

Master of Education for Health Care Professionals

Student Final Projects

Expert Modeling to Improve Acquisition of Behavioral and Technical Skills in Resuscitation Training

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Abstract: *Background:* Birth asphyxia accounts for approximately 20% of the five million neonatal deaths that occur globally each year. For this reason, the Neonatal Resuscitation Program (NRP) was developed in 1987 to increase success in neonatal resuscitation during the first few critical minutes after birth. Despite the positive impact on neonatal outcome, many of the skills acquired in the traditional NRP training (lecture-based) do not translate well to actual delivery room practice. Video analyses of delivery room resuscitations and root cause analyses of term infant death and disability have identified a lack of expertise in requisite technical, behavioral and cognitive skills contributing to poor outcome. Where traditional NRP training involves a multiple choice examination with passive learning activities, experiential learning theory supports the use of more immersive, realistic learning opportunities to better address the needs of NRP providers. Simulation-based training in this pretext has been shown to be effective in technical behavioral and cognitive skills acquisition and translation. The Neonatal Resuscitation Program has embraced these findings; all NRP training will be simulation-based by 2011. Improving this critical education will involve more than simulating a few resuscitations though; the ideal training paradigm will decrease the amount of real-life experience required to become an expert. Exploring expertise may allow refinement of our educational strategies in resuscitation training. In simulation-based training, learners learn from mistakes (learner modeling) during the facilitated debriefing, which promotes reflection-on-action. While reflection-on-action can change future performance, learning to reflect-in-action may be of equal importance. Reflection-in-action separates the novice from the expert, allows the participant to respond to cues in the environment and make critical decisions based on those cues. Demonstrating expertise involves modeling the expert's technical and behavioral skills and revealing the internal conversation and critical thinking as the expert responds in the moment to these dynamic cues. When skills such as these are modeled, learners selectively take in information about performing; from these observations a mental image is created that provides a standard of reference for future performance. T

Objective: To assess the impact of expert modeling on the acquisition and performance the requisite of technical and behavioral skills in neonatal resuscitation training.

Methods: A video was created using a Delphi process to demonstrate expert technical skills, behaviors, and thought processes during newborn resuscitation. A convenience sample of 31 subjects was enrolled; all participants had completed a simulation-based NRP course prior to the study. Baseline demographics, NRP cognitive test scores, and a subjective measure of confidence were collected. Subjects were randomized by a table of random numbers. The experimental group reviewed the expert model video while the control group practiced megacodes with facilitated debriefing. All participants then individually underwent a videotaped megacode in the simulator. The videos were scored by blinded reviewers to assess technical and behavioral skills. Mean scores were calculated and compared for each group using a two tailed t-test.

Results: There was no significant difference between the groups in age, gender, simulation experience, NRP experience, cognitive knowledge, or confidence. The experimental group scored significantly higher in technical skills than the control group ($p < 0.001$). The experimental group

scored significantly higher in behavioral skills than the control group ($p < 0.001$). The Cronbach's alpha was 0.97 and the inter-rater reliability was 0.8 for the behavioral assessment..

Conclusion: The addition of expert modeling to simulation-based neonatal resuscitation training improves acquisition of behavioral and technical skills.

Continuing Medical Education in Pediatrics: Motivation, Attitudes, and Learning Strategies

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Abstract: not available

Development and Testing of a CD-ROM Program for Improving Adolescent Knowledge of Inflammatory Bowel Disease

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Abstract: *Objective:* To design a theory-based educational program for adolescents with IBD using an interactive multimedia CD-ROM and to test its effectiveness in improving baseline knowledge in IBD.

Methods: IRB approval and informed consent/assent was obtained. A pilot study and assessment of baseline IBD knowledge was performed on target learners (adolescents 13-17 years) using the Crohn's and Colitis Knowledge Score (CCKNOW). Maximum score on the CCKNOW is 30. Curriculum-based instruction was designed using educational theory and principles. Concepts in IBD were taught via an interactive multimedia CD-ROM. Summative evaluation of the CD was done by measuring gain in IBD knowledge.

Results: Adolescents found the CD to be informative, appealing, and easy to use. The mean score of the adolescents on the CCKNOW was 11 (SD 4.1, range 1, 19), compared to 15 for parents (4.4, range 6, 26). After an average of 30 minutes using the CD-ROM, adolescent subjects increased their post-test score to a mean of 19.85, a gain of 7.65 points over baseline (95% CI 5.2-10.1, $p < 0.0001$). Knowledge of medications, disease complications and gastrointestinal structure and function was gained.

Conclusions: A rigorously developed interactive educational tool is now available for instructing adolescent patients about their IBD. This educational program will enable the patient to become more involved in disease management and will be an excellent contribution to efforts to increase medication adherence and health-related quality of life in adolescents with IBD.

The Use of Leadership Training for Pediatric Fellows to Improve Code Team Performance

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Abstract: The resuscitation of a child in extremis or cardiac arrest requires the coordinated effort of an effective code team. The team leader orchestrates this team. His or her performance and style can have deleterious effects on the team's performance. Despite this pivotal role, code team leaders often do not receive additional training in how to be an effective leader. The purpose of this study was to determine if specific leadership behaviors could be taught to the code team leaders and improve the code team's performance as measured by team member perceptions and adherence to established guidelines. An educational intervention using simulation was designed using literature from current

team training in medicine and other fields. To determine if there was a noticeable effect on team leader behavior and code team performance in situ, mock codes were conducted using actual code teams. These mock codes were reviewed for team leader behaviors in the areas of communication, monitoring, and feedback, as well as adherence to established guidelines. Finally, all team members completed a survey at the end of the study to assess perceptions of the team leader and the team's performance. Team leaders adopted specific communication, monitoring and feedback behaviors following the educational intervention that were noticed by team members. However, there was no improvement in the team's performance as related to adherence to established guidelines or in the team member's perceptions of the performance. In conclusion, educational interventions designed at improving team leader behavior's can work; however, it is not enough to improve team adherence to established guidelines.

Multisource Feedback to Pediatric Residents: The Efficacy of an ACGME Competency-Based Assessment Tool

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Abstract: *Objective:* To determine whether augmenting standard feedback on resident performance with a multi-source feedback intervention improved pediatric resident communication skills and professionalism.

Design: Randomized controlled trial.

Setting: Children's Hospital Medical Center, Cincinnati, Ohio, from June 2004 to June 2005.

Participants: Thirty-six first-year pediatric residents.

Interventions: Residents assigned to multi-source feedback (n=18) completed a self-assessment, received a feedback report regarding baseline parent and nurse evaluations, and participated in a tailored coaching session in addition to receiving standard feedback. Residents in the control group (n=18) received standard feedback only. The control group and their residency directors were blinded to parent and nurse evaluations until the end of the study.

Main Outcome Measures: Ratings of specific communication skills and professionalism behaviors by parents and nurses of pediatric patients. Both groups were evaluated at baseline and five months later. Scores were calculated on each item as percentage in the highest response category.

Results: Both groups had comparable baseline characteristics and ratings. Parent ratings increased for both groups. While ratings increased more for the multi-source feedback group, differences between groups were not statistically significant. In contrast, nurse ratings increased for the multi-source feedback group and decreased for the control group. The differences in change between groups was statistically significant for communicating effectively with patient and family (35%, 95% confidence intervals 11 to 58), timeliness of completing tasks (30%, 7.9 to 53), and demonstrating responsibility and accountability (26%, 2.9 to 49).

Conclusions: A multi-source feedback intervention positively impacted communication skills and professional behavior amount pediatric residents.

An Educational Intervention to Teach Families How to Use a Patient/Family Care Notebook

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Abstract: Because children with special health care needs (CSHCN) require the use of more services and are treated by more physicians, therapists, and other service providers than children generally, their families need to have a means to organize the medical records and reports they receive when their child is evaluated by these specialists. They need a means to communicate and partner with their child's service providers to help improve the care their child receives. Families of CSHCN who receive care at Cincinnati Children's Hospital Medical Center do not all have access to a health care notebook to use to keep track of important paperwork and record pertinent information, improve coordination of care, and improve communication and interactions with their child's service providers.

The purpose of this pilot project is to develop an educational intervention that can be provided to families of CSHCN who receive care at Cincinnati Children's Hospital Medical Center which will enable them to use the Patient/Family Care Notebook more effectively as a tool to improve the health care of their child with special health care needs. This pilot study was conducted to evaluate the Patient/Family Care Notebook and the educational intervention to teach families about the use of this notebook to obtain input from user families to strengthen and improve both the notebook and the intervention in order to prepare for the larger study that will be implemented beginning June 2008.

Members of the Cerebral Palsy Clinic, the Spina Bifida Clinic, and the Transition Clinic and the Parent Coordinator of the Division of Developmental and Behavioral Pediatrics developed a prototype notebook, entitled the Patient/Family Care Notebook, for families who have CSHCN. After completing the notebook, the team recognized the need to train parents to use the Patient/Family Care Notebook effectively and designed an educational class/intervention to enable families to network with one other and support each other while simultaneously giving them an opportunity to begin the notebook. It was determined that before the larger study was

On March 17, 2008 fourteen families who have children with Spina Bifida ages newborn to five years of age attended a two hour educational intervention to learn how to use the Patient/Family Care Notebook. At the conclusion of the intervention, families completed an evaluation of the class itself that consisted of 12 open-ended, yes/no questions as well an evaluation of the notebook itself that consisted to 10 open-ended, yes/no questions.

The families who attended the pilot educational intervention session commented that the notebook was "excellent," "very good," and "great." They reported that the notebook was "very comprehensive," organized in a usable manner, "flexible" and easy to adapt in order to meet the personal needs of their child and family. They reported the notebook will be most helpful to "keep track of medical records," and "write down questions and concerns." Families suggested that the notebook contain additional blank tabs, additional "log" forms, and be available in a PDF format so that additional copies could be obtained.

The families who attended the educational intervention session reported that the class was long enough to review the contents of the notebook. The participants reported that clear instructions were provided during the class. There was not enough time at the educational intervention session to enable families to actually assemble the notebook. Six of the families reported they preferred to put together the notebook at home and did not believe there needed to be additional sessions to enable families to assemble the notebook. The other six families reported the need for additional sessions to assemble the notebook.

The results of this pilot study were used to finalize the design of the larger study of the Patient/Family Care Notebook. A twelve-month study will be implemented beginning June 2008 in order to evaluate the educational sessions and the Patient/Family Care Notebook with 100 families

whose children receive care in the divisions of Developmental and Behavioral Pediatrics and Physical Medicine and Rehabilitation.

The Theory of Reasoned Action to Predict Preschool Vision Testing Behaviors in Primary Care Setting

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Abstract: not available

Emergency Medicine Mock Oral Board Examination Simulation: Is Peer-Reviewed Simulation More Effective than Individual Simulation?

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Abstract: *Background:* While emergency medical education continues for an entire career, passing the oral board certification marks a transition point from being a resident to being an attending physician. There is limited evidence in the literature to guide emergency medicine training programs in the most effective and efficient way to train residents to pass the American Board of Emergency Medicine oral board examination. Most examinees find the content of the exam straightforward, but often struggle with the unfamiliar role-playing environment of the examination.

Aims: The purpose of this study is to compare two methods for oral board exam preparation, and to determine which method is more efficient educationally and which method simulates the actual exam with greater fidelity.

Methods: The Cleveland MetroHealth / Cleveland Clinic / Case Western Reserve University residency in emergency medicine has historically performed oral board case simulations confidentially in one-on-one resident and faculty sessions. A new preparation method introduced at our institution involves a resident performing a sample oral board case with a faculty member in front of a peer audience of residents and faculty members. Twelve PGY-3 emergency medicine residents were surveyed regarding their opinions of each type of oral board preparation methods, and the results were compared using a paired samples t-test.

Results: The residents found the peer-reviewed oral board simulations a more efficient use of their educational time compared to one-on-one simulations ($p=0.02$). The residents found the cases presented in front of the peer audience more realistic ($p=0.02$). The residents found the cases presented in front of the peer audience more helpful as a learning tool ($p=0.02$). Overall, the residents also rated the peer-reviewed mock oral board cases higher as part of the educational curriculum ($p=0.01$). The residents found no significant difference in anxiety levels between performing oral board cases in front of an audience of their peers versus performing cases one-on-one privately with a faculty member.

Conclusions: Performing peer-reviewed oral board case simulations is an efficient and realistic way for resident physicians to prepare for oral board examinations. Residents do not find a peer-audience more stressful or more anxiety provoking than practicing oral board cases privately.

The Reliability and Validity of the Keirsey Temperament Sorter Among Physician Leaders

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Abstract: Little research exists on the psychometric properties of the Keirsey Temperament Sorter (KTS). This study examined the reliability and validity of the KTS among 70 physicians leaders. Respondents completed two administrations of the KTS 1-4 months apart and an MBTI and professional survey. The reliability (temporal stability) of the KTS was adequate for the E/I and T/F scales, but inadequate for the S/N and J/P scales. The concurrent validity (between KTS and MBTI) also reflected these results, implying that the validity may be adequate but limited by reliability. This study lacked the sample size to judge construct validity and selected subgroups. Until proven to possess adequate psychometric properties, the KTS should not be used as an educational metric.

Effects of Simulation Training on Pediatrician Knowledge and Self-Efficacy in Airway Management

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Abstract: The purpose of this project was to develop a simulation-based workshop on the initial management of potentially difficult airways in pediatrics and to determine whether workshop participants improved their knowledge and self-efficacy in managing pediatric respiratory emergencies. A 90-minute workshop was developed for the Celebration in Pediatric Pulmonary Conference in March 2007. The educational intervention included a brief didactic review, a skills station, and two simulations of respiratory emergencies with debriefing and feedback about performance. Forty-eight pediatric providers, mostly experienced pediatric pulmonologists, participated in three separate sessions. A one-group pretest-posttest design was integrated into the flow of the workshop to assess knowledge and self-efficacy. Knowledge gains were noted in the technical aspects related to airway management but not in the ability to predict a difficult airway, although significant threats to validity undermine these results. There was a significant increase in mean self-efficacy scores in performing the skills related to initial airway management as well as the management of specific respiratory emergencies. Participants' workshop evaluation reflected their satisfaction with the session format. Directions for future research include determining what factors predict higher levels of self-efficacy and how self-efficacy relates to the performance of airway skills during resuscitations.

Measuring Knowledge and Attitudes about Asthma in Pediatric Nurses in an Inpatient Setting

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Children's Hospital and Health Center

Abstract: *Objective:* This study was performed to demonstrate the effectiveness of an educational intervention on knowledge and attitudes about pediatric asthma in bedside nurses in a community hospital.

Study Design: Registered nurses working in pediatrics were given an asthma knowledge examination before and after an educational intervention was administered. After the post-test, a survey was administered to determine changes in attitude and confidence about asthma diagnosis, therapy, and patient teaching.

Results: Statistical analysis of the results showed a significant difference in asthma knowledge scores based on the educational intervention and a significant difference in self-reported attitudes and confidence regarding asthma diagnosis, therapy and the communication of asthma knowledge to affected patients and families.

Conclusions: This study showed a significant increase in asthma knowledge and significant improvement in attitudes and self-confidence about asthma care and asthma education in pediatric bedside nurses in a community hospital setting. Educational programs for pediatric asthma inpatients and their families should be preceded by formal asthma education for the nurses involved in the teaching. This allows them to improve their own knowledge, skills, attitudes and confidence regarding asthma pathophysiology, and therapy, and to improve their ability to communicate with and teach patients and families about asthma

The Ophthalmic Clinical Evaluation Exercise: Interrater Reliability Determination

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Abstract: Purpose: New concise tools must be developed to reliably and validly assess the core residency competencies identified by the Accreditation Council for Graduate Medical Education. The Ophthalmic Clinical Evaluation Exercise (OCEX) is a tool designed to assess the ophthalmology resident's competence in patient care. The OCEX has been shown to be a valid assessment tool. This study will determine if the OCEX has interrater reliability.

Participants: Ninety-four academic ophthalmology faculty.

Methods: Participants reviewed a video-CD of the same resident-new patient encounter while completing an OCEX. A scoring rubric was provided.

Results: The Cronbach alpha statistic was 0.74 when analyzing only the 74 OCEXs that were 100% completed and 0.81 when analyzing all 94 OCEXs using imputed means. Of the 33 individual OCEX items, 31 (95%) had at least 85% of the ratings occur in two consecutive rating categories.

Conclusions: The OCEX has interrater reliability. It has been shown to meet the ACGME criteria for an acceptable assessment tool.

Can an Educational Video Improve Parental Understanding of Physician Trainee Roles in the Pediatric Emergency Department?

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Abstract: not available

Resident Selection: Is Moral Reasoning Related to Clinical Performance?

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Abstract: Purpose: Residency programs select applicants for residency training on the basis of traditional criteria that have not been shown to be related to subsequent clinical performance during residency, including medical school grades and United States Medical Licensing Examination (USMLE) scores. Clinical performance during residency is assessed in the six domains of competence defined by the Accreditation Council on Graduate Medical Education (ACGME) —

Medical Knowledge, Patient Care, Professionalism, Interpersonal and Communication Skills, Systems Based Practice, and Practice-Based Learning and Improvement. The aspects of clinical performance that are most difficult to predict from traditional selection criteria include the so-called non-cognitive characteristics of interpersonal skills, integrity, and professionalism, all of which are deemed by faculty across many specialties to be among the most important features of successful performance as a physician. The assessment of moral reasoning, using the Defining Issues Test (DIT), has been proposed as a means to identify those individuals who may demonstrate these highly valued characteristics during residency training.

Method: We studied the relationships among overall application score (a score combining several traditional selection criteria), clinical performance evaluations during training, and scores on the Defining Issues Test as an assessment of moral reasoning. The study group was 59 pediatric residents in training during the 2008-2009 academic year at the Children's Hospital of Pittsburgh.

Results: We found no significant differences across years of training in mean USMLE Step 1, Step 2, or overall application scores. Faculty rated third-year residents more highly than first- and second-year residents in all domains of clinical performance, including Patient Care and Practice-Based Learning and Improvement ($p < 0.001$), Medical Knowledge ($p = 0.013$), Professionalism ($p = 0.011$), Communication ($p = 0.022$), and Systems Based Practice ($p = 0.022$). Mean DIT scores were in the range typically seen in post-graduates (41-50.5); there were no significant differences in mean DIT scores by year of training ($p = 0.114$).

Overall application scores were not related to clinical performance except for weak correlations between overall application score and the medical knowledge competency domain in all three classes of residents, as well as between USMLE Step 2 score and the medical knowledge domain among the first-year residents. No associations existed between moral reasoning as measured by the DIT and clinical performance evaluations in any competency domain.

Conclusions: In this small sample of residents from a single institution, the results support our first hypothesis and prior research suggesting that traditional resident selection criteria are not related to subsequent faculty evaluations of resident clinical performance during training. Our second hypothesis, that the maturity of moral reasoning as measured by the DIT is related to resident clinical performance, was not supported by the data, which showed no significant relationships between the DIT score and faculty evaluations of clinical performance in any competency domain. The community of medical educators needs to examine other ways to assess characteristics of medical students that predict excellent clinical performance during residency and beyond.

Retention of Surgical Knot-Tying Skills for Second-Year Medical Students: Performance and Timed Assessments of Skill Levels Over Time

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Abstract: The purpose of the study was to look at the retention of surgical knot-tying skill performance assessment and time-on-task outcomes over time (in weeks). Forty-five second year medical student participants volunteered and represented 29% of the Class of 2007. The skill of the surgeon's knot and square (reef) knot was learned and practiced in a one hour session. Each participant was required to complete one sequence of knots prior to baseline assessment. For baseline and retesting, each participant completed 3 attempts to tie the sequence and each attempt was timed. An average performance assessment and time-on-task was recorded. No practice was allowed between baselines and retesting. The retesting assessment occurred at 3, 5, 7, or 10 weeks. Performance assessment scores declined significantly ($p < .05$) over the 10 week interval and

the time-on-task increased significantly ($p < .05$) when no practice occurred. Since the last significant drop in skill performance assessment occurred by the 7th week, a refresher session for surgical knot-tying training should occur at that time, or the skills of surgical knot-tying should not be offered until the clerkship when practice would be integral part of clerkship participation.

Effect of the ACGME work-hour restrictions on surgical residents, faculty and patients: a systematic review

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Abstract: *Background:* In July 2003, the Accreditation Council of Graduate Medical Education (ACGME) developed guidelines for residents' work hours for all training programs, and this has resulted in significant restrictions in work hours in residency training programs. Educators in surgical training programs are concerned that this reduction in work hours will adversely affect surgical residents' education, especially their operative experience.

Purpose: To evaluate the impact of the ACGME reduction in work-hours on the education and training of surgical residents.

Data sources: We searched the English and French literature for articles studying the impact of work hours restrictions on surgical residents' well-being, education, and patient care and on faculty educators. We used the following databases from 2000-2008: Medline, Embase, Cochrane Central Register of Controlled Trials and ERIC.

Study selection: We retrieved 1048 articles, and included every paper which examined the effects of work-hour limits on surgical training. We excluded opinion papers and editorials. Surgical specialties were defined as any specialty with operative experience, e.g. general surgery, cardiothoracic surgery, neurosurgery, otorhinolaryngology, orthopedics, ophthalmology, and obstetrics and gynecology.

Data extraction: All papers underwent data extraction and assessment of quality by 2 independent reviewers. Disagreements were resolved by consensus.

Data synthesis: Fifty-nine studies were included. Positive and negative outcomes on 1) residents' education, 2) resident lifestyle, 3) patient care, and 4) surgical faculty were compiled. Overall the effects were positive in the first three categories, but negative on surgical faculty. The papers with the highest quality scores had 39 positive themes and 13 negative themes. Resident education in particular was not negatively affected by the work hour limitations, particularly the operating exposure: 13 papers reported positive or neutral effect on number of operating room cases, and only two papers reporting a negative effect.

Conclusions: This is the largest and most current review of the literature addressing the effect of the ACGME work hour limitations on surgical training. These limitations had a positive effect on residents and patients, but a negative effect on faculty. Most importantly, surgical residents' operating room experience was not adversely affected.

Assessing Clinical Competency of Residents in Reproductive Health Interviewing

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Abstract: not available

Learning About Learning: Can Instruction of Expert Clinician's Reasoning Techniques Change Resident Physicians' Attitudes Toward Inpatient Rounds?

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Abstract: The differences in the cognitive approach taken by the novice and expert clinician have been studied in depth. It has been determined that there is in fact a fundamental difference between how the physicians representing these disparate mastery levels make a diagnosis. The novice throws a wide net and is not able to analyze data based on its relevance to the chief complaint. The expert uses his/her substantive library of "illness scripts" or experiences of pattern recognition to formulate a differential immediately upon hearing the chief complaint. The "illness script", in this context, represents the knowledge the clinician has from caring for a particular patient who has that disease or diagnosis. The expert clinician has accumulated this rich library of illness scripts by exposure to many patients. In the academic setting, one of the fertile places for this to occur is during in-patient rounds.

It is not clear whether instructing the novice on the expert's process can help the novice develop more expertise with his/her diagnostic skills, or affect his/her attitudes about learning more illness scripts. In order to test whether understanding the process of expert diagnosis can affect attitudes, we undertook the following study: half (n=23) of an incoming intern class (n=46) in a large pediatric training program was randomized to receive instruction in expert clinician diagnostic techniques, and how inpatient rounds are the ideal setting in which they could most efficiently acquire more illness scripts. The entire class (controls n=23) was surveyed about their attitudes toward inpatient rounds and learning before the intervention, and then again at 6 and 12 months after the intervention. A total of 85% of the participants surveys (59/69) and 86% of the control surveys (60/69) were completed.

The results indicated that the intervention group had lower expectations for learning than the control group at baseline. The trend for those expectations fell less than the control group over the 12 month period of observation, but did not meet a level of significance. The intervention group was more likely to mention learning in the open text questions as the most important goal of inpatient rounds than the control. Some causes for lower expectations were noted from the survey answers. These were primarily: 1) Attending physicians: the resident's expectations for learning rested with his/her attending's teaching behavior and was negatively affected when the attending did not perform adequately, 2) Process: the structure of rounds had the potential to limit medical knowledge acquisition by lack of time, focus on direct patient care issues rather than learning, too many patients to see, and the lack of an appropriate learning environment, and 3) Competing agendas: distractions of being paged away from rounds, busy entering orders or being separated from the team during walk rounds.

Development of Preliminary Quality Measures for Juvenile Rheumatoid or Juvenile Idiopathic Arthritis - A Project in Progress

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Abstract: Quality improvement is a mandate for all individuals and institutions in medicine. Pediatric rheumatology is charged with establishing quality measures for Juvenile Rheumatoid Arthritis (JRA) by the American College of Rheumatology and the American Board of Pediatrics. The latter organization will use these measures to register data for rheumatologists to conduct quality improvement projects in order to recertify in rheumatology. The Delphi method is a consensus building tool to establish a set of measures from a group of experts. A national quality measures workgroup housed in Cincinnati has developed an email Delphi survey in order to solicit consensus on quality measures from 60 pediatric rheumatologists, 4 advanced practice nurses, and 31 parents and patients with JRA. The Delphi has gone through one national survey and 7 modifications by the workgroup. The workgroup has reduced the suggested quality measures to items in 5 domains which coincide with the 6 aims of the Institute of Medicine. A broader plan for approval by the American Medical Association Quality Performance Consortium and National Quality Forum has been funded and will follow the Delphi and subsequent face-to-face Nominal Group Technique. Ultimately this will lead to a national collaborative for quality initiative throughout pediatric rheumatology to improve the outcomes of children with JRA.

Development and Implementation of a Patient Safety Curriculum in a Pediatric Emergency Department

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Abstract: The 1999 Institute of Medicine report, *To Err is Human*, identified the emergency department (ED) as the area of the hospital with the highest risk of adverse events. In one study of adult emergency medicine claims, teamwork failures accounted for almost half of the cases. The purpose of this project is to improve teamwork and communication skills among staff and physicians in a pediatric ED by having the ED teams learn and practice these skills with a pediatric patient simulator in a simulated ED. The overall goal of this project is to decrease and mitigate the effects of medical error in a pediatric emergency department through the implementation of a multidisciplinary, simulation-based safety curriculum that emphasizes team behaviors.

Simulation training has proven effective in improving communication and teamwork in other high risk industries such as aviation and nuclear energy. This paper describes the development and implementation of this pilot project and the subsequent formative evaluation of the curriculum. Specifically, a senior physician, a fellow, three nurses, one paramedic and one patient care assistant comprised the pilot multidisciplinary team. These individuals attended the one and a half day curriculum. Knowledge, attitudes and behavior were assessed prior to and immediately following the intervention. Immediate short term gains were measured in knowledge and some aspects of attitude. It was less clear that behaviors were immediately impacted, though qualitative evidence suggests that behavior were affected.

All care providers, including residents, in our pediatric ED will eventually participate in this intervention. This project is unique in its setting, a pediatric ED, and its inclusion of all care providers as well as residents in training. The specific aims of this proposal are: 1) To implement a multidisciplinary simulation-based safety curriculum that encompasses crew resource management, teamwork behaviors and critical communication skills, 2) To evaluate the effectiveness of the curriculum by assessing knowledge of an attitudes towards patient safety among caregivers prior to

and following the intervention, 3) To evaluate the effectiveness of this training by assessing teamwork behaviors in a simulated setting prior to and following the intervention, 4) To evaluate the transfer of the skills learned in a simulated setting to the ED environment by evaluation of teamwork skills in actual critical emergency department patients.

By improving teamwork and communication skills among caregivers, the care of critically ill and injured pediatric patients will be improved and safer.

Providing Uniform Instruction Using Web-Based, Asynchronous Technology in a Geographically Distributed Clinical Clerkship: Analysis of Student Participation and Satisfaction

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Abstract: As medical schools in the United States increase their class size, many are forced to extend their teaching affiliations outside of their immediate communities in order to provide adequate clinical experiences for their students. Geographic distribution threatens the ability to provide the uniform learning opportunities that students need and accrediting bodies require. The purpose of this work was to determine if the sophistication and availability of Internet technology may provide a solution for this challenge.

Sixty-three third-year medical students from the University of North Texas Health Science Center enrolled in an eight-week core clinical clerkship in surgery were required to take part in a Web-based, asynchronous interactive instructional module designed to provide opportunities for higher order thinking through analysis, synthesis and reflective learning. Quantitative and qualitative measures of participation were determined by interrogating the frequency of their interaction and the content of their online discussion. At the completion of the clerkship students completed an attitude survey of their experience to determine both positive and negative attributes of the Web-based learning module.

Students found little difficulty in navigating the Web-based module and were readily able to meet the requirements for completing weekly projects and participating in asynchronous, online discussions. The content of their discussion, as determined by message coding, identified the critical thinking needed to acquire abstract conceptualization of the problems presented. Students found the content of the module relevant to the clerkship and most valued the participation of an instructor/facilitator to provide feedback on their work. Although they prefer classroom-based instruction students indicated that the Web-based module provided an enhancement to their overall cognitive learning experience in the clerkship.

The application of Web-based technology appears to afford an acceptable teaching alternative when face-to-face instruction cannot be provided. Further study of the impact of instructional design on the quality of higher order thinking in this domain is needed as is an appreciation for the dynamics of group learning in a virtual environment.

Is Patient Feedback A Useful Adjunct to Medical Student Evaluation?

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Abstract: *Background:* Effective evaluation of medical students and their competencies has become more challenging as the definition of competency has been expanded to encompass more than medical expertise. New evaluation guidelines require assessment of communication skills,

professionalism, health advocacy, collaboration and the pursuit of scholarly endeavors. In addition to traditional written and oral examinations, novel techniques to evaluate these competencies need to be developed.

Purpose: The purpose of this project is to evaluate the feasibility and usefulness of utilizing patients in the evaluation of medical students' communication skills. The goal is to assess the reliability of the data collected and determine whether patients actually give a novel and added perspective that cannot be obtained from preceptors. Furthermore, the attitude of medical students toward this form of evaluation will be evaluated.

Methods: New clinic patients were recruited to complete a questionnaire evaluating the communication skills of clerkship students. At the end of the study, the students were given a summary of the patient feedback and completed their own questionnaire regarding their attitudes toward the experience.

Results: The patient mean scores did not differ significantly from the preceptor mean scores ($p=0.097$). Although the optimal statistical method could not be employed, minimal reliability of 0.70 was achieved in 80% of cases when more than 14 patients were recruited. Overall, the students rated their experience with the project as positive, and did not feel nervous or change their behavior knowing that they were being evaluated.

Conclusions: Based on the findings of this study, patient feedback can be a useful adjunct to student evaluation, but it can be cumbersome to collect, and may not provide any novel data.

The Need for and Development of an Effective Case-Based Multimedia CD for Pediatric Pulmonary Board Review: The PEDSEEK Program

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Abstract: Most pre-medical and medical specialties have programs that incorporate active learning strategies to facilitate preparation for "high-stakes" examinations, such as board exams. Although the exam content is outlined by the American Board of Pediatrics, other review tools are lacking in pediatric pulmonary medicine. This study hypothesizes that a case-based or question-based tool that employs multimedia would be educational for pediatric pulmonary board review. A needs assessment identified strategies and a CD called PEDSEEK was created. Post-tests demonstrated improved scores for material covered in this blinded, prospective, randomized, within-subjects study. Post-boards surveys in a representative population confirmed that PEDSEEK was a helpful, useful and educational tool for board review. The cases, questions, radiographs, internet links and feedback were favorably reviewed. Participants felt that its utility was not limited to board review but that PEDSEEK's educational strategies could be used for general education, continuing medical education (CME) and for board recertification. In summary, PEDSEEK is a case-based, question-based multimedia tool that is educational and useful for pediatric pulmonary board review.

Development of a Research Curriculum in Basic Science: A Pilot Study of a Formal Curriculum in Research Training

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Abstract: The purpose of this study is to develop and pilot a structured training program in bench research (educational intervention) for clinical fellows who are beginning a research project as part of their fellowship. The results of the pilot study will inform a larger study which will evaluate the

effectiveness and outcomes of the program. The primary research question for the larger study is: Will a structured course/curriculum in basic science research techniques enhance the research experience of clinic fellows?

Comparison of Video-enabled Versus Traditional Debriefing in Neonatal Resuscitation Simulation Training

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Abstract: *Background:* Simulation-based learning is a rapidly growing and effective mode of medical education. The facilitated debriefing session held after a simulation are considered by many to be the most important component of simulation training. Prior reports have shown conflicting results from the use of video playback as an aid to debriefing.

Aims: The purpose of this study was to compare the effects of traditional verbal debriefing to video-enhanced debriefing on resident performance in simulated neonatal resuscitation.

Methods: Thirty two residents, divided into 16 teams of two, completed three standardized simulation sessions over a seven month period. Seven teams received traditional verbal debriefing after each simulation session and nine teams received video-enhanced debriefing. Videos of all sessions were reviewed and scored by a blinded reviewer. Performance in neonatal resuscitation and crisis resource management (CRM) were then compared to determine if videoenhanced debriefing was more effective than traditional verbal debriefing.

Results: A total of 42 simulation sessions were scored. Only the video-enhanced debriefing group showed significant improvement in neonatal resuscitation performance from the first to the third simulation. No difference in neonatal resuscitation performance was noted between the two groups at the conclusion of the study. No improvement was seen in CRM skills in either group and there was no difference in CRM skills between the two groups.

Conclusions: Results of this study suggest that video-enhanced debriefing may be more effective than traditional verbal debriefing at improving performance in neonatal resuscitation. However, larger studies are required to determine if there are significant differences between video-enhanced and traditional verbal debriefing.

Use of In Situ Simulations to Identify Barriers to Patient Care for Ad Hoc Multicultural and Multidisciplinary Teams in Developing Countries: A Qualitative Study to Inform the Design of Educational Interventions in Under-Resourced Settings

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Purpose: By understanding the barriers that exist to efficient teamwork in resource-constrained settings in addition to the naturalistic decision-making processes of pediatric care providers in these settings, one can presumably design an educational intervention and cognitive aids that focus clinicians on those tasks or routes of decision-making that result in favorable outcomes for patient care and reduce barriers to care. The removal of barriers to teamwork and efficiency of decision-making processes becomes even more salient in resource-constrained settings within the developing world, where clinicians may often have to rely on intuition, empirical thought and macro-cognitive functioning rather than testing to assess, diagnose and treat pediatric patients. The proximal purpose of this study is to utilize in situ simulations of emergency situations in order to observe and attempt to

understand the barriers that exist to effective patient care, as well as the decision making processes of clinicians practicing in rural or remote areas in developing countries during the care of children in emergent situations. The ultimate purpose is for these observations to inform the design of a cognitive aid/ educational intervention to be utilized in this setting.

Readiness Assessment of Medical Residents for an Online Residents-as-Teachers Curriculum

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Abstract: *Background:* The University of Puerto Rico, School of Medicine (UPR SOM) needs to implement a comprehensive Residents-as-Teachers (RAT) curriculum to fulfill accreditation requirements. One of the options would be to implement an online RAT curriculum, though the literature has been controversial as to the readiness of residents to participate in such a curriculum.

Aims: The purpose of this study was to evaluate if the residents at the UPR SOM are ready to engage in an online RAT curriculum.

Methods: This was a descriptive, mixed method design study which used both qualitative and quantitative approaches through a combination of an online survey and a focus group interview.

Results: More than 80% of the residents that participated in the study had the technical knowledge and computer/internet accessibility to engage in an online curriculum; 90.5% thought an online RAT course is a good alternative to a traditional one; 87.5% would be willing to participate in an online curriculum and 68.6% residents preferred an online course to a traditional one. All of these results were supported by the qualitative data analysis results.

Conclusions: Most of the residents at the UPR SOM are ready to engage in an online Residents-as-Teachers Curriculum. Also it is recommended, prior to a wide-spread implementation, to conduct a pilot test of the curriculum to maximize success.

West African Immigrant Families in Cincinnati: A Cultural Primer on Children's Health

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Abstract: *Background:* Similar to many cities in the U.S., the Greater Cincinnati area has recently had an increase in immigrants from other countries. In particular, there is a small but growing population of West African immigrants especially from Senegal and Mauritania.

Aims: In order to better understand children's health of West African families in the Cincinnati area, in-depth, in-home narrative interviews were conducted with 10 West African immigrant parents from Senegal and Mauritania.

Results: Four salient themes about cultural information related to children's health were derived from the qualitative analysis: 1) health care practice and expectations including barriers; 2) cultural values and identity; 3) health beliefs and traditions/customs; and 4) quality of life.

Conclusions: It is essential that health care providers understand the nuances of working with West African immigrants including cultural differences, strengths, challenges and nuances in order to provide these individuals with the most effective healthcare services.

Assessing the Effectiveness of a Longitudinal, Clinically Integrated, Multi-method Curriculum in Evidence-based Medicine (EBM) Skills for Pediatric Residents

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Abstract: *Background:* Evidence-based medicine (EBM) skill development is a residency core competency. Many activities have been implemented to teach these skills but few have been evaluated for effectiveness.

Objectives: To evaluate the effect of year 1 of a 3-year EBM skills curriculum on intern acquisition of EBM skills and self-assessment of EBM attitudes, knowledge, self-efficacy and behaviors.

Design/Methods: A 3-year curriculum in EBM skills for pediatric residents was implemented in our residency in July 2007. In June 2008, using a static group comparison design, 2007 interns who were exposed to Year 1 of the curriculum and unexposed 2008 interns completed the adapted Fresno Test of EBM (aFTEBM), an EBM self-assessment survey and an inventory of prior EBM education. Mean Likert scale scores were calculated for the self-assessment domains and the aFTEBM was scored using the developer's rubric. Scores were compared using the Student's t-test.

Results: Seventeen (67%) 2007 interns and 21 (78%) 2008 interns completed both the aFTEBM and the self-assessment surveys. Pre-residency EBM educational experiences were no different between the groups. Exposed 2007 interns had significantly higher aFTEBM scores ($p < 0.01$), and mean knowledge self-assessment and negative attitude scores ($p < 0.01$). There were no differences in positive attitudes, self-efficacy or behavior scores.

Conclusions: Year 1 of this EBM curriculum is associated with increases in EBM knowledge and skills, self-perceived knowledge of EBM concepts and negative attitudes toward EBM practice. Further study will determine whether experiences that promote practice of EBM skills will be associated with increased skill use and positive attitudes.

High-fidelity Medical Simulation in the Difficult Environment of a Helicopter: Feasibility, Self-Efficacy and Cost

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Abstract: *Objectives:* This study assessed the feasibility, self-efficacy and cost of providing a high-fidelity medical simulation experience in the difficult environment of an air ambulance helicopter.

Methods: Seven of 12 EM residents in their first postgraduate year participated in an EMS flight simulation as the flight physician. The simulation used the Laerdal SimMan™ to present a cardiac and a trauma case in an EMS helicopter while running at flight idle. Before and after the simulation, subjects completed visual analog scales and a semi-structured interview to measure their self-efficacy, i.e. comfort with their ability to treat patients in the helicopter, and recognition of obstacles to care in the helicopter environment. After all 12 residents had completed their first non-simulated flight as the flight physician, they were surveyed about self-assessed comfort and perceived value of the simulation. Continuous data were compared between pre- and post-simulation using a paired samples t-test, and between residents participating in the simulation and those who did not using an independent samples t-test. Categorical data were compared using Fisher's Exact test. Cost data for the simulation experience were estimated by the investigators.

Results: The simulations functioned correctly 5 out of 7 times, suggesting some refinement is necessary. Cost data indicated a monetary cost of \$440 and a time cost of 22 hours of highly skilled instructor time. The simulation and non-simulation groups were similar in their demographics and pre-hospital experiences. The simulation did not improve residents' self-assessed comfort prior to

their first flight ($p>0.234$), but did improve understanding of the obstacles to patient care in the helicopter ($p=0.029$). Every resident undertaking the simulation agreed it was educational and it should be included in their training. Qualitative data suggested residents would benefit from high-fidelity simulation in other environments, including ground transport and for cardiac arrest responses within the hospital.

Conclusions: It is feasible to provide a high-fidelity medical simulation experience in the difficult environment of the air ambulance helicopter, although further experience is necessary to eliminate practical problems. Simulation improves recognition of the challenges present and provides an important opportunity for training in challenging environments. However, use of simulation technology is expensive both in terms of monetary outlay and personal involvement. The benefits of this technology must be weighted against the cost for each institution.

Comparison of Team Leader Training in the Neonatal Intensive Care Unit: A Randomized, Controlled Trial Involving Simulation-Based and Traditional Training Methodologies

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Abstract: *Background:* Simulation-based training has been identified as an effective methodology for industries with high risk for human life. Medicine has recently embraced its use for training healthcare teams to manage medical emergencies. What has yet to be determined is how to identify where it is the ideal methodology in medical curriculum.

Aims: The purpose of this study was to determine whether simulation-based training was superior over traditional preceptorship for nurses training to respond to neonatal emergencies in the delivery room.

Methods: Fourteen neonatal intensive care unit (NICU) nurses were randomized to either two days of traditional preceptorship or one day of preceptorship followed by one day of simulation-based training. Approximately one to three months after training was completed, subjects participated in two mock resuscitations. These resuscitations were videotaped and sent to blinded reviewers for scoring of behavioral skills. Subjects also completed surveys to rate the respective training programs' ability to prepare them for their new role and to report levels of self confidence in their ability to perform the steps of neonatal resuscitation.

Results: A statistically significant difference in behavioral skills between the groups was not detected. The surveys revealed simulation-based training was overwhelmingly preferred over the traditional training. In addition, subjects in the simulation group reported higher levels of self-confidence in their ability to care for newborns in a crisis.

Conclusion: Simulation-based training has the potential to eliminate education by random opportunity and results in increased confidence levels of nurses training for an advanced practice role. This program has the potential to serve as a template for training for advanced practice nursing roles at a local and national level.

Development of a Quality Improvement Knowledge Assessment Tool

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Abstract: The Accreditation Council of Graduate Medical Education now requires Internal Medicine residency programs to train and involve residents in quality improvement (QI). Residents at Lehigh Valley Health Network (LVHN) participate in QI projects, but a formal QI curriculum does not exist

and many residents do not identify current projects as QI. This study will present how to develop and implement a reliable assessment tool to measure residents' QI knowledge. The assessment tool was developed using improvement and lean concepts and QI scenarios. Faculty at LVHN who are educated and/or active in QI were involved in the development and scoring of this assessment tool to ensure the questions test essential QI knowledge. Even though it may be a hard assessment for residents at their current knowledge level, the assessment is a reliable measure for QI knowledge. The results of this assessment will be used to guide the development of the QI curriculum at LVHN. The assessment will also be used as a post-assessment at the completion of QI curriculum.

Assessing Self-Directed Learning Readiness in Family Medicine Resident Physicians

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Abstract: Self directed learning skills are essential in the professional lives of physicians in the United States today. There has been little assessment of readiness for self-directed learning in graduate medical education. This study measured readiness for self-directed learning of resident physicians in Family medicine using the Self-directed Learning Readiness Scale (SDLRS). A simple ex post facto study design on Family medicine resident physicians in two residency programs using this validated instrument showed that their readiness for self-directed learning was significantly higher than the average adult learner population. Investigation of two subgroups of these residents, United States medical school graduates versus international medical school graduates, showed that the readiness for self-directed learning did not differ significantly between the two groups. Potential underlying factors for these findings are explored. This study serves to raise awareness of learner readiness to engage in self-directed learning during graduate medical education.