

# 2009 OTA Pre-Meeting Course Basic Science Focus Forum

Theodore Miclau, III, MD, Chair

Attendees of this activity can earn up to 11.5 AMA PRA Category I Credits™.

Douglas Pavilion D

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## Wednesday – Thursday, October 7 – 8, 2009

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### Target Audience

Attendees of the 25th Annual Meeting of the Orthopaedic Trauma Association, orthopaedic trauma surgeons, fellows and residents, basic scientists, bioengineers and biologists.

### Forum Objectives

- Understand the latest developments in inflammation as it relates to musculoskeletal injury and repair.
- Develop a greater working knowledge of growth factors.
- Become up-to-date on the latest methods of cartilage injury and repair.
- Understand new innovations in biomechanical testing of musculoskeletal tissues.
- Learn the most current concepts in the diagnosis and treatment of musculoskeletal infection.
- Review functional outcomes measures used in clinical research on orthopaedic trauma.

### Program

#### Wednesday, October 7, 2009

|                |  |
|----------------|--|
| 6:30 am        | Registration   |
| 7:25 am        | Introduction:<br><i>Theodore Miclau, III, MD, Program Chair</i>  |
| 7:30 – 8:40 am | <b>SYMPOSIUM 1:<br/>Inflammation and Musculoskeletal Injury and Repair</b><br>Moderators: <i>Edward J. Harvey, MD<br/>Richard Marsell, MD, PhD</i> |
| 7:30 am        | The Systemic Inflammatory Cascade: Implications for Bone Healing<br><i>Hans-Christoph Pape, MD</i>   |
| 7:45 am        | Inflammatory Cell Properties and Fracture Healing<br><i>Ralph S. Marcucio, PhD</i>   |
| 7:55 am        | The Molecular Cascade and Cellular Response to Inflammation after Skeletal Injury<br><i>Richard Marsell, MD, PhD</i>                               |

|                     |  |
|---------------------|--|
| 8:10 am             | <b>Anti-Inflammatories: Effects on Fracture Healing</b><br><i>Catherine A. Humphrey, MD</i>  |
| 8:20 am             | Discussion   |
| 8:40 – 9:24 am      | <b>PAPER SESSION 1:<br/>Inflammation and Musculoskeletal Injury and Repair</b><br>Moderators: <i>Edward J. Harvey, MD<br/>Hans-Christoph Pape, MD</i>  |
| 8:40 am             | Overview: <i>Edward J. Harvey, MD</i>  |
| 8:50 am<br>Paper #1 | <b>Is Indomethacin a Potential Treatment for Compartment Syndrome? An Experimental Study</b><br><i>Ajay Manjoo, MD; David Sanders, MD; Abdel Lawandy, MD;<br/>University of Western Ontario, London, Ontario, Canada</i>   |
| 8:56 am<br>Paper #2 | <b>The Genetics of Heterotopic Ossification: Insight into the Bone Remodeling Pathway</b><br><i>Erika Mitchell, MD<sup>1</sup>; Jeffrey Canter, MD<sup>2</sup>; Patrick Norris, MD<sup>2</sup>; Judith Jenkins, RN<sup>2</sup>; John Morris, MD<sup>2</sup>;<br/>Vanderbilt University Medical Center, <sup>1</sup>Division of Orthopaedic Trauma, <sup>2</sup>Division of Trauma, Nashville, Tennessee, USA</i> |
| 9:02 am<br>Paper #3 | <b>Mitochondrial DAMPs Released by Femoral Reaming Activate PMN via Formyl Peptide Receptors and P44/42 MAP Kinase</b><br><i>Carl J. Hauser, MD, FACS; Edward K. Rodriguez; Paul T. Appleton, MD; Qin Zhang, MD; Kiyoshi Itagaki, PhD; Beth Israel Deaconess Medical Center and Harvard Medical School; Harvard University, Boston, Massachusetts, USA</i>   |

## Basic Science Forum Program, *cont'd*

|                         |  |                        |  |
|-------------------------|--|------------------------|--|
| 9:08 am<br>Paper #4     | <b>Enhancing Fracture Repair with Oral Leukotriene Antagonism</b><br><i>John J. Wixted, MD; Paul Fanning, PhD; Tripti Gaur, PhD; Jason Silva, MD; Shannon O'Connell, BS; Jane Lian, PhD; University of Massachusetts Medical School, Worcester, Massachusetts, USA</i>                       | 11:11 am<br>Paper #6   | <b>Effect of the hVEGF Transfer on Endogenous VEGF mRNA Expression in a Rat Osteoblast or Fibroblast Culture Model</b><br><i>Ru Li, BS; Claire Li, BS; Michael McKee, MD; Emil Schemitsch, MD; St. Michael's Hospital, Toronto, Ontario, Canada</i>  |
| 9:14 am                 | <b>Discussion</b>  | 11:17 am<br>Paper #7   | <b>The Effect of BMP-2, BMP-7, PTH and PDGF on Mesenchymal Stem Cells. A Comparative Study of Proliferation and Osteogenic Differentiation</b><br><i>Ippokratis Pountos, MD; Theodora Georgouli, MD; Karen Henshaw, MD; Diane Corscaden, MD; Peter V. Giannoudis, MD; Academic Department of Trauma &amp; Orthopaedic Surgery, School of Medicine, University of Leeds, United Kingdom</i> |
| 9:24 am                 | <b>Break</b>   | 11:23 am<br>Paper #8   | <b>Expression of the Bone Morphogenetic Proteins in Fracture Nonunion Tissue, and their Interactions with the Matrix Metalloproteinases in Vitro</b><br><i>Marc Fajardo, MD; Chuan-Ju Liu, PhD; Kenneth Egol, MD; NYU Hospital for Joint Diseases, New York, New York, USA</i>   |
| <b>9:45 – 10:55 am</b>  | <b>SYMPOSIUM 2:<br/>Growth Factors: Beyond BMPs</b><br>Moderators: <i>Emil H. Schemitsch, MD<br/>Peter V. Giannoudis, MD</i>   | 11:29 am               | <b>Discussion</b>  |
| 9:45 am                 | <b>The Current State of Growth Factors in Orthopaedic Trauma</b><br><i>Peter V. Giannoudis, MD</i>   | 11:39 am –<br>12:45 pm | <b>Lunch</b>   |
| 9:55 am                 | <b>Systemic Agents for Fracture Healing: The PTH Story</b><br><i>Thomas A. Einhorn, MD</i>   | <b>12:45 – 1:55 pm</b> | <b>SYMPOSIUM 3:<br/>Cartilage Injury and Repair</b><br>Moderators: <i>Joseph Borrelli, Jr., MD<br/>Todd O. McKinley, MD</i>  |
| 10:05 am                | <b>Angiogenic Growth Factors: Turning on the Blood Supply for Fracture Healing</b><br><i>Kurt D. Hankenson, DVM</i>  | 12:45 pm               | <b>Prevention of Cell Death after Cartilage Injury: Impact on Osteoarthritis</b><br><i>Darryl D. D'Lima, MD</i>  |
| 10:15 am                | <b>Platelet-Derived Growth Factor: Can We Get What We Need From the Blood?</b><br><i>Gary E. Friedlaender, MD</i>  | 1:00 pm                | <b>Post-traumatic Arthritis: In-vivo Modeling</b><br><i>Bridgette D. Furman, BS</i>  |
| 10:25 am                | <b>Gene Therapy for Growth Factor Delivery: Does It Have a Future in Orthopaedic Trauma?</b><br><i>Aaron Nauth, MD</i>   | 1:15 pm                | <b>Articular Step-Off: How Much is too Much?</b><br><i>Peter V. Giannoudis, MD</i>   |
| 10:35 am                | <b>Discussion</b>  | 1:30 pm                | <b>Cartilage Impact Injury: Does Mitochondrial Dysfunction Cause Chondrocyte Death?</b><br><i>Todd O. McKinley, MD</i>   |
| <b>10:55 – 11:39 am</b> | <b>PAPER SESSION 2:<br/>Growth Factors</b><br>Moderators: <i>Emil H. Schemitsch, MD<br/>Thomas A. Einhorn, MD</i>  | 1:45 pm                | <b>Discussion</b>  |
| 10:55 am                | <b>Overview:</b> <i>Thomas A. Einhorn, MD</i>  |                        |  |
| 11:05 am<br>Paper #5    | <b>Quantitative Assessment of Osteogenic Gene and Protein Expression in Alternate Bone-Graft Harvesting Sites</b><br><i>Richelle Takemoto, PhD; Marc Fajardo, MD; Chuan-Ju Liu, PhD; Thorsten Kirsch, PhD; Kenneth A. Egol, MD; NYU Hospital for Joint Diseases, New York, New York, USA</i> |                        |  |

# Basic Science Forum Program, *cont'd*

|                      |   |                      |   |
|----------------------|---|----------------------|---|
| 1:55 – 2:54 pm       | <b>PAPER SESSION 3:<br/>Cartilage Injury and Repair</b><br>Moderators: <i>Joseph Borrelli, Jr., MD</i><br><i>Todd O. McKinley, MD</i>   | 2:39 pm              | Break   |
| 1:55 pm              | Overview: <i>Joseph Borrelli, Jr., MD</i>   | 3:00 – 4:20 pm       | <b>SYMPOSIUM 4:<br/>Recent Innovations in Biomechanical Investigations</b><br>Moderators: <i>Loren L. Latta, PhD</i><br><i>Steven A. Olson, MD</i>  |
| 2:05 pm<br>Paper #9  | <b>P188 Is Effective in Reducing Cartilage Degeneration and Promoting Cell Survival in the Model of Acute Trauma to Human Ankle Cartilage: The Mechanism of Action</b><br><i>Sarvottam Bajaj, BS<sup>1</sup>;</i><br><i>Arnavaz A. Hakimiyan, BS<sup>1</sup>;</i><br><i>Lev Rappoport, MD<sup>1</sup>;</i><br><i>Cecilla Pascual Garrido, MD<sup>1,2</sup>;</i><br><i>Theodore Oegema, PhD<sup>1</sup>;</i><br><i>Markus A. Wimmer, PhD<sup>1,2,3</sup>;</i><br><i>Susan Chubinskaya, PhD<sup>1,2,4</sup>;</i><br><sup>1</sup> <i>Departments of Biochemistry,</i><br><sup>2</sup> <i>Orthopedic Surgery, <sup>3</sup>Anatomy and</i><br><sup>4</sup> <i>Cell Biology and Section of Rheumatology,</i><br><i>Rush University Medical Center,</i><br><i>Chicago, Illinois, USA</i> | 3:00 pm              | Overview: <i>Steven A. Olson, MD</i>  |
| 2:11 pm<br>Paper #10 | <b>Chondrocyte Viability Following Traumatic Joint Disruption in a Novel Closed Intraarticular Fracture Model of the Porcine Knee</b><br><i>Jonathon D. Backus, BS;</i><br><i>Bridgette D. Furman, BS;</i><br><i>Louis E. DeFrate, PhD;</i><br><i>Poston Pritchett, BA; Farshid Guilak, PhD;</i><br><i>Steven A. Olson, MD;</i><br><i>Division of Orthopaedic Surgery,</i><br><i>Duke University Medical Center,</i><br><i>Durham, North Carolina, USA</i>  | 3:10 pm              | Kinematic Motion Analysis<br><i>Louis E. DeFrate, PhD</i>   |
| 2:17 pm<br>Paper #11 | <b>Acute-Phase Aggravation of Chondrocyte Death in Ankle Intra-Articular Fractures</b><br><i>Yuki Tochigi, MD, PhD; James A. Martin, PhD;</i><br><i>Abigail D. Lehman; Todd O. McKinley, MD;</i><br><i>Joseph A. Buckwalter, MD;</i><br><i>Thomas D. Brown, PhD;</i><br><i>University of Iowa, Iowa City, Iowa, USA</i>   | 3:25 pm              | Dynamic Modeling with Cadaveric Specimens<br><i>Neil A. Sharkey, PhD</i>  |
| 2:23 pm<br>Paper #12 | <b>Optical Coherence Tomography (OCT) Detection of Subclinical Traumatic Cartilage Injury</b><br><i>David Bear, MD; Michal Szczodry, MD;</i><br><i>Scott Kramer, BS; Christian H. Coyle, PhD;</i><br><i>Gary S. Gruen, MD; Patrick Smolinski, PhD;</i><br><i>Constance R. Chu, MD;</i><br><i>University of Pittsburgh Medical Center,</i><br><i>Pittsburgh, Pennsylvania, USA</i>   | 3:40 pm              | Micromechanics: Energy of Injury Analysis<br><i>Steven A. Olson, MD</i>   |
| 2:29 pm              | Discussion  | 3:50 pm              | Finite Element Modeling of Skeletal Fixation<br><i>Loren L. Latta, PhD</i>  |
|                      |   | 4:05 pm              | Discussion  |
|                      |   | 4:20 – 5:38 pm       | <b>PAPER SESSION 4:<br/>Biomechanics</b><br>Moderators: <i>Loren L. Latta, PhD</i><br><i>Steven A. Olson, MD</i>  |
|                      |   | 4:20 pm              | Overview: <i>Steven A. Olson, MD</i>  |
|                      |   | 4:30 pm<br>Paper #13 | <b>Mechanical Advantages of Locked Plating in Short Segment Fracture Fixation</b><br><i>William M. Ricci, MD<sup>1</sup>;</i><br><i>Paul Tornetta, III, MD<sup>2</sup>;</i><br><i>Yanming Zheng, MD<sup>3</sup>; A. Whitten, MD<sup>3</sup>;</i><br><i>Andrew H. Schmidt, MD<sup>4</sup>;</i><br><sup>1</sup> <i>Washington University School of Medicine,</i><br><i>St. Louis, Missouri, USA</i><br><sup>2</sup> <i>Boston University School of Medicine,</i><br><i>Boston, Massachusetts, USA;</i><br><sup>3</sup> <i>Smith &amp; Nephew, Inc.,</i><br><i>Memphis, Tennessee, USA;</i><br><sup>4</sup> <i>Hennepin County Medical Center,</i><br><i>Minneapolis, Minnesota, USA</i> |
|                      |   | 4:36 pm<br>Paper #14 | <b>Role of the Proximal Tibio-Fibular Joint and Interosseous Membrane on Lateral Tibial Plateau Fracture Stability: A Biomechanical Evaluation</b><br><i>Christopher T. Mudd, MD;</i><br><i>J. Tracy Watson, MD; Gary Bledsoe, PhD;</i><br><i>Saint Louis University School of Medicine,</i><br><i>St. Louis, Missouri, USA</i>   |

## Basic Science Forum Program, *cont'd*

4:42 pm  
Paper #15     **The Protective Effect of Locking Screw Placement on Non-Locking Screw Insertion Torque in an Osteoporotic Supracondylar Femur Fracture Model**  
*Michael J. Prayson, MD;*  
*David J. Dalstrom, MD;*  
*Wright State University Orthopaedics,*  
*Dayton, Ohio, USA*

4:48 pm  
Paper #16     **Comparative In-Vitro Testing of Tibial Nails: Is Nail Fixation Improved with Additional Proximal Screws?**  
*Andrew L. Freeman, MS<sup>1</sup>;*  
*Matthew R. Craig, MD<sup>2</sup>;*  
*Andrew H. Schmidt, MD<sup>3</sup>;*  
*<sup>1</sup>Excelen Center for Bone and Joint Research and Education,*  
*Minneapolis, Minnesota, USA;*  
*<sup>2</sup>Orthopaedic Specialty Center,*  
*Willow Grove, Pennsylvania, USA;*  
*<sup>3</sup>Hennepin County Medical Center,*  
*Minneapolis, Minnesota, USA*

4:54 pm     **Discussion**

5:04 pm  
Paper #17     **Comparison of Patello-Femoral Contact Pressures and Forces between Supra-Patellar vs. Infra-Patellar Tibial Nailing**  
*Tommy DiPasquale, DO;*  
*Martin K. Gelbke, MD;*  
*Florida Orthopaedic Institute,*  
*Tampa, Florida, USA*

5:10 pm  
Paper #18     **Quantifying Fracture Repair: Is It Possible and Practical?**  
*John J. Wixted, MD; Jason Silva, MD;*  
*Christopher Baker, MD; Judith Siegel, MD;*  
*University of Massachusetts Medical Center,*  
*Worcester, Massachusetts, USA*

5:16 pm  
Paper #19     **Biomechanical Analysis of Locking Plate Fixation with Smooth Pegs Versus Threaded Screws for Proximal Humerus Fractures**  
*Nobuyuki Yamamoto, MD;*  
*Michio Hongo, MD;*  
*Lawrence J. Berglund, BS; Kai-Nan An, PhD;*  
*John W. Sperling, MD; Robert R. Cofield, MD;*  
*Scott P. Steinmann, MD;*  
*Mayo Clinic College of Medicine,*  
*Rochester, Minnesota, USA*

5:22 pm  
Paper #20     **Biomechanical Comparison of Large Fragment versus Small Fragment Fixation for Humeral Shaft Fractures**  
*Ravi Patel, BS; Corey Neu, PhD;*  
*Shane Curtiss, BS; Brad J. Yoo, MD;*  
*University of California, Davis Medical Center, Sacramento, California, USA*

5:28 pm     **Discussion**

5:38 pm     **ADJOURN**  
Evening on your own.

# Basic Science Forum Program, *cont'd*

Thursday, October 8, 2009

|                |   |                  |  |
|----------------|---|------------------|--|
| 7:25 am        | Introduction:<br><i>Theodore Miclau, III, MD, Program Chair</i>   | 9:02 am          | Negative Pressure Wound Therapy in a Contaminated Musculoskeletal Wound Survival Model: Is NPWT Effective on Staph. Aureus, Too?<br><i>CPT Daniel J. Stinner, MD;</i><br><i>CPT Scott J. Waterman, MD;</i><br><i>Joseph C. Wenke, PhD;</i><br><i>USA Army Institute of Surgical Research, Fort Sam Houston, Texas, USA</i> |
| 7:30 – 8:40 am | <b>SYMPOSIUM 5:<br/>Infection</b><br>Moderators: <i>Theodore Miclau, III, MD</i><br><i>Mark E. Shirtliff, PhD</i>   | 9:08 am          | Methicillin-Resistant Staphylococcus Aureus Screening, Surveillance, and Control Protocol in Trauma Patients<br><i>John Fennesy, MD; Timothy Ganey, PhD;</i><br><i>Martin Franzus, MS; Daniel R. Schlatterer, DO, MS;</i><br><i>Atlanta Medical Center, Atlanta, Georgia, Atlanta, Georgia, USA</i>                        |
| 7:30 am        | The Use of BMPs in the Setting of Infection: Unsafe or Advantageous?<br><i>Andrew H. Schmidt, MD</i>  | 9:14 am          | Discussion   |
| 7:40 am        | Novel Methods for Diagnosing Infection<br><i>Joseph C. Wenke, PhD</i>   | 9:24 am          | Break  |
| 7:50 am        | Developing New Treatment Regimens for Challenging Problems: Bacterial Biofilm and Intracellular Infections<br><i>Lawrence X. Webb, MD</i>   | 10:00 – 11:10 am | <b>SYMPOSIUM VI:<br/>Function Matters! Understanding Functional Outcomes in Orthopaedic Trauma Research</b><br>Moderators: <i>Mohit Bhandari, MD</i><br><i>Marc F. Swiontkowski, MD</i>  |
| 8:00 am        | Chronic Orthopaedic Infections: Are Vaccines the Answer?<br><i>Graeme A. O'May, PhD</i>   | 10:00 am         | Overview: Which Functional Outcomes Matter in Fracture Care?<br><i>Marc F. Swiontkowski, MD</i>  |
| 8:10 am        | The Host Immune Response: How Important Is It?<br><i>Mark E. Shirtliff, PhD</i>   | 10:10 am         | How Do I Pick Functional Measures for My Study?<br><i>Paul Tornetta, III, MD</i>   |
| 8:20 am        | Discussion  | 10:20 am         | Does Function Correlate with Fracture Healing?<br><i>Saam Morshed, MD, PhD</i>   |
| 8:40 – 9:24 am | <b>PAPER SESSION 5:<br/>Infection</b><br>Moderators: <i>Theodore Miclau, III, MD</i><br><i>Mark E. Shirtliff, PhD</i>   | 10:30 am         | SF-36, SMFA, and EQ-5D: Do I Use All, None, or Some?<br><i>Emil H. Schemitsch, MD</i>  |
| 8:40 am        | Overview: <i>Mark E. Shirtliff, PhD</i>   | 10:40 am         | There Is No Valid Measure – Now What Do I Do?<br><i>William T. Obrebsky, MD</i>  |
| 8:50 am        | The Use of a Biodegradable, Load-Bearing Scaffold as a Carrier for Antibiotics in an Infected Open Fracture Model<br><i>Rena L. Stewart, MD; Joe Cox, BS;</i><br><i>Ken Waites, MD; James P. Stannard, MD;</i><br><i>David A. Volgas, MD; Tien-Min G. Chu, PhD;</i><br><i>University of Alabama at Birmingham, Birmingham, Alabama, USA</i>   | 10:50 am         | Discussion   |
| 8:56 am        | Local Antibiotic Delivery Using Tailorable Chitosan Sponges: The Future of Infection Control?<br><i>CPT Daniel J. Stinner, MD<sup>1</sup>;</i><br><i>Scott P. Noel, MS<sup>2</sup>; Warren O. Haggard, PhD<sup>2</sup>;</i><br><i>Joseph C. Wenke, PhD<sup>1</sup>;</i><br><i><sup>1</sup>United States Army Institute of Surgical Research, Fort Sam Houston, Texas, USA;</i><br><i><sup>2</sup>University of Memphis, Memphis, Tennessee, USA</i> | 11:10 am         | Basic Science Focus Forum Adjourns   |
| Paper #21      |   | 1:00 pm          | 25th ANNIVERSARY MEETING BEGINS  |
| Paper #22      |   |                  |  |

# 2009 OTA Pre-Meeting Course Disaster Management and Emergency Preparedness Course

Christopher T. Born, MD, Chair

Developed by the American College of Surgeons Committee on Trauma

Attendees of this activity can earn up to 8 AMA PRA Category I Credits™.

Annie A/B

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## Wednesday, October 7, 2009

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### Target Audience

Attendees of the 25th Annual Meeting of the Orthopaedic Trauma Association, local and regional trauma-care providers and hospital/government administrators.

### Course Description

The medical community needs to participate in the planning, triage and medical management of mass casualties following disasters. This course will be directed to frontline providers who are likely to be charged with the initial care of large numbers of victims. An "all-hazards" curriculum that emphasizes the common principles of disaster management regardless of specific mechanism will be utilized. Time will also be devoted to small group interactive sessions of disaster scenario presentations. An expansive course syllabus and bibliography of relevant literature will be provided.

### Attendees of the OTA Disaster Mass Casualty Course will:

- Become familiar with the preparation and planning for mass casualty events, their epidemiology, basic terms, definitions and principles;
- Understand the prehospital elements of disaster management, scene and field organization, initial casualty management/triage/transportation, security, communications, and casualty distribution to hospitals;
- Recognize the importance of pre-determined and rehearsed in-hospital management systems and pitfalls both to response and to delivery of care;
- Be familiarized with the pathophysiology and injury patterns of weapons of mass destruction;
- Understand the long term effects and issues of disasters.

### Invited Faculty

Christopher T. Born, MD, Chair

Faculty to be announced from:

American College of Surgeons,  
American Academy of Orthopaedic Surgeons,  
and Orthopaedic Trauma Association

*All attendees need to complete the pre-test, which will be sent upon receipt of registration. Return to OTA staff at [ota@aaos.org](mailto:ota@aaos.org) or Fax: 847-823-0556 AND bring to San Diego.*

### Program Schedule (Annie A/B)

|          |  |
|----------|--|
| 7:15 am  | Registration (Turn in completed pre-test)                              |
| 7:30 am  | Introduction/Scenario  |
| 7:45 am  | Overview of Principles for Effective Disaster Preparation and Response |
| 8:30 am  | Planning   |
| 9:00 am  | Incident Command   |
| 9:30 am  | Mass Casualty Triage   |
| 10:00 am | Break  |
| 10:15 am | Pre-hospital Disaster Preparation                                      |
| 10:45 am | Process for Hospital Disaster Response                                 |
| 11:15 am | Interactive Scenario   |
| 12:00 pm | Lunch (provided)   |
| 12:45 pm | Pathophysiology/Patterns: Blast  |
| 1:15 pm  | Pathophysiology/Patterns: Burns  |
| 1:45 pm  | Pathophysiology/Patterns: Chemical & Radiological                      |
| 2:30 pm  | Break  |
| 2:45 pm  | Long-Term Issues/Recovery  |
| 3:15 pm  | Pediatric Considerations   |
| 3:45 pm  | Interactive Scenario   |
| 4:30 pm  | Post test / Review test  |
| 5:00 pm  | Adjourn  |