



ABSTRACTS

2012 Innovations in Emergency Medicine Education (IEMEs)

Each year, academic progress made in Innovations in Emergency Medicine Education (IEME) is presented as part of the Society for Academic Emergency Medicine (SAEM) Annual Meeting. Submission for presentation as IEME exhibits follows a different format, timeline, and judging process from the scientific abstracts. This year, we received 125 IEME submissions and accepted 37 for presentation. It is with pleasure that the editors of *Academic Emergency Medicine* publish in this issue the abstracts of the IEME exhibits that will be presented at the 2012 SAEM Annual Meeting in Chicago, Illinois, May 9 to 12. These abstracts are published as they were received, with minimal editing, corrections, or clarifications; the authors are solely responsible for their content. This year, in addition to posters and exhibits, we are pleased to include three sessions spotlighting excellence in simulation, ultrasound, and resident-faculty collaboration.

1 **ABCs of Team Leadership in Emergency Medicine: A Literature Review and Novel Curriculum**

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Background: Emergency medicine (EM) residents are required to direct major resuscitations during their training. Residency programs vary greatly in preparing the residents for this role with team leadership skills education. There is no current team leadership skills curriculum to teach EM residents to specifically prepare them for this role.

Objectives: We sought to design a focused team leadership skills curriculum with dedicated feedback for residents leading both simulated and real resuscitations.

Methods: A literature search was performed. We also reviewed some of the larger, more popular medical 'teamwork' courses to glean key teaching points that focus specifically on team leadership knowledge and skill. In addition to the medical literature, we searched aviation, business, and U.S. Army literature to learn more about best practices in other high stakes fields.

Results: Despite the varied areas of application, many common themes arose in our literature review. We applied these common themes to our experience to develop an EM-specific team leadership curriculum, which we call "The ABCs of Team Leadership in Emergency Medicine." We have incorporated the ABCs into our curriculum and have developed a simple feedback tool for helping residents reflect on their team leading

ASSEMBLE:

- Prepare yourself:
 - Personal precautions (gown, gloves, mask)
 - Mental aids if needed (ACLS, ATLS, PALS electronic or paper algorithms)

Prepare your team:

- Organize the team with clear roles
 - If possible, inform team members about any knowledge available about the case prior to the patient's arrival in the ED
 - Articulate goals and first steps for team members
- Consider any special steps needed to prepare for the incoming case (e.g.; blood products, supplies, consultants)

BE AN EFFECTIVE LEADER:

- set a positive tone
- choose an appropriate leadership style (directing versus participating)
- maintain a global assessment while supervising and prioritizing activities
- invite the ideas and input of your team, use that input
- periodically reassess team structure and roles
- use resources wisely
- obtain support when needed (equipment, consultants)
- resolve or diffuse conflict

COMMUNICATE:

- direct
- clear
- closed loop communication
- effectively control room volume
- use positive tone
- periodically review plan with the entire team
- listen to team members

DEBRIEF:

- create environment where reviewing a critical case is the norm, even if only briefly
- review what went well and areas for improvement

ABCs of Team Leadership

Evaluation Form

Resident: _____ Date: _____

Faculty: _____ Feedback given to resident: Yes / No

Resuscitation Type: Adult / Pediatric Medical / Trauma Location: ED / SIM

ASSEMBLE:

Were you prepared? Yes No
 Was your team prepared? Yes No

Comments:

BE AN EFFECTIVE LEADER:

Were you an effective leader? Yes No

Comments:

COMMUNICATE:

Overall, did you communicate well with your team? Yes No
 Did you use direct, clear, closed-loop communication? Yes No
 Did you periodically review the plan with the entire team? Yes No

Comments:

DEBRIEF:

Did you do a quick debriefing of the case with your staff, team, or key personnel? Yes No

Overall, what went well:

Areas for improvement:

Global rating score: 1 2 3 4 5
 (below expectations competent exceeds expectations)

Nursing feedback:

performance and receive written and verbal feedback from nursing staff and supervising ED faculty.

Conclusions: Given the need for EM residents to receive training in team leadership and the gap we found in the EM literature, we reviewed the pertinent literature from medical, business, aviation, and U.S. Army sources to assist in the development of a novel EM-specific team leadership curriculum. We incorporated this curriculum into didactic sessions, small group simulation cases, and ED practice. We also are successfully using this rubric to improve resident self-reflective and faculty feedback on team leadership skills vital to the successful practice of EM.

2 Life After Residency Workshop: A Statewide Workforce Preparation Day for Emergency Medicine Residents and Pediatric Emergency Fellows

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Emergency medicine (EM) residents and fellows graduate from their respective programs with a wealth of clinical knowledge and patient care experience, but

often feel unprepared for the business of medicine and entering the “real” workforce. Since 2001, our EM program has conducted a local Life After Residency program that initially focused on interview preparation and ED contracts. The program has improved each year based on resident and ED director input and was expanded this year to a statewide event. Our purpose was to design a curriculum and workshop for preparing EM residents and fellows for transition to the workforce and to promote networking opportunities for all Florida EM training programs. Five of six residency programs in the state (100 attendees), ten ED groups with differing administrative structures, and the Florida College of Emergency Physicians participated in the event. The curriculum was designed to address the job search, interviewing, contract negotiation, medical malpractice, and financial planning. Differences among working for a contract management company, a hospital, or an independent contractor were highlighted. The workshop format included didactic lectures and a panel discussion with recent EM graduates working in various settings. A dinner reception was held before the workshop to provide resident, fellow, faculty, and ED administrator networking opportunities. Written evaluations were conducted at program conclusion and participants will be surveyed after graduation as to usefulness of the workshop and materials. This workshop provides valuable career planning materials and assists senior residents and fellows in making sound employment choices. The curriculum for this workshop is not routinely covered in EM program educational conferences and can be easily duplicated by other programs. Workshop resources, program agendas, and evaluation forms will be made available during the presentation of this innovation in EM education.

3 Introduction of Symptom-Based Point-of-care Ultrasound Lecture Curriculum Into an Emergency Medicine Residency: A Novel Approach

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Traditionally, emergency medicine resident ultrasound education includes lecture series modeled on the type of ultrasound examination such as FAST, cardiac, pelvic, and gallbladder. To date, little has been written about symptom-based ultrasound lecture curricula in emergency medicine residency programs. Symptom-based (chest pain, abdominal pain, dyspnea, joint pain) point-of-care ultrasound teaching could be more stimulating and effective than traditional teaching methods. To enhance resident ultrasound education, we implemented a novel symptom-based point-of-care ultrasound lecture curriculum for emergency medicine residents in July 2011. The curriculum consisted of monthly ultrasound lectures covering symptoms such as chest pain, abdominal pain, dyspnea, joint pain, etc. The lecture sessions were reformatted to cover several actual emergency department cases (presenting with a specific symptom), scanning technique, pearls, pitfalls, and review of available evidence from the literature.

The lectures included patient photographs, ECGs, x-rays, ultrasound images, and video clips relevant to the cases. We received excellent feedback from our residents. This novel curriculum led to a greater interest in ultrasound among our residents. With the introduction of symptom-based ultrasound, there has been increased resident engagement and a substantial increase in the number of residents who perceive the ultrasound curriculum to be effective in learning. There is improvement in the number and quality of scans performed by emergency medicine residents. The symptom based point-of-care ultrasound curriculum was well received by our residents. This model could be a valuable teaching tool in training emergency medicine residents in ultrasound. Emergency ultrasound directors should consider using this approach to engage residents effectively and enhance resident ultrasound education.

4 A Human Cadaver Training Model for Ultrasound Diagnosis of Pneumothorax

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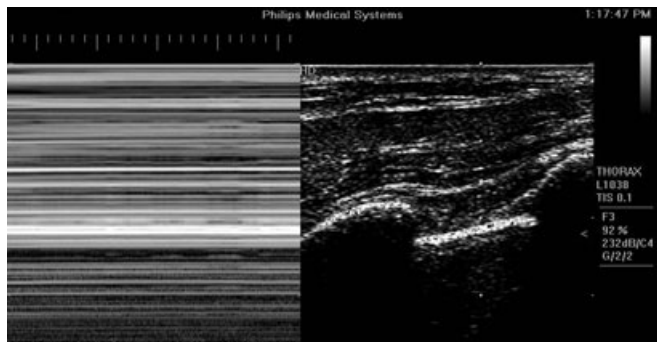
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Multiple studies have demonstrated the utility of point-of-care ultrasound (US) in the diagnosis of pneumothorax. However, very little research has been done to develop a reliable training model. To our knowledge, there are no commercially available simulation models to train emergency physicians in US diagnosis of pneumothorax.

Educational Objective: To develop a human cadaver training model for ultrasound diagnosis of pneumothorax.

Methods: Cadavers were lightly embalmed using a technique that preserves tissue texture and elasticity. Glutaraldehyde was used for embalming the cadavers. Cadavers with chest tubes or significant thoracic trauma or significant thoracic pathology were excluded. The cadavers were orotracheally intubated and tube placement was confirmed by direct visualization of tube passage through vocal cords. Lungs modeling a “pneumothorax” were created by ligating the main stem bronchus. The ligation was performed by dissecting the posterior thorax of the cadaver. A Phillips Envisor US system with a 12–5 MHz broadband linear transducer was used to obtain images of the hemithorax. With ventilation the presence or absence of the sliding lung sign on B-mode US and sea shore sign on M-mode was confirmed. Absence of sliding sign and sea shore sign was defined as a pneumothorax. Emergency medicine residents with no prior thoracic US experience received a one-hour didactic session followed by a hands-on cadaver training session.

Results: A total of 14 emergency medicine residents were trained using the cadaver model. Residents reported high level of confidence in obtaining and interpreting the US images. They were comfortable using both B-mode and M-mode to diagnose pneumothorax.



Conclusion: Lightly embalmed cadavers provide an excellent experimental model for the sonographic appearance of pneumothorax. Our study results suggest that a human cadaver model can reliably be used to train emergency physicians in ultrasound diagnosis of pneumothorax.

5 An ECG Blog for Education in Electrocardiography

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Residents seek information on the internet. Textbooks are not interactive, have no video, become obsolete, cannot be edited in real time, are expensive, and have limited capacity. I had written a book, many book sections, and chapters on the ECG in Acute Coronary Syndromes, but I was frustrated by copyright issues, books going out of print, and limitations on numbers of ECGs. In November 2008, to replace the “ECG of the week”, we created Dr. Smith’s ECG Blog, subtitled “Instructive ECGs in Clinical Context.” The plan was to cover advanced ECGs and difficult cases. We started on a free Google Blogspot with approximately two posts per month. Residents easily accessed it from smartphones or the internet. As the blog became known more widely, we posted four times monthly. In December 2010, the Blog was listed #6 on EMCrit.org’s “Dirty Dozen” best EM websites. Other favorable reviews and multiple links from other web sites appeared. Viewership rapidly rose.

We added video demonstrations of ECGs, then embedded cardiac ultrasound video to further illustrate many of the cases. Viewers could post immediate comments and questions, making possible immediate feedback, editing of errors, and clarification of difficult points. Very sophisticated readers added to the dialogue. As of December 2011, I post approximately eight cases per month. There are now 186 posts, some with multiple cases, and most cases with multiple ECGs. It has now become a free online interactive textbook with video. Each post has “labels” resulting in a 175-item index. To date, 386 followers have signed on and a corresponding Facebook page now has 823 “likes,” with 217 Twitter followers. Pageviews as of January 2011 are at 40,000 per month, from 173 countries, with a total of 500,000 all the time and growing. A questionnaire found that viewers enjoy text and video presentation equally. All ad revenues are donated.

Conclusion: Blogging can be a free, unlimited, scalable, highly successful, and popular method of presenting rich content.

6 **Pediatric Emergency Care Safety Initiative (PECSI): An E-Learning Educational Program for Just-In-Time Training and Continuing Education**

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Pediatric emergencies are less common than in adults and often lead to medical errors. Treatment is challenging due to age ranges and need for weight-based equipment and medications. Most emergency departments (EDs) primarily see healthy children with simple acute illnesses. Pediatric emergency skills deteriorate rapidly without clinical experience yet continuing education (CE) is often not required or difficult to attain. E-learning programs on average increase health professional knowledge by one standard deviation.

A patient safety grant was obtained to develop an e-learning program on pediatric emergency care. A literature and legal claim search was used to determine areas of focus. Investigators used the open-source Moodle™ program as the course management system to develop e-learning modules employing an instructional designer. Pediatric emergency and patient safety experts developed eight modules representing key areas of risk: Introduction; Recognition of Critically Ill Child; Respiratory Failure; Shock; Cardiac Arrest; Post-resuscitation; Legal and Risk Issues; and Medication Dosing. Content was critiqued by organizations and students. Investigators explored e-learning, web hosting, and IT support options while creating the Pediatric Emergency Care Safety Initiative (PECSI) program. Up to seven CE credits are available at no charge. To augment learning, modules include videos, simulation cases, resources, references, and a glossary. A brief post-test is required for CE credit and feedback. Development challenges encountered were related to program compatibility, IT, copyright, and user skills.

E-learning offers an excellent and economical venue to maintain or teach pediatric emergency skills and improve patient safety. Production of functional e-learning programs must include consideration of student technology skills, time investment, instructional design, and hosting technology. Program and resources will be reviewed (<http://www.emedjax-pecsi.com>).

7 **From Passive Observers to Active Learners: Using New Technologies to Capture Observer Ratings**

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Educators often struggle to maximally engage otherwise passive learners during simulation sessions. While one could increase the opportunities for active simulation for all learners, this may not be feasible due to financial, staff, or space limitations. Faced with many of these challenges, we expanded our approach using video-assisted debriefing where a faculty member was the sole rater to include the observations of otherwise passive students and developed an innovative approach using an electronic rating device to engage otherwise passive learners during simulations. Students are divided into two groups; the simulation group is brought into the simulation room while the observers remain in the debriefing area to watch a live feed of the simulation group managing a simulated patient. The observers use an electronic rating tool that allows for recording multiple instances of an observation in a single scenario and correlates the observation with a specific time on the video. At the end of the simulation, the collated observations are immediately available to the faculty leading the debriefing session. During debriefing, the expert facilitator uses the faculty and student observations to highlight and close

performance gaps in the active learners. Additionally, having a representation of the observers' mental model in the form of a checklist allows the facilitator to assess for and correct knowledge gaps in the previously passive learners. Subsequently, the groups switch to provide several opportunities to learn in the simulation and the observer roles. We have found that with only a very brief orientation, students have been able to quickly learn how to use the electronic rating forms. The student's observations, in addition to the faculty observations, have created a much richer and engaged discussion. With this new approach we have doubled the number of students taught during a single session while enhancing the overall quality of the discussion.

8 Quick Case Simulation Curriculum: A Time-Sensitive Approach To Emergency Medicine Education Utilizing Simulation

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Medical simulation is integral to emergency medicine resident education, but it is challenging to effectively incorporate it into a curriculum. All residencies face time constraints for educational activities, and simulation can pose a significant time commitment. Another challenge is conveying the information effectively while maintaining the learner's attention. Adult learners are likely to only take away five to nine pieces of information from an educational session. With these issues in mind, we developed a time-sensitive simulation curriculum for emergency medicine residents. It is designed to teach critical decision making with focused objective based debriefing. We took core content from our emergency medicine curriculum and reduced it to three to four key objectives. These objectives were used to develop a simulation case meant to be administered over 10 minutes. The cases are designed to be similar to real emergency department encounters, where life or death decisions must often be made in minutes. The residents have to rapidly gather data, assimilate it, and take action. Each case is then followed by a very focused debriefing session of five to ten minutes to address the three critical actions of the case. This allows the learner to walk away with several high-yield critical knowledge points. We created broad topic categories containing three cases that can be administered over one hour with debriefing included. An example is our "Obstetric Emergency" category, which includes cases of maternal cardiac arrest, eclampsia, and a shoulder dystocia delivery. Another novel element of this curriculum is that one resident is encouraged to lead and make all the decisions in each case. This design is expected to place the resident "on the spot" in order to elevate their individual patient care skills. Overall, this innovative curriculum will allow simulation educators to teach emergency medicine residents effectively and efficiently.

9 Trauma Ambush - Statewide Trauma Education via Video Teleconference Trauma Simulation

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Background: Rural EDs are often staffed by non-emergency medicine (EM) trained physicians. Our state legislature passed a trauma bill in 2009. Our site is the only Level 1 trauma center. EDs across our state have been equipped with telemedicine units that allow video conferencing between facilities.

Objectives: Our goal was to use our established monthly trauma morbidity and mortality conference as an education opportunity not only for EM and trauma residents, but for and staff at Level 2-4 trauma centers.

Methods: A simulation scenario was developed requiring stabilization and transfer to a Level 1 facility. It involved a 42 year old male working on a power line, who came in contact with a wire and fell 20 ft. He presented hypotensive and tachycardic with a Glasgow Coma Scale score of 14. His injuries included a tension pneumothorax, compartment syndrome of the burned arm, and hemodynamic instability secondary to a splenic laceration. In the conference room, a video screen showed four ED nurses nearby in our Sim Center discussing the ambulance report of the scenario patient. The trauma chief resident, EM chief resident, and two other residents were "ambushed" and asked to care for this patient. They had no prior knowledge that this would occur. En route to the simulation center, they were informed that this case was being telecast to EDs across the state and back to the conference room. At the end of the scenario, the residents returned for debriefing by the EM and trauma faculty. The conference continued to be broadcast and other facilities participated in the discussion.

Results: An educational forum was established between Level 2-4 trauma centers and our Level 1 trauma center. EM and trauma faculty were able to answer management questions as they pertained to each unique site.

Discussion: Our institution is the only state Level 1 trauma center. This novel educational offering combines telemedicine and simulation allowing participants with markedly different backgrounds and levels of training in trauma care to observe and discuss a difficult simulated trauma scenario.

10 Transition in Critical Care from PGY1-2: Carolinas Healthcare System: Intern Simulation-based Common Critical Care Curriculum

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Increasing demands on physicians, emphases from accrediting and regulatory agencies on patient safety, resident work hour restrictions, and increased patient acuity have created a growing need for consistent, safe, efficient, and unified critical care training. The

above constraints have led to inconsistent exposure to key elements and procedures crucial to preparing for ICU rotations. As such, residents report feeling ill-prepared for rotations in intensive care units. As leaders in resuscitation and simulation-based education, emergency medicine (EM) physicians have the unique opportunity to affect this challenging aspect of resident education. Addressing the above demands, two board-certified EM faculty, specially trained in high-fidelity medical simulation and debriefing, developed and implemented a longitudinal, interdisciplinary critical care simulation curriculum based on a previously developed EM simulation curriculum. This program provides formative instruction for all 59 interns from multiple specialties caring for adult patients within our hospital system. The primary goal: increase competence in select critical care skills in high-acuity, commonly encountered, critical care topics prior to resident matriculation to the second post-graduate year. To meet curricular objectives, interns participate in three 4-hour simulation-based sessions scheduled over a 6-month period. Debriefing and guided feedback is integrated into each session along with relevant procedural instruction and discussion of key topics. Additional use of standardized patients allows ethical and spiritual topics such as code status, death, sentinel events, and errors to be addressed to enhance overall professional performance and IPR skills. Resident performance is evaluated through self and faculty ratings and shared with each residency program's director to identify those in need of further education in critical care topics prior to their second post-graduate year.

11 **Lightning Rounds: A Resident-Directed Short Format Didactic Innovation**

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Lightning Rounds is a short format didactic session designed to address focused knowledge questions, alter the flow of a standard conference day, and be rapidly responsive to resident directed educational needs. Lightning Rounds are 12–15 minute didactic sessions given by faculty during regular weekly emergency medicine conferences. The topics are very narrow in scope and draw heavily on the literature. They are designed to supplement the existing didactic curriculum, not replace core content. Example Lightning Rounds topics are: “Does Hypertension Cause Headaches?”, “Using/Interpreting a Urinalysis”, “The Levitan Approach to Airway Positioning”, and “An Update on LBBB”. Topics are selected for Lightning Rounds by polling the residents with Survey Monkey® regarding both general content areas of interest and specific topics/questions they would like to see addressed. This allows the residents to rapidly identify perceived holes in their knowledge base and maintain a sense of ownership over their didactic learning. Faculty are identified for Lightning Rounds by similarity of their areas of interest to the topic. We developed Lightning Rounds to make the

flow of a typical weekly conference day more dynamic and to provide a forum for answering questions that are too specific to occupy a full hour of conference. We have been using Survey Monkey® as a tool to generate content, assess the effectiveness of the method, and poll faculty for variations of opinion and practice style differences.

We are currently including Lightning Rounds in our weekly didactics one to two times a month as a block of three mini-topics in place of a standard lecture. In the future we are considering using Lightning Rounds individually between regular lectures to further prevent stagnation and keep learners engaged.

12 **Implementation of Small Group Reflection Rounds at an Emergency Medicine Residency Program**

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Background: The rates of depression and burnout are known to increase during residency. Affected residents cite feelings of isolation and cynicism. Few residency curricular interventions have focused on improving well-being and promoting humanism.

Objectives: We describe the implementation of a novel curriculum based on small group reflection rounds, the Emergency Medicine Reflection Rounds (EMRR), at a 4-year emergency medicine (EM) residency program.

Methods: During the inaugural year ('10-'11), nine residents volunteered to take part in one-hour monthly sessions with faculty facilitators. Residents were provided a confidential environment to discuss difficult ethical and interpersonal encounters, and to share strategies for dealing with these encounters. Ongoing feedback from participants was solicited, culminating with a focus group interview and a four-question survey (three questions with a 1–5 Likert scale and one with free-text response).

Results: All nine respondents strongly recommended EMRR for other EM residencies. All agreed that EMRR provided an important forum for residents to discuss difficult issues in a safe environment. All agreed that EMRR contributed to improving their own well-being. Free-text comments included: “We see a lot of tragedies in a high-stress environment. EMRR is a rare chance to process the gravity of what we do.” “Often, we feel like we're all alone. It's reassuring to know that other people have similar experiences.” Based on the positive feedback, EMRR has been expanded to the entire residency in '11-'12 in monthly one-hour facilitated sessions during conference time.

Conclusions: Wellness in residency is an underemphasized yet critical topic. Dedicated small group rounds allow for reflective practice and foster cooperative learning around the communication, professional, and ethical challenges inherent to EM practice. Our EMRR model may be useful to other EM residencies looking to supplement their wellness curriculum.

13 The Incorporation of High-fidelity Simulation in the Evaluation of Efficacy of a Residency Remediation Plan

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One of the most significant challenges facing the leadership of a graduate medical education program is in effectively conducting and verifying remediation of the struggling trainee. The prescription of a remediation plan is usually fairly straight-forward and may include: extension of the training period, additional time spent in the emergency department (ED) with higher levels of observation, directed reading assignments, and use of other teaching resources. Frequently, however, non-standardized subjective measures are used to judge the efficacy of a remediation plan and the competency of the trainee.

We will describe a thorough program of assessment of the ACGME competencies (including professionalism, patient care, medical knowledge, interpersonal skills and communication, and systems-based practice) that was applied to a resident undergoing remediation in our emergency medicine (EM) residency program. The resident was given a structured 6-week remediation plan. Upon completion of the plan, the following tools were used for assessment of competency: written essay examination, oral board-type examinations, and multiple patient-based scenarios using high fidelity simulation.

The simulation sessions were administered by medical simulation center staff and core emergency medicine program faculty members. Cases included both adult and pediatric patients with presenting problems in both the acute care and critical care categories. All oral board and simulation cases were recorded on digital video for subsequent review.

Evaluation of both oral board and simulation cases, using standardized case-based critical action checklists and the Council of Emergency Medicine Residency Directors (CORD) standardized direct observation tool (SDOT), were performed both in real-time and after video review by core faculty members.

We feel this method provided the program with ample verification of the efficacy of the remediation plan for this resident. The resident has subsequently completed the program and passed the American Board of Emergency Medicine (ABEM) qualifying and certifying exam.

14 The "EBM Smartphrase": A Novel Use of the Electronic Health Record, Smartphones, and QR Codes to Teach Evidence-based Medicine at the Bedside

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Background: Evidence-based medicine (EBM) has been proposed as the gold standard for patient care in

the United States. It is specified by the ACGME as part of the Common Program Requirements. It has also taken a more prominent role on the national stage, having been adopted by regulatory bodies and legislators as a means to improve patient safety and deliver cost-effective care. Significant barriers exist that prevent EBM from being taught and utilized at the bedside. The increasing prevalence of electronic health records (EHR) and smart devices can aid in delivering best evidence without the need for time consuming searches.

Objective: To utilize the EHR and smartphone as tools to deliver and teach case-specific EBM at the point of care.

Methods: Our department uses an EHR that allows for customizable prefilled notes (smartphrases) containing text, images, and hyperlinks that can be included in the medical record with a few keystrokes (Fig 1) on p. S8. We have developed a series of EBM smartphrases containing evidence-based summaries, decision rules, and guidelines that can be generated on-demand at the bedside. Also included in these smartphrases, through the use of hyperlinks and quick response (QR) barcodes, are links to pertinent articles from which the clinical guidelines were derived as well as links to well-established online resources (Fig 2) on p. S8. Scanning the embedded QR code allows for the upload of the original work onto a smartphone for review at any time, and can allow for transfer to a personal computer for inclusion into an individualized learning portfolio.

Discussion: This novel approach of using the EHR as a teaching tool for delivering EBM at the bedside can greatly enhance teaching problem-based learning and can improve the safe and efficient care we provide to our patients. Through the use of QR codes, these teaching resources can migrate across multiple electronic platforms. This method can be further expanded to allow the EHR to be used as a multimedia database of on-demand teaching tips and cases.

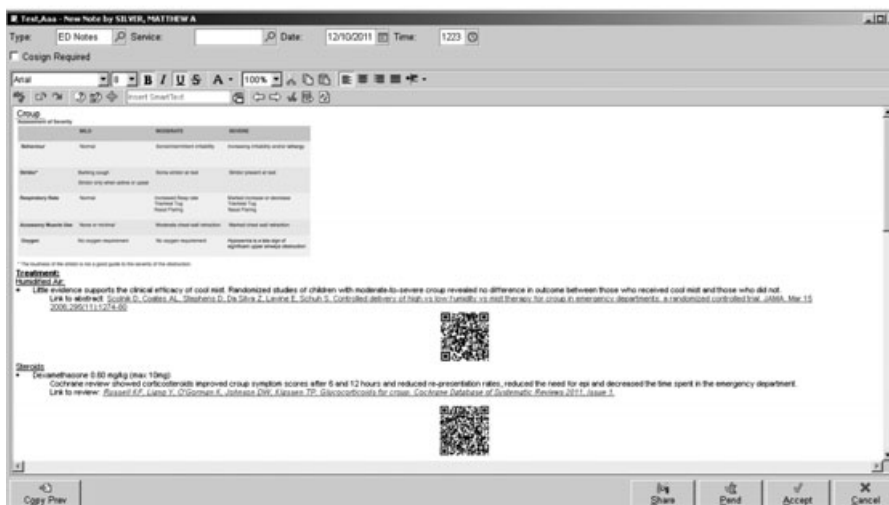
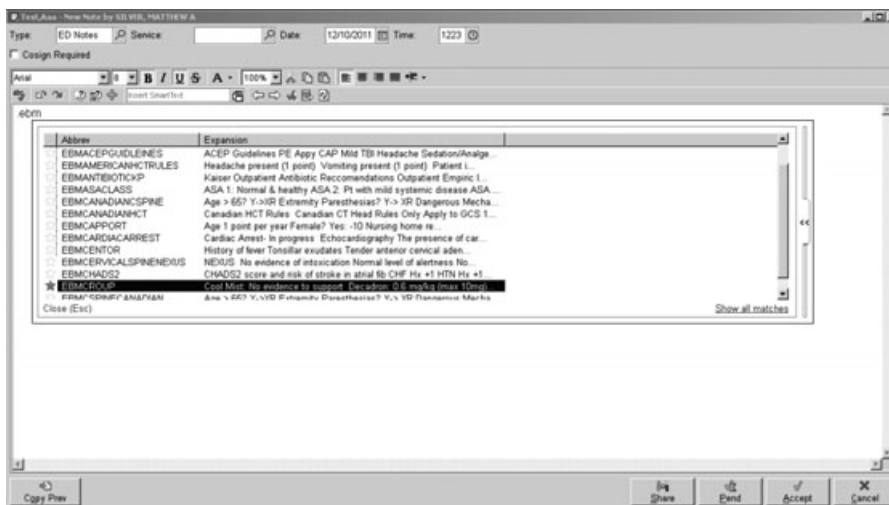
15 A Novel Approach Using Self-assessments To Improve Performance on the Oral Board Examination

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Background: Residents learn based on a combination of self-assessment, response to feedback, and the creation of learning goals. Attention has been devoted to improving the effectiveness of feedback; however, recent research suggests that feedback is interpreted through the lens of the learner's own perception of ability.

Objective: Design an enhanced format for mock oral boards to improve resident performance by incorporating self-assessment and standardized effective feedback.

Methods: We developed a structure for mock oral board examinations comprised of three novel methods to enhance learning. After the exam is conducted in the



standard fashion: 1) the resident completes a self-assessment based on the American Board of Emergency Medicine (ABEM) oral board evaluation, 2) faculty provide feedback using a standardized checklist, choosing four or five strengths and points for improvement, so as not to overwhelm the learner with more information than can be effectively processed, and 3) the resident is asked to generate learning goals that are “SMART” (Specific, Measurable, Attainable, Realistic, and Timely) and may be achieved in a specific time-frame.

Conclusions: The completion of a self-assessment motivates the resident to recognize his or her own strengths and weaknesses. The specific feedback is standardized to be effective (facilitative, specific, timely, and focused on the task). The learner’s generation of SMART learning goals allows task-oriented benchmarking and provides a framework for performance improvement. The ability to set learning goals demonstrates the relevance of feedback, and theoretically confirms that the feedback influenced the learner. Emergency medicine residents’ formation of self-assessments prior to receiving feedback, as well as the generation of SMART learning goals, should enhance performance improvement on oral board exams and potentially other educational activities.

16 **Development of a Tablet-based Application for Self-guided Training on Emergency Orthopedic Care**

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Background: Today’s trainees are in a world in which material may be taken with them anywhere due to the technology available. Specifically, through the use of tablet computers, a user has the ability to have most educational texts, internet-based tools, and an array of applications available almost anywhere they may go. Development of these applications for specific educational purposes serves as a new area for medical education.

Objectives: The objective was to design an interactive application for self-guided learning focused on radiograph interpretation and orthopedic care in the emergency department. Our secondary objective was to develop associated online tests to track student progress.

Methods: FracturED: A Fracture in the ED was developed using Xcode with an iOS Developer Program membership. The application is a combination of tab-bar and table-view navigation to provide an interactive format for users to navigate related

radiographs and discussion sections on related emergency department care. The primary author and application developer had almost no knowledge of programming prior to this and was able to do so with the use of the above mentioned software and a book on iOS programming.

Results: An interactive iPad application is available for any trainee interested in improving his or her knowledge on emergency department-based orthopedic care. A series of tests are also available to users to measure improvement on knowledge acquisition and radiograph interpretation.

Conclusions: Through a small initial monetary and time investment the development of iOS applications provide a means for any iPad owner to have an emergency medicine focused educational application at any time. Associated online test question banks provide a means for users to assess their starting knowledge and skills along with their improvement.

17 A Blog-format Educational Media Collective

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The past five years has seen an explosion of emergency medicine (EM) educational material in the form of blogs, audio podcasts, and instructional videos. Many of these resources are produced by content experts and are therefore of exceptionally high quality. EM learners have taken notice and clinicians at all levels have incorporated internet-based educational media into their study routine.

Our goal is to bring the best internet-based educational media into the resident curriculum. We launched a blog format website, media.sinaiem.org, created using Wordpress, an open-source, free, ready-to-use content management system. The blog structure packages content into discrete modules that can be easily produced and are automatically indexed and presented in a "news feed" style that encourages readership and allows for readers to follow new entries in a variety of familiar ways (e-mail, RSS, Twitter, Facebook). The site was launched with 30 modules, each linking to a media item (podcast, video, journal article, textbook chapter, etc). Each post contains a summary of the media and a link to a three-question post-test, created using Google Forms, which allows the residency leadership to track consumption credits. Each resident is expected to accrue 10 credits per month: two points are earned for each module consumed, and four points earned for each module written. Residents are also expected to attest to their media accrual in a monthly survey, which is reviewed by residency leadership. This system allows for a spectrum of engagement: residents (and faculty) can quickly browse media summaries, residents can consume media for credit, or synthesize and summarize media for more credit. As the database expands, it becomes a valuable resource in its own right. Finally, the process encourages lifelong learning habits that will benefit residents when they transition to independent practice.

18 EM Lyceum—A Novel Method to Encourage Academic Debate and Teaching Amongst Faculty and Residents

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Introduction: The chaotic nature of many shifts in the emergency department makes the incorporation of quality, evidence-based education and nuanced academic debate a herculean task. Additionally, the practice of emergency medicine (EM) varies greatly between and within departments. Our goal was to promote relevant, enjoyable, and succinct faculty teaching during clinical shifts.

Methods: We developed a monthly set of questions centered on a controversial area in EM. These questions are sent to faculty and residents. Faculty members receive relevant articles and citations to aid them in reviewing in advance of that month's topic. Posters (please see example) are prominently displayed in all clinical areas, and residents are encouraged to ask their attending physicians and senior residents that month's questions. Although all the questions pertain to a specific topic, they also function in a "stand-alone" fashion permitting brief mini-lessons intercalated into the functioning of a department.

Results: This curriculum encourages residents to think critically about differing approaches to clinical problems in our field, hear various viewpoints, and examine the evidence behind their teachers' practices. At the end of the month, "answers" are published, and discussed in our weekly conference. The answers are based on a review of the best available literature. During the summer of 2011, this method evolved into a

Acute Coronary Syndrome



1. What anti-coagulants and/or anti-platelet agents do you use in a patient with a STEMI? In an NSTEMI?
2. How do you identify and manage patients with unstable angina?
3. How do you risk stratify patients with chest pain? Do you use any clinical decision rules?
4. How reassuring is a recent (< 1 year) negative stress test in managing a patient with chest pain? How about a recent "normal" cath (i.e., < 30% blockage, no intervention)?



EMLYCEUM.COM

Sickle Cell Disease



1. How do you determine whether or not a sickle cell patient is currently having an acute pain crisis?
2. How do you differentiate an acute pain crisis from a pulmonary embolus or acute chest syndrome (ACS)?
3. What do you do for patients once you've decided this is an acute pain crisis? What lab values are helpful? Do you give oxygen and fluids to all your pain crisis patients?
4. Which pain medications do you use for patients experiencing an acute pain crisis?
5. Which patients do you admit? For discharged patients, what is the discharge plan?



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web page, <http://www.emlyceum.com>. The questions, and monthly posters, are distributed for free to subscribers to the web page, as are the “answers,” with hypertext links to the literature, at the end of each month.

Discussion: Critical debate with master clinicians on controversial management issues represents an under-used educational mode for residents and medical students. To that end, we have created a novel curriculum and presentation method to promote discussion on various EM topics and to encourage residents to investigate the evidence basis and rationale for how they care for patients.

19 **Academic and Clinical Integration: A Novel Residency Curriculum Translating Evidence Into Action**

Joel Moll

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Background: Emergency medicine (EM) residents graduate to a health care environment with increasing emphasis on evidence-based quality metrics and outcomes. Teaching evidence-based medicine (EBM) by journal club has not been shown effective, and EM programs surveyed in 2010 averaged 5 hours of EBM instruction. Our residents mainly use the internet for clinical queries, and may not develop skills to research a question. Literature suggests care may be increasingly compromised the more time after residency, presumably from outdated knowledge. The need to obtain and evaluate evidence and translate it into effective, efficient, and measureable care led to a novel EBM and knowledge translation (KT) curriculum.

Objectives: To install critical analysis and discovery that is career long, and to learn to use EB knowledge in clinical care and problem-solving.

Methods: The longitudinal curriculum has four 6-month modules, starting mid intern year and ending mid third (final) year. Module one provides an introduction and tools needed. Faculty with interest and training in EBM lead the second module consisting of small groups which formulate a clinical question, research and rate literature, and set recommendations. The small group projects are presented, and one project is selected to implement. In the implementation module, the class will perform knowledge translation and set metrics. The final module reviews the metrics and project outcomes.

Results: The curriculum was initiated in December 2010. Measurable outcomes of the curriculum focus on evidence source and knowledge translation tool use and retention. At the end of phase 2, EBM sources are the first query in 67% compared to 50% at start, and 63% self-identify a change in how they obtain information.

Conclusion: The curriculum directly addresses several core competencies, and effects knowledge and behavior patterns that are challenging to teach. Early results indicate a trend toward more evidence-based problem solving.

20 **Use of an Innovative Web-based Mentoring Tool to Guide Residents and Faculty in Design of Original Clinical Research**

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CoolResearcher.com: a web-based mentoring tool for assisting faculty, resident, and student novices, providing stepwise guidance with developing the project. Initiating a research project is often a difficult and intimidating task for a newer faculty member, resident, or student who does not have prior experience, thus necessitating the use of a mentor. Henri (1992) described mentoring as a three-step process, the first of which involves communication from the mentor providing the starting information; second the student/mentee responds to this information, and third, there is a reply. This innovation is an online tool which provides the first two steps of that process, a site which leads the user through the initial steps of research design. The user is able to present an idea to the mentor with some degree of basic development and sophistication, thus making greater use of the mentor's time. When complete, the user sends the resultant design entered into blank fields via automated e-mail to the mentor prior to a live meeting to discuss the results and further progress. The site is free, open-access, and noncommercial in nature. The reader is referred to a web site for a live view of this proposal at the following link: www.CoolResearcher.com.

1. Use of the web site

- a. All information is personal and private, and only shared between mentee and mentor. The owners of the site do not see any content except for e-mail addresses provided.
- b. The site is free, open-access, and noncommercial in nature.
- c. Name and contact information are entered (to be sent to the mentor).
- d. A series of questions are answered, leading the user to create a focused question, literature review, and preliminary design of a project.

2. With each of the above steps, there is a bright red “click for tips!” button. When one of these is pressed, a pop-up appears with advice on how to answer the next step.

3. Clicking a “submit” button sends a copy to the mentor and to the user.

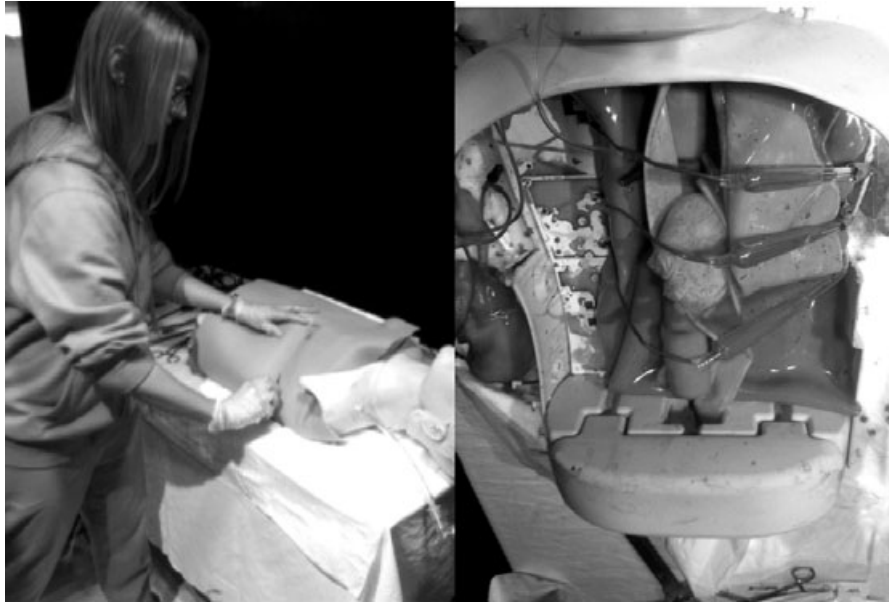
Use of this innovation will be demonstrated live to participants.

21 **Emergency Department Thoracotomy: A Novel Simulation Teaching Model for Residency Training**

Erinn Hama¹, Kevin Reed¹, Sangeeta Desai¹, Jesse Jamieson², Christine Trankiem³

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While emergency medicine (EM) residents commonly receive extensive trauma training, opportunities to



perform emergency department (ED) thoracotomy can be infrequent. This can lead to a lack of comfort level and expertise in performing ED thoracotomy, even for senior EM residents. Nevertheless, the RRC requires all EM residents to develop procedural competency during their residency training.

In conjunction with faculty from the Department of Trauma Surgery, we developed a novel ED thoracotomy simulation model for EM residents to review all aspects of this critical skill they need to develop during their training. Instruction included pre-lab readings, didactic sessions, and hands-on instruction with the ED thoracotomy model. Faculty included both board-certified EM and trauma surgery attendings. A case scenario was used to illustrate a clinical problem best treated by ED thoracotomy. The model for the procedure was developed within the SiTel simulation center, using common ED supplies, red dye, and chicken breast pieces placed into a modified partial task trainer. Residents were instructed on indications, procedural steps, and final disposition for cases requiring ED thoracotomy. Residents were required to perform each step of the procedure, including release of cardiac tamponade, suturing of an open stab wound to the pericardium, open cardiac massage, and defibrillation. In addition, cross-clamping of the descending aorta to prevent blood loss below the diaphragm and to achieve cardiac and brain perfusion, as well as steps to control pulmonary hemorrhage, were reviewed using the model.

Residents enjoyed this experience, and in general stated their confidence and comfort in performing this procedure was greatly enhanced by this intensive training. We believe our ED thoracotomy model is a novel and inexpensive way of teaching EM residents critical but infrequent procedures required during EM training in a safe, low-pressure environment.

22 **Umbilical Vascular Access Task Trainer - An Inexpensive and Biohazardly Safe DIY (Do It Yourself) Model**

Jacqueline Nemer

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San Francisco, CA*

Background: Umbilical vascular access is an essential skill set for providers involved in neonatal resuscitation. It is imperative to learn, practice, and perfect these important skills prior to performing these procedures on a critically ill neonate. Umbilical cord procedures are infrequently performed in most emergency departments, which may lead to a lack of comfort and expertise. Simulation provides a valuable opportunity to acquire and maintain competency in umbilical vascular access.

Simulation of umbilical vascular access currently involves two types of models: commercially available task trainers, and real umbilical cord sections. Commercial trainers are expensive, easily damaged, and require costly replacements after a limited number of uses. Real umbilical cords involve those plus additional challenges in supply, storage, and biohazard exposure.

Objectives: This DIY (Do It Yourself) umbilical cord model was created to provide an inexpensive biohazardly safe umbilical cord model which includes two arteries and a vein to simulate the experience of performing umbilical vein and artery catheterization. This model has realistic anatomy with twisting umbilical vessels, and realistic texture of rubbery exterior amniotic epithelium of the cord, and the slippery Wharton's jelly supporting the "vessels". The model can be refrigerated and reused or discarded like other food and plastic waste.

Equipment needed: gelatin, food coloring, syrup, glove fingers, catheters, tubing, and syringes.

Methods: This presentation will include detailed instructions, and comparisons in cost and limitations of each type of umbilical cord trainer.

Conclusion: This DIY umbilical cord task trainer is a low cost alternative to the expensive commercially available kits, and without the biohazard risks of a real umbilical cord.

23 Simulation in Education: A Fracture Reduction Model

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Though the simulated environment is increasingly used for procedural skill acquisition and training, the significant cost of simulation mannequins and models can limit the utilization of this teaching modality. The purpose of this project was to assess the feasibility of developing a practical, low-cost fracture model (\$230), which enables practice of hand placement and reduction motion against simulated tissue resistance. An adult-size plastic model of the bones in the right arm was purchased from an online resource. A Smith's and Colle's fracture model was chosen for development. A jigsaw was used to cut out a V-shaped angle from the medial to lateral aspect of the distal radius, with the apex of the V towards the elbow. Two holes were then drilled from the medial to lateral aspect of the radius approximately 1 cm distant from the fracture site. The tension normally produced by soft tissue, muscle, and ligaments across the fracture site was simulated by the elastic bands from anaerobic cord. A 4-inch length of elastic band was placed through the holes and tied together to apply tension across the fracture site. The placement of the holes allows the model to dislocate in either volar or dorsal direction. The V-shape of the fracture provides stability once proper fracture re-alignment is achieved. Successful fracture reduction produces an audible and palpable "click" with resolution of the defect. To create the feel of subcutaneous tissue and skin, two forearm-length thick chemical-resistant gloves were used. One section of glove was wrapped tightly around the fracture site. The skeletal model was then inserted into the second glove. Both gloves were held in place with fishing wire and tape. The model can be repeatedly dislocated to allow the practitioner a hands-on, repeatable approach to fracture reductions in a relaxed environment, where teaching and refinement can be encouraged.

24 A Novel Technique for Teaching Deliveries: A Low-Fidelity Model

Danielle Hart
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Background: It is often difficult to teach obstetric skills effectively in a large group format. As for most procedural skills, learners need hands-on practice for successful skill acquisition. This often requires the purchase of expensive models, as well as small group sessions requiring a larger investment of faculty time for facilitation.

Innovation: We have developed a low-fidelity delivery model which is affordable and easy to use, and can be utilized as a practice tool even in a large group format. This involves a small doll (Figure 1), and a 'floatie' (Figure 2). The floatie is inflated and the doll is placed inside (Figure 3). A short large group discussion of the delivery technique is followed by hands-on practice time with this low-fidelity model. One model is used for each group of two learners. One learner holds the floatie and the feet of the doll (or the head of the doll when teaching breech deliveries), and the other learner does the delivery (Figure 4), only accomplishing a successful delivery after all of the correct maneuvers are performed. This model can be used to practice regular deliveries, breech deliveries, or shoulder dystocias.

Conclusion: This low-cost, low-fidelity model can be used to facilitate acquisition of obstetric delivery skills in a large or small group format, and has been well received in a number of local and national large group educational settings for learning both routine and difficult deliveries.



25 **Cadaveric Porcine “Beating Heart” Model for Training Emergency Cardiorrhaphy**

Michael C. Plewa, Kristina K. Burgard
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Background: Live animals are often used to train emergency medicine (EM) residents various trauma resuscitation skills, including thoracotomy and cardiorrhaphy.

Objective: In an effort to reduce live animal use, we devised an innovative “beating” cadaveric porcine heart model to allow EM residents practice in repair of penetrating cardiac wounds.

Methods: Frozen specimens including porcine heart, mediastinum, great vessels, and lungs, obtained from a local butcher, are thawed overnight and placed in a large emesis basin. The aortopulmonic window is bluntly dissected to allow access to the proximal main pulmonary artery, which is opened with scissors at least 2 cm above its origin. The one-way output valve from a foot pump is removed and replaced with a 0.375” adaptor in-line with approximately 30” length of 0.375” ID 0.5” OD vinyl tubing which is inserted in the main pulmonary artery, past the pulmonic valve, and into the right ventricle, then secured with two zip ties around the pulmonary artery. Vena cavae and hilar vessels are ligated with 2–0 silk ties and leaking branch vessels are clamped with hemostats. The foot pump is then placed in a large emesis basin filled part-way with red water, simulating blood, and the right ventricle is inflated with successive hand compressions of the pump to simulate a “beating heart”.

Results: This model allows repair of multiple successive scalpel stab wounds in the right ventricle. EM residents are able to practice the essential components of 1) finger or Foley catheter tamponade of the “bleeding” wound, 2) closure of the wound with suture or staples, and 3) internal cardiac massage. Training success can be assessed by volume of “blood” loss, procedure time, hemostasis, and learner confidence.

Conclusion: This simple, realistic, and inexpensive cadaveric porcine heart model simulates a “bleeding” and “beating heart” to facilitate training of cardiorrhaphy for EM residents.

26 **Integrating a Wireless Remote Programmed Stethoscope into Simulation Scenarios**

Steven J. Warrington, Michael Beeson, Frank Fire
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Background: Simulation is frequently used in emergency medicine education for many purposes with multiple adjuncts available to assist in training. Training may range from procedures on simple task trainers to full case-based scenarios on a standardized patient or high-fidelity mannequin. Recently a wireless remote programmed simulation stethoscope, VentriloScope TM, was developed as a new adjunct to simulation training.

Objectives: Our goal was to begin integration of this new technology into the simulation curriculum at Akron General Medical Center’s Simulation Learning Center for a PGY1-3 Emergency Medicine Residency Program.

Methods: The Simulation Learning Center began integrating this technology in the spring of 2011 through case-based scenarios for resident training/assessment and procedural training purposes. The wireless remote programmed stethoscope has two parts, one that appears as a stethoscope with a small box in the middle of its tubing, and the other that appears as a handheld recorder with four buttons and a three selection switch. Use of the simulation stethoscope is efficient with an SD card that can have any mp3 file programmed as a sound, and the ability to use 12 sounds per scenario. The observer or standardized patient has control over which sounds the trainee hears with attention to location of auscultation.

Results: Integration of a simulation stethoscope into simulation-based training and assessment has been a simple task through the use of a simulation stethoscope. This adjunct is useful for task trainers, high-fidelity mannequins, and standardized patient simulations. The programmed simulation stethoscope provides realistic sounds encountered with real patients.

Conclusions: A wireless remote programmed stethoscope represents a unique and realistic adjunct for a simulation center to enhance its training modalities.

27 **Educational Video Production Using BoinxTV**

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Joseph Clinton

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Hqmeded.com is a medical education-focused website maintained by the Department of Emergency Medicine at Hennepin County Medical Center in Minneapolis, MN. Most content is in the form of short educational videos, interesting case presentations, or longer traditional lectures. Content areas include ultrasonography, airway management, toxicology, pediatrics, and radiography. The use of BoinxTV (Boinx Software, boinx.com, Puchheim, Germany) and a green screen has improved our ability to produce and publish educational videos. The main advantage of BoinxTV is its ability to integrate and record multiple video elements in real time, greatly minimizing post-production work. Our Innovation in Emergency Medical Education exhibit will include a working demo of our video recording setup using BoinxTV.

28 **Redesigning Patient Follow-up Logs: Harnessing Technology to Promote Self-Directed Learning and Create an Interactive, Collaborative, Emergency Medicine Patient Follow-up Blog**

David H. Salzman, Lanty O’Connor, John A. Vozenilek, Michael A. Gisondi

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Patient outcome follow-up is an RRC-required element of emergency medicine training and can also be used to assess the ACGME core competency of practice-based learning. There is flexibility and variability in how various residency programs meet the requirements. We

developed a novel approach to fulfill this requirement as well as providing an opportunity for self-directed learning in the adult learner.

Previously, residents completed an online follow-up log which was then reviewed for completion, but the content of the log and evidence of learning was uncertain. To improve the learning associated with a required activity, we developed a secure, online, collaborative environment utilizing Web 2.0 technologies where the residents added their follow-up entries to a blog. Each blog entry was required to include at least one self-generated patient-related learning point and an image pertinent to the case which could include radiology images, ECG tracings, or pertinent figures from articles to enhance the learning point. Residents chose a main topic category according to the categories listed in the 2009 Model of the Clinical Practice of Emergency Medicine, as well as indicating any pertinent keywords for each post. These categories and keywords can be used by residents to find specific topics and use the blog as a learning tool while working clinically. Residents also commented on each other's posts to demonstrate review as well as indicate specific knowledge learned. The blog is hosted on a server at our institution utilizing open source WordPress software. Real-time information regarding the frequency of site visits is monitored using Google Analytics to monitor use and to identify the most frequently read posts. This new approach to resident follow-up log documentation has resulted in a more interactive learning experience which has provided the entire residency an opportunity to benefit in learning from all of the interesting patients that are followed-up on a monthly basis.

29 **An Emergency Medicine Research Course and Curriculum for Emergency Medicine Residents and Junior Faculty**

Edward P. Sloan, Wes Eilbert, Heather Prendergast
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Problem: Emergency medicine (EM) residents and faculty strive to be academically productive, with the creation of research work products, despite being inadequately trained in the methods necessary for success.

Methods: A curriculum is presented that provides the essentials for how to successfully conduct research, present the findings, publish the work, and create a research career and program.

Results: There are four questions addressed by this research curriculum: 1. What is the rationale for relevant scientific inquiry? This part of the curriculum discusses idea generation, question development, hypothesis testing, data sources, and the areas of EM interest. 2. How should the research projects be conducted and completed? This part examines how to design studies, perform power calculations, how to collect, store, and analyze data, and how to easily include information from the medical literature. 3. How is the completed project submitted, presented, and published? This part describes how to regularly submit and present abstracts, oral and poster presentations, and

manuscripts. 4. How is a successful career in academic EM built around scientific inquiry, grantsmanship, and academic productivity? This area identifies how the individual EM faculty member can develop skills and behaviors in order to successfully be academically productive, including grant funding, as well as how a successful research program can be created within an EM academic department. This 8-hour course can take place during regular conference time or during a 1-day meeting, can be taught by senior EM faculty, utilizes templates for future use, and includes a pre- and post-test. This course has been conducted yearly by our university-based EM residency with other EM residencies for over 20 years.

Conclusions: This research course can enhance the academic productivity of EM residents and junior faculty through the identification of strategies for successful completion of research work products.

30 **The Visual Odyssey Case of the Week**

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An interactive educational tool, the Visual Odyssey Case of the Week, was developed primarily to improve emergency medicine (EM) resident medical knowledge. The tool is a weekly PowerPoint case sent out via e-mail every Friday to all emergency medicine (EM) residents. The topic of each case corresponds to the curriculum topic of the month. At least one visual stimulus picture is presented with a maximum of five questions that may or may not be part of a case presentation. A challenging bonus question is sometimes included. Residents have until the following Thursday to respond. Timely feedback is given for every response, usually within minutes to hours. Unlimited chances are given to answer all questions correctly. On Thursday evenings, another PowerPoint is e-mailed with the answers which may include more pictures, topic pearls, current guidelines, or links to recent literature or pertinent videos. Utilizing the "carrot" method for maximal participation, a prize is awarded monthly to the winner of a raffle that includes the weekly winners for that month. Each quarter, one lucky winner is chosen by raffle from the weekly winners for the special prize of an EM shift off. Over 100 cases have been e-mailed so far. Resident participation has been excellent. Material from the cases is reinforced by incorporating it into their monthly written exams. The cases have been collated on a resident Dropbox account for their review in preparation for in-training exams. We have recently added our rotating medical students and off-service residents to the list of case recipients during the month they are in our department. This tool is also being used for faculty development as they are copied on the cases. Junior faculty, and senior faculty who are due to re-certify, have found it a helpful preparatory tool for their EM board exam. In conclusion, the Visual Odyssey Case of the Week educational tool is an engaging and effective way to impart EM medical knowledge. Monthly and

quarterly prizes provide an excellent incentive for participation.

31 **Project Professionalism**

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The core competencies of professionalism and interpersonal and communication skills (PICS) have proven the most difficult to teach, measure, and evaluate. One critical measure of success in clinical practice is patient satisfaction (PS), which reflects the degree to which these two core competencies have been successfully mastered. PS surveys are increasingly implemented in many community emergency departments (EDs), and American Board of Emergency Medicine (ABEM) now requires documentation of a PICS activity as part of the assessment of practice performance component of continuous certification. PS surveys are recommended as an assessment tool for demonstrating achievement in communication and professionalism. Many residents are not concerned with PS as a training goal. Historically, PS in a public hospital setting has not been encouraged, measured or rewarded. Residents not adequately trained in PICS may be unprepared and may perform poorly on PS surveys when starting their careers. Project Professionalism (PP) is a "resident friendly and resident approved" curriculum. Resident volunteers were solicited through an e-mail from the faculty advisor. Respondents were evenly distributed among the four years of residency. A PGY-4 resident developed a PS survey administered at discharge, consisting of six questions on patients' perceptions of care provided by their doctors. PP compiled and prioritized a list of PICS topics and developed them into workshops on roles and responsibilities, mutual respect for team members, communicating with patients and families, ethnic and cultural competency, social media and consultations, dealing with difficult people, multi-tasking, leadership, the resident as teacher, breaking bad news, and the art of consultation. Through the workshops, residents have been able to teach and learn PICS. Through use of the PS survey, residents have been able to identify areas that they would like to improve on, and have used members of the committee as liaisons to communicate this with faculty.

32 **Teaching Clinical Reasoning in Emergency Medicine: A Curriculum for Third and Fourth Year Students**

Todd Guth¹, Dave Matero¹, Tien Vu², Jacqueline Ward-Gaines¹, Jacqueline Ward-Gaines¹, Jason Hoppe¹, Jeff Druck¹

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Background: Clinical reasoning is a set of problem-solving skills used by all physicians to generate a meaningful differential diagnosis, to work through these diagnostic possibilities through additional testing, and to create an appropriate treatment strategy for patients.

Problem Identification and Needs Assessment: Clinical reasoning is frequently not taught in a formal fashion in medical training. Historically, junior physicians learned how to "think like a doctor" by observing and modeling the behaviors of a senior expert physician in action at the bedside. As patient safety and quality improvement command attention, the importance of avoiding costly, prevalent diagnostic errors can be seen. More explicit educational experiences focusing on clinical reasoning should be pursued.

Goals and Objectives: The goal of this curriculum is for learners to recognize the importance of clinical reasoning in emergency medicine and make use of fundamental skills in clinical reasoning during their clerkships. The objectives for the learners are 1) to describe the dual-process theory that captures contemporary clinical reasoning, 2) to demonstrate "worst-first" prioritization of a differential diagnosis using an analytical approach to clinical reasoning, and 3) to analyze exemplary and problematic clinical cases that highlight important aspects of clinical reasoning.

Educational Strategies: A combination of lecture and clinical case example introduce the concept of clinical reasoning to students. Direct observation sessions, "thinking out loud" exercises, and SNAPPS focused oral presentations provide bedside activities for supervisor modeling of clinical reasoning and learner assessments. Clinical reasoning case conferences allow learners and supervisors to discuss analytical and intuitive examples that demonstrate importance concepts in clinical reasoning, such as illness scripts, cognitive bias, and the "worst first" specific differential diagnosis.

33 **SLICE: Simulation to Limit the Incidence of Cognitive Errors**

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Cognitive biases represent a significant source of medical error. Cognitive forcing strategies that compel providers to avoid such biases may reduce errors of medical decision making. Our objective was to develop a cognitive forcing strategy for medical students that reduces cognitive errors during the evaluation of emergency department patients. Third and fourth year medical students rotating through a 4-week emergency medicine (EM) elective were taught the mnemonic "CPR", to represent three common cognitive errors: C - "Consider all diagnoses" (availability error), P - "Prove the diagnosis" (anchoring error), R - "Review all the data" (premature closure error). Students were taught the concepts of each cognitive error and the mnemonic through a brief didactic session prior to simulated patient encounters. Students were encouraged to utilize "CPR" by prompting them during an initial case and were observed without prompting for subsequent encounters. A qualitative assessment was made upon conclusion of the case to determine the degree to which "CPR" was utilized and its effect on reducing cognitive errors.

Students successfully demonstrated a clear understanding of each cognitive error and the mnemonic. Repetition and prompting improved their skill at integrating the cognitive forcing strategy during subsequent unprompted encounters. "CPR" is a promising cognitive forcing strategy that can be readily learned by medical students via simulation to minimize errors in medical decision making.

34 The Ultrasound Podcast

Michael P. Mallin¹, Matthew Dawson²

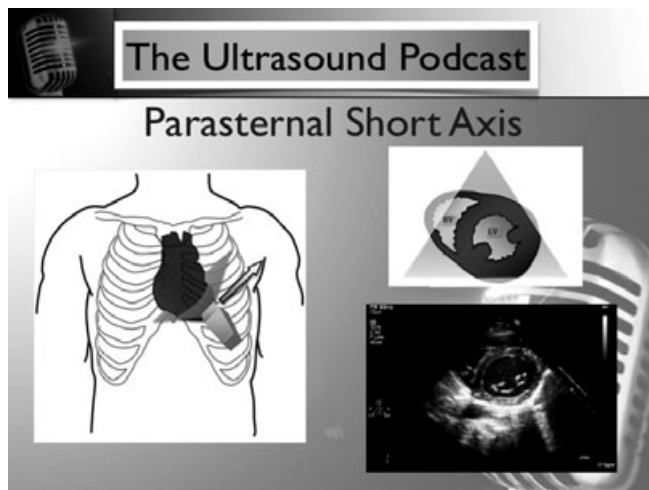
¹University of Utah, Salt Lake City, UT; ²University of Kentucky, Lexington, KY

The Ultrasound Podcast is a free video podcast which was created due to the lack of ultrasound related video podcasts available and a relative need for multimedia education within the niche of emergency ultrasound.

Podcasts, such as EMRAP, EMCRIIT, and ERCAST have emerged as a new exciting form of education in the realm of emergency medicine. These audio podcasts deal with a wide range of educational topics but rarely use video. The Ultrasound Podcast is all video due to the visually intensive nature of ultrasound.

To date, The Ultrasound Podcast has released 20 video podcasts ranging from 1 minute to 45 minutes in length. They have had >25,000 downloads and been rated five stars in iTunes on 13/13 reviews with comments such as: "Very entertaining and informative podcast, keep up the good work" and "Great Job, better than an US course." Another e-mail received said: "Wow, thanks so much, really, really helpful, you may have saved lives down this side of the world (Singapore) by updating your podcasts."

One ultrasound director stated, "Very educational, I am working in the emergency department and I am totally glued to my computer monitor watching your fabulous podcast. Thanks for the podcast and keep up the great work that you are doing." Rob Ormen, the producer of ERCAST, had the following to say: "Just watched your 3 casts. Off the hook! Abso-



lutely fantastic." The goal of the Ultrasound Podcast is to advance ultrasound education everywhere. We currently have downloads from >20 different countries and it is being actively translated into Italian by an EP blogger.

Multimedia, portable education has become a very important part of medical education. Its ease of distribution and short succinct topics make it ideal for the busy learner, much of whose life is spent in a car. As academic physicians charged with educating students, residents, and peers, we seek to use technological advancements to meet the changing needs of our learners. The Ultrasound Podcast is our attempt at this.

35 Emergency Department Ultrasound Simulator

Paul Kulyk, Paul A. Olszynski

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The emergency department ultrasound simulator (**edus²**TM) is a portable bedside ultrasound device that





allows for the seamless integration of emergency department ultrasound (EDUS) into high-fidelity simulation scenarios (HFS). Competence in bedside ultrasound requires three components: awareness of indications, mastery of image generation, and sound image interpretation. These components are commonly gained through course attendance and reading, scanning of predominantly healthy volunteers, and video review, respectively. The application of indications and interpretation of positive and negative findings in the setting of a critically ill patient is much less common. Trainees using the **edus²** have the opportunity to learn the indications of bedside ultrasound while learning proper image generation technique and image interpretation all within the context of critical care HFS scenarios.

The **edus²** plays predetermined video clips of areas of interest through the coupling of those videos to specific radio frequency identification devices (RFIDs) placed under the skin of an existing HFS mannequin. A USB-based RFID scanner is hidden inside a hollowed low frequency ultrasound probe. Passing the probe over a hidden RFID initiates video clips on the **edus²** specific to the anatomic area on the HFS mannequin (with either positive or negative findings). Multiple RFIDs can be placed during any given scenario including thoracic, cardiac, abdominal, and pelvic. To our knowledge, this

is the first such EDUS simulator that allows for actual use of a simulated ultrasound probe on any available manufactured HFS mannequin resulting in seamless incorporation of EDUS into all HFS scenarios.

36 1-Minute Ultrasound iPhone App

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Medicine is hard to forget when it's learned when it matters. That is partly why it takes place best at the bedside. There's nothing like the crashing patient right in front of you to solidify neural pathways with a little adrenaline. The American College of Emergency Physicians (ACEP) Model of the Clinical Practice of Emergency Medicine defines emergency ultrasound (EUS) as "A skill integral to the practice of Emergency Medicine". However, many emergency physicians still aren't proficient in this skill. Most emergency physicians have had some sort of ultrasound course or training, but many fewer have actually had bedside teaching and practiced enough to develop the skill. This is simply due to the fact that there aren't enough ultrasound-trained physicians to spread out between every emergency department (ED) in the U.S. and provide that bedside teaching.



Therefore, we have developed “1-Minute Ultrasound”. This is an app that can be opened up at the bedside on your smartphone or tablet and demonstrates how to perform EUS scans in less than 1 minute. There are full lectures included as well, but the point is to be able to quickly get a refresher and then perform on your own. If a picture is worth a thousand words, then each 1-minute video is worth thousands of words as we have multiple congruent videos playing on the screen of hand placement, normal images, pathology, and a bird’s eye view of the scan. Each video is occurring in real time, so that the physician can see how the image changes with hand movements. This spatial orientation is lost in hardcopy books. Of course, this is not a substitute or as good as actually scanning with someone, but we hope it provides just enough support and a tipping point to give emergency medicine (EM) physicians the confidence to perform the scans. It is also a great complement to bedside training as the trainer can quickly show the trainee how the scan is done prior to walking in the room. This practice combined with more formal education will hopefully bridge the gap to proficiency for physicians in practice who may need a little extra support to gain these new skills.

37 Opath: A Web Based Image Archival System and Feedback Loop. The Newest Innovation in Ultrasound Education at Robert Wood Johnson University Hospital
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The ACGME mandates procedural competency for all emergency medicine (EM) residents in emergency ultrasound as it is considered a “skill integral to the practice of Emergency Medicine” as defined by

the 2007 Model of Clinical Practice of Emergency Medicine. Although the use of ultrasound is widespread in both community and academic settings, there is no universally accepted way to archive images and conduct ongoing quality assurance and feedback. As a result, learners of ultrasound often are not given feedback in a timely or effective manner impeding the learning process. At Robert Wood Johnson University Hospital, we have implemented a web-based image archival system, Qpath. This system has dramatically improved our ultrasound education and quality assurance process by creating a workflow loop that ensures timely review of every resident scan. This enhances the resident learning experience by having remote and reviewable clip-by-clip feedback as needed on each scan.

- System highlights:**
1. Automatically wirelessly send images and clips from the bedside to a server located within the hospital.
 2. Fill out worksheets on ultrasound machine directly at patient bedside or view images on any internet-connected computer in order to fill out worksheet.
 3. Submit worksheet with embedded images for QA with an automated e-mail alert to our ultrasound director.
 4. PDF file with comments and tips alongside each of our individual images and clips e-mailed back to resident after review by ultrasound director viewable on a smart phone.
 5. Review, archive, and export scans for future reference or for presentations with patient identifiers removed.

With this new innovation, every scan a resident or student performs becomes a learning experience without the need for a more experienced physician to guide them through the scan. This innovation will expedite ultrasound training in our residency program and ensure that all of residents who train at Robert Wood Johnson University Hospital will leave as experts in ultrasound.

Ultrasound Education Feed Back Loop at UMDNJ-Robert Wood Johnson

