based early goal directed therapy protocol for severe sepsis and septic shock: a before and after study <b>12-Lead ECG Findings</b> of Pulmonary Hypertension Occur More Frequently in Emergency Department Patients With Pulmonary Embolism Than in Patients Without Pulmonary Embolism <b>Prospective evaluation</b> of right ventricular function and functional status 6 months after acute submassive pulmonary embolism: frequency of persistent or subsequent elevation in estimated pulmonary artery pressure <b>The significance</b> of non-sustained hypotension in emergency department patients with sepsis. <b>Comparison of</b> 8 biomarkers for prediction of right ventricular hypokinesis 6 months after submassive pulmonary embolism.
Danielle Turner-Lawrence (2008 Grad)	<b>A feasibility study</b> of the sensitivity of emergency physician Dysphagia screening in acute stroke patients. <b>Intravenous fat</b> emulsion: a potential novel antidote.
John Garrett (2009 Grad)	<b>The effect of a</b> quantitative resuscitation strategy on mortality in patients with sepsis: a meta-analysis
Edward Green (2009 Grad)	<b>Indirect computed</b> tomography venography: a report of vascular opacification.
Michael Puskarich (2010 Grad)	<b>Sepsis-induced tissue hypoperfusion</b> <b>One year mortality</b> of patients treated with an emergency department based early goal directed therapy protocol for severe sepsis and septic shock: a before and after study. Effect of glucose-insulin-potassium infusion on mortality in critical care settings: a systematic review and meta-analysis.
Patrick Burnside (2011 Grad)	<b>Indirect computed</b> tomography venography: a report of vascular opacification. <b>Systematic review of</b> emergency physician-performed ultrasonography for lower-extremity deep vein thrombosis

Carolinas Medical Center  
Department of Emergency Medicine  
2013-2014 E-mail Address List

PGY 1

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Kevin Yavorcik	<a href="mailto:kevin.yavorcik@carolinas.org">kevin.yavorcik@carolinas.org</a>

PGY 2

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