

## Poster 1

### DOES A NEW NEONATAL NIGHT SHIFT TEAM INCREASE RESIDENT EXPOSURE TO NEONATAL RESUSCITATIONS?

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**Background:** ACGME duty hour changes will require that most pediatric residency programs change from traditional call systems to shift work. These changes may pose challenges in preserving high quality resident education and providing sufficient patient exposure for resident learning.

**Objectives:** To create a nighttime newborn resuscitation team and compare resident experience with resuscitations in the new and old systems.

**Methods:** We created a night shift system, "the newborn resuscitation team", comprised of one intern and one resident, who cover the neonatal intensive care unit (NICU-level 3) and newborn nursery (level 1-2) and perform all nighttime resuscitations. The traditional coverage consists of three residents, one covering the NICU and two covering the newborn nursery. On each post-call morning, house staff completed a survey delineating numbers of deliveries attended, separating term and pre-term births, and procedures, burden of patient care, hours of sleep, and autonomy. Using linear regression methods with log transformation and Wilcoxon rank sum test, we compared resident experiences on the resuscitation team with those of our traditional q4, 30 hour call system.

**Results:** During the study period, 19 nights were pilot resuscitation team nights and 30 were traditional call nights; 26 different residents worked the overnight shifts. During the pilot nights, NICU residents attended 3.1 fold more (95% C.I.: 2.0-4.6,  $p < .0001$ ) term newborn resuscitations than in the traditional call nights (geometric mean 2.3 vs. 0.7) and 2.6 fold more (95% C.I.: 1.6-4.0,  $p < .0001$ ) total resuscitations than in the traditional call nights (geometric mean of 2.9 vs. 1.1). We observed no difference in number of deliveries attended by the newborn nursery resident. We found no significant differences in the hours of sleep, number of procedures and burden of patient care. All residents in the pilot and traditional q4 call groups reported an appropriate amount of autonomy during the overnight shift.

**Discussion:** The redesign of the traditional call structure to a night shift system can allow for increased overnight exposure to resuscitations and neonatal care, while maintaining resident autonomy and a high quality experiential education.

## Poster 2

### THE EFFECTS OF A DAY/NIGHT SHIFT SYSTEM ON INTERN SLEEP, WORK LOAD, AND CONFERENCE ATTENDANCE

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**Background:** The ACGME regulations limit interns to 16 continuous duty hours beginning July 1, 2011. The impact of this rule on sleep, work load, and conference attendance is unknown.

**Objective:** To conduct a trial of a ward shift system compliant with the 2011 ACGME regulations and to compare sleep quantity and quality, patient load, hours worked, and conference attendance with a q 4 call schedule.

**Research methods:** We implemented a two month trial of a pediatric ward system with 12 hour daytime and 12 hour night-time shifts. We surveyed interns (PL1s) daily during the trial and during two call ward months regarding average daily sleep, patient numbers, hours worked, and conference attendance. The daily hospital census was recorded. Parametric and nonparametric statistical methods were used to compare results.

**Results:** Twenty-five PL1s completed 78% of 896 surveys. PL1s on both day and night shifts worked fewer hours/week than during q 4 call (73.2±4.2 and 71.6±2.7 hrs on shifts v. 79.6±5.6 hrs in the call system;  $P < 0.01$ ). Compared with q 4 call PL1s on day shifts cared for more patients/day when the ward census was high (95% CI: 7.89-8.12 vs. 95% CI: 5.67-6.69;  $P < 0.001$ ) and cared for no fewer patients/day when the ward census was lower. Hours of daily sleep did not differ between PL1s on day and night shifts, but PL1s working night shifts slept more hours/day than those on the q 4 call schedule (95% CI: 6.64-7.71 v. 95% CI: 5.85-6.82;  $P < 0.05$ ).

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Overall sleep quality did not differ between shift and call schedules. When the ward census was high, PL1s on the day shift attended fewer conferences than PL1s on the call schedule (none v. 30% of morning report; 14% v. 39% of noon conference).

**Discussion:** These results indicate that although interns might work fewer hours in a shift system, they may actually care for more patients. Sleep quantity and quality were largely unaffected. PL1 conference attendance suffered in the shift system indicating that programs may need to implement new strategies to preserve didactic opportunities for resident education.

### Poster 3

#### LONGITUDINAL CURRICULUM TO ENHANCE THE AUTONOMY OF RESIDENTS IN SELF-EVALUATION AND SELF-IMPROVEMENT

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**Background:** This IPE project will develop and evaluate a model curriculum that integrates the 4 components of Self-Determination Theory (SDT)—autonomy, competence, purpose, and connectedness—into residents' development as independent, effective, and goal-driven learners. The SDT of Deci and Ryan [<http://www.psych.rochester.edu/SDT/questionnaires.php>], which is applied widely in business, education, and health care, teaches that individuals who cultivate intrinsic motives to pursue goals are higher achievers than those who are prodded to perform by extrinsic rewards and punishments.

**Objectives:** Our Self-Determined Learning and Improvement (SDLI) curriculum aims to enhance residents' drive for excellence (purpose); ability to accept responsibility for their own learning and engage in active, proactive, and personalized learning and improvement (autonomy); and ability to skillfully self-evaluate on the primary objectives of the residency program (competence). (Connectedness will be measured but not explicitly taught.) To supplement our competency-based curriculum, we will engage residents in new activities that build autonomy, including didactic and interactive experiences, longitudinal experiences in self-evaluation in parallel faculty evaluations, guided planning of 6-monthly personal improvement goals, and critical incident essays.

**Research methods:** We will track residents' SDT characteristics across residency using validated tools, and collect longitudinal evaluation data in parallel from residents and faculty on global SDT characteristics and clinical competencies. Control groups will include the past year of PGY-1, 2 and 3 residents at URM, and also cohorts in Syracuse and Buffalo. Qualitative data from residents' yearly critical incident essays and 6-month and post-graduate written self-assessments will allow triangulation with quantitative measures to deepen our understanding of the SDLI maturation process. Sustainability of autonomous learning in CME, MOC, and practice-based learning after graduation will also be evaluated. An evaluation of the program aims to demonstrate the curriculum's feasibility, and efficacy based on Kirkpatrick's evaluation hierarchy (levels 1-3).

**Planned Results and Discussion:** We believe that longitudinal SDLI will help residents in any program to direct their own learning by constructively identifying their learning gaps and realistically designing ways to fill those gaps. Our specific activities to develop, maintain, and measure self-determination in residents should also be broadly applicable and valuable.

### Poster 4

#### CAN A LEARNER-CENTERED DIABETES MANAGEMENT CURRICULUM SERVE TO REDUCE RESIDENT ERRORS ON AN INPATIENT DIABETES PATHWAY?

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**Background Information:** Over the last decade, evidence-based literature on the inpatient treatment of diabetes has documented that 33% of the medical errors causing death in patients involved inappropriate use of insulin, prompting concern re the lack of trainee knowledge and performance in this area. The purpose of this study was to develop a diabetes curriculum in a children's hospital that would impact resident performance and decrease the number of diabetes related errors.

**Objective:** Our goal was to develop a multifaceted instructional curriculum for pediatric residents to determine if this intervention would reduce inpatient diabetes pathway errors.

**Methods:** Prior to the intervention, the following categories of diabetes pathway errors were totaled for nine months (January-September 2010) via voluntary recording of CNMC web-envison and incident reports: insulin, fluids, communication, discharge, and nutrition. The intervention consisted of an online tutorial addressing residents' baseline knowledge of managing patients with diabetes, a diabetes pathway discussion, a diabetes question and answer session, and a case presentation featuring embedded pathway errors for residents to resolve. These were presented over a two week period in September 2010. Diabetes pathway errors are currently being collected after the intervention to determine the educational impact on resident behavior.

**Results:** Five types of errors were recorded: Communication, Discharge Delay, IV Fluids, Nutrition, and Insulin. Prior to the educational intervention, 56 errors were recorded over 9 months with an average of 6.2 errors/month. Post intervention, 12 errors over 4 months occurred with an average of 3 errors/month. In this study there was a 50% reduction in errors 4 months post intervention.

**Discussion:** An interactive and learner-centered diabetes curriculum model that activates pediatric residents can be effective in reducing diabetes related errors, in the short-term. This educational model applied adult learning principles to the curriculum by combining self-directed computer-based learning, interactive didactic sessions that focused on pathway errors, and problem-solving sessions to detect errors in case presentations. Further monitoring of errors will determine at what point there is need for intermittent reinforcement of this process.

## Poster 5

### CAN A RESIDENT SAFETY CURRICULUM HELP PEDIATRIC RESIDENTS FEEL SAFE USING THE SAFETY EVENT REPORTING SYSTEM?

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**Background:** Quality improvement and patient safety training are required ACGME Practice Based Learning and Improvement and System Based Practice competencies. Physicians must demonstrate knowledge and apply this content for professional development and maintenance of certification. A needs assessment on safety education practices at this institution indicated that residents feel obligated to report using the hospital's Safety Event Reporting System (SERS), but are uncomfortable reporting ( $p < 0.05$ ). Previous studies identify time constraints and lack of feedback about reported events as barriers to event reporting. There is a disparity in reporting between nurses and physicians, and amongst physicians depending on level of training. Few innovative educational strategies have been described for residents about event reporting which engage them in the process of safety event investigation, increase their usage of event reporting systems, and result in changes that impact clinical outcomes.

#### Program Goals:

- Implement a patient safety curriculum which will:
  - Identify barriers to pediatric resident usage of SERS
  - Impact attitudes of pediatric residents towards SERS
  - Increase pediatric residents as event reporters

**Description:** Pediatric residents will actively participate in a 4 week curriculum embedded into a required outpatient rotation. The pediatric quality officer will mentor residents in reviewing a reported pediatric safety event, identifying contributing factors, performing a root cause analysis, and engaging multidisciplinary healthcare team members. Residents will propose an action plan and present the plan at the appropriate venue, such as M&M or pediatric quality council meetings.

**Evaluation:** Resident attitudes and perceived barriers to safety event reporting will be assessed using pre- and post-curriculum surveys. The number of pediatric events reported in SERS by residents will be reviewed prior to, during, and after curriculum implementation.

**Discussion:** It is hypothesized that if residents understand the safety event reporting process and how reported events are used to improve clinical care, they will become more frequent reporters. If the curriculum is successfully removes barriers to SERS usage, the number of events reported by residents should increase. The resident surveys will be used for curriculum revision to meet the learners' needs.

## Poster 6

### THE HYBRID HOSPITALIST TEACHING SERVICE: AN INNOVATIVE MODEL FOR INDIVIDUALIZED LEARNING, PATIENT CASE-MIX, AND MEDICAL STUDENT AND RESIDENT EDUCATION

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**Background:** A hybrid hospitalist teaching service (HHTS) was created to meet increased patient volume and provide general pediatric inpatient experiences for residents and medical students, without requiring pediatric intern involvement. The HHTS consists of an attending, pediatric senior resident (SR), family practice intern (FPI), pediatric sub-intern (Sub-I), and two 3rd-year medical students (MS3s). Upcoming resident work-hour restrictions may necessitate the creation of patient care models that differ from traditional teaching teams. No study has evaluated the educational and clinical service needs of the entire medical team (learners and attending) on such a team.

**Objective:** To evaluate whether a HHTS meets the educational, clinical, support, patient-mix, autonomy, and efficiency needs of team members.

**Methods:** After their pediatric rotation from July 2008 to April 2009, team members anonymously answered 7-11, piloted, 5-point Likert-scale questions and completed an open-ended comment section about the HHTS.

**Results:** Seventy-eight of 80 team members (97.5%) completed the survey. FPIs, Sub-Is, and MS3s all evaluated the HHTS highly in terms of addressing educational, clinical, support, and case-mix needs (mean=3.7-4.9 on 5-point Likert-scale with 5=strongly agree). SR responses were positive for autonomy, education, and opinions of hospitalists (mean=4.2-4.6), but neutral on leadership (mean=3.3-3.6). Attending scores varied for efficiency, teaching, and clinical duties (mean=3.1-4.1). For attendings, the HHTS resulted in direct trainee observation and increased teaching outside of rounds; poor delineation of roles and expectations, however, impeded clinical task completion, teaching on rounds, and attending meetings.

**Conclusions:** Trainees reported that a HHTS resulted in excellent individualized learning, patient case-mix, and educational environment. Some SRs cited limitations in HHTS leadership and teaching opportunities. Although lacking pediatric interns, the HHTS is an effective, well-accepted means of enhancing trainee education and patient care, but roles and expectations must be clearly defined early in the rotation to maximize the efficiency and satisfaction of attendings. Alternative teaching models, such as the HHTS, could be in a unique position to comply with resident work-hour restrictions while meeting educational and patient care requirements at academic institutions.

## Poster 7

### DEVELOPMENT OF A NIGHT TEAM CURRICULUM: AN EXPERIENCE IN IMPLEMENTATION FOR TWO PEDIATRIC RESIDENCY PROGRAMS

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**Background:** In response to ACGME work duty hour standards, many pediatric residency programs have initiated a Night Team (NT) rotation. There may be limited direct contact with faculty overnight.

**Objective:** To implement an educational curriculum for and meaningful assessment of residents on the NT rotation.

**Methods:** The curriculum was originally developed at the University of Connecticut. Goals for the rotation were identified with resident input. These included improving clinical reasoning and communication skills, providing appropriate patient surveillance, enhancing the teaching role of the senior resident, and increasing faculty feedback.

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Educational activities include

- 1) Periodic structured audit of resident admit notes by on-service faculty to assess documentation of clinical reasoning
- 2) Completion of reflection logs related to systems issues affecting patient care
- 3) Formal feedback on resident initiated calls to faculty targeting handoffs and patient surveillance
- 4) Structured clinical observations of interns' patient interactions by senior residents
- 5) Senior resident led teaching sessions based upon common clinical scenarios encountered overnight. Evaluations for the NT residents come from multiple sources. In addition to faculty assessment of resident performance, patients/families and nurses assess the interpersonal and communication skills and professionalism of the residents. Nurses also evaluate the systems based practice abilities of the resident, and teaching skills are evaluated by peers.

**Results:** The curriculum has been modified at the University of Connecticut and implemented at Children's National Medical Center. Evaluations of this curriculum by the residents at both programs have proven satisfactory. The New England Pediatric Program Directors have agreed to pursue a regional implementation of this curriculum. A study is underway to determine the reliability and validity of the chart audit tool, and to study the feasibility, satisfaction and success of faculty to evaluate the residents on the stated goals/objectives when implemented at multiple programs of varying demographics.

**Discussion:** A night team curriculum has been established at two institutions in the setting of limited direct contact with faculty overnight. Different educational activities incorporating existing clinical responsibilities are used to create a more comprehensive assessment of the NT resident, and can be adapted to fit the traditions of the residency program.

### Poster 8

#### A NEW APPROACH TO INTEGRATING BASIC EVIDENCE-BASED MEDICINE SKILLS IN RESIDENT CLINICAL EDUCATION

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**Background:** Most residents learn evidence-based medicine (EBM) by participating in a journal club, a format that does not lend itself to practical application. Recent work suggests that teaching EBM in a more clinically integrated format may improve resident learning.

**Purpose:** The purpose of this curriculum is to teach pediatric residents basic EBM skills, and to encourage their regular use in the care of patients. The overall curricular goals are to teach question building, searching strategies and critical appraisal skills, with independent guided practice. The objectives of the pilot unit were to teach residents how to build questions using the PICO format, and to perform a basic medical literature search.

**Methods:** Four pediatric interns attended two small-group, instructional sessions and completed three independent literature searches, which were reviewed with a preceptor. Four expert reviewers provided feedback prior to the implementation of the pilot test. Before and after the unit, interns completed surveys and four timed cases, for which they generated PICO questions and completed searches.

**Results:** All four interns showed improved knowledge and efficiency in using EBM, and indicated that they were likely to continue to apply these strategies in the future.

**Discussion/Next actions:** This pilot curriculum was integrated into a new three-year longitudinal EBM curriculum in July, 2010. In year one, interns complete six small-group sessions, including the two in PICO question formation and searching, and four sessions in critical appraisal, with additional meetings with a preceptor. In year two, residents will participate in the completion and presentation of a critically appraised topic (CAT), utilizing the skills garnered in year one. These presentations will be compiled into an online CAT bank available to the pediatric department for reference. In year three, senior residents will mentor interns by teaching and precepting the year-one sessions.

**Conclusions:** Teaching EBM in a practical fashion may improve residents' understanding of evidence-based medicine, and promote the integration of better evidence-based practice in the clinical context.

## Poster 9

### IMPLEMENTATION AND PLAN FOR EVALUATION OF A WEB-BASED EDUCATIONAL CURRICULUM ON COMPLEX CARE FOR HOSPITALISTS

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**Background:** There is an increased prevalence of medically complex children in US hospitals (Burns et. al.). Such children have a diversity of multi systemic disease, are on multiple medications, are often technology dependent, and require coordination of their care between their subspecialists, outpatient providers, and inpatient admissions. Exposure to and skills in caring for this population vary amongst providers. No published educational curricula are in existence specific to the hospitalist's care of the medically complex child.

**Objectives:** To provide a structured educational curriculum on the care of the medically complex pediatric patient for hospitalist faculty and fellows.

**Methods:** A needs assessment of the Hospitalist division at Children's National Medical Center was performed via electronic survey. Eleven topics identified by 70% of respondents were selected for initiation of the curriculum. A working group of hospitalists created evidenced-based resource lists, chapter summaries, and electronic case-based learning modules for each topic.

**Results:** Plans for program evaluation include satisfaction surveys, assessment of knowledge acquisition using pre and post tests, and demonstration of skill acquisition in simulation scenarios and peer structured clinical observations. Changes to teaching practices reflected by increased comfort and frequency of teaching trainees on topic areas will be assessed. Changes to clinical practice will be determined by the caliber of and frequency of consultations specific to the care of medically complex children.

**Discussion:** We hypothesize that the provision of this curriculum with it's multifaceted assessments will be a unique contribution to hospitalists and hospitalist fellows caring for the medically complex child. In addition, the production of this curriculum involved the recruitment and involvement of junior faculty on a collaborative scholarly initiative for faculty development and peer dissemination.

## Poster 10

### USE OF COGNITIVE AID COUPLED WITH SIMULATION TO IMPROVE RESIDENT PHYSICIAN PERFORMANCE AND KNOWLEDGE OF NEONATAL RESUSCITATION

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**Statement of the Problem:** Knowledge retention of neonatal resuscitation (NR) declines within 3-4 months of initial NRP training 1, 2.

**Background:** Due to a 50% decrease in resident exposure to deliveries and NR3, and despite increased NR high-fidelity simulation experiences, resident physicians show decreasing knowledge retention of NR2. Cognitive aids, (visual/auditory prompts to aid recall of), are used in Anesthesiology and Critical Care, but the results of studies evaluating improvement of simulation outcomes with cognitive aid use are mixed<sup>4,5,6</sup>. We found no published studies evaluating pediatric residents using a cognitive aid during NR simulation.

**Objectives:** To improve pediatric residents' NR knowledge, skills, and retention of knowledge using a cognitive aid coupled with simulation.

**Experimental Method:** This prospective trial involves the PGY-1 pediatric and internal medicine/pediatric residents using convenience sampling by class year. The intervention group receives a facility developed cognitive aid pocket card containing the NRP algorithm and common resuscitation procedures. All participants will be evaluated with 2 NR simulation scenarios, and then retested with a different scenario 3-5 months later to evaluate their retention of knowledge of NR. Videotapes of all scenarios will be reviewed by 2 NRP instructors to score the participants' performances utilizing a skill checklist. We hypothesize that cognitive aid use in the NR setting will improve resident NR performance and decision-making skills, as well as the retention of NR knowledge.

**Results to date:** 9 interns in the control group have completed all 3 simulation scenarios with 10 more interns scheduled to complete their third scenario in the next 2 months. The intervention group will start July 2011. Analysis of scores will compare the residents' NR performance based on use of the cognitive aid to determine the utility of pocket card use. Participant satisfaction with the pocket card, documentation of card use outside the testing scenarios, and self perceived comfort level with NR will be evaluated through an online survey after participation in the study. We will have analyzed data available for the conference.

## Poster 11

### MEDICAL STUDENT NUTRITION INTERVENTION COUNSELING AND COACHING

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**Background:** Obesity and its comorbid factors are an increasingly common problem in the pediatric population. Improved physician skills in nutrition history acquisition, assessment and management are needed to improve physician counseling of patients and families. There are various ways in which these skills could be taught.

**Objective:** To evaluate the efficacy of an enhanced nutrition module in improving medical student ability to obtain a comprehensive nutritional history and formulate an appropriate nutrition plan.

**Methods:** 59 (goal of 68) third year medical students (self-selected during pediatric rotation) were randomly assigned to either a nutrition enhanced study module (study) or an injury prevention module (control). Students in the enhanced module were given one-on-one coaching for nutrition in a directed patient encounter. Interview content was highlighted during this encounter. Nutrition knowledge was assessed at the end of the rotation through an observed structured clinical exam (OSCE) for differences in communication skills, interview content, and applied knowledge.

**Results:** Power analysis done prior to the study indicated that a total sample of 68 would give 90% statistical power to detect 2 point increases in the outcome measure. Mann-Whitney U test was performed on data to date and shows no difference in communication skills or applied knowledge scores (P .971 and .547 respectively). Interview content scores were also not significantly different though P value was marginally significant (.063).

**Discussion:** As expected, we did not see a difference in communication skills between the study and control group as all students had similar assessment and guidance in this area during the rotation. While our difference in interview content was notable, it was not at this point statistically significant. We feel some of this may be related to small sample size and the fact that study subjects were self-selected. We have opportunity for expansion of this study in the future by expanding this module into the pediatric clerkship (students would be randomly selected). This would allow for a greater number of subjects over a shorter period of time. We also have room to improve the coaching module with a goal of demonstrating an improvement in applied knowledge.

## Poster 12

### WHAT TO DO WITH ALL THOSE MEDICAL STUDENTS? ATTENDING-ONLY SERVICES CAN PROVIDE VALUABLE EDUCATIONAL EXPERIENCES.

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**Background:** With more students entering medical school, finding meaningful inpatient educational experiences can be difficult. Further challenges have arisen with decreasing resident duty hours and the formation of more attending-only services (AOS). Prior studies revealed concerns about teaching quality and quantity under these restricted hours. To address these challenges, Children's National Medical Center (CNMC) and Children's Hospital Los Angeles (CHLA) created rotations for third year students on AOS. Literature has described fourth year student curriculums on AOS, but there are no reports related to third year pediatric clerkships.

**Objective:** To create a high value curriculum for third year medical students on inpatient AOS.

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**Description:** Using their respective pediatrics clerkship learning objectives, CNMC and CHLA created two models for student education on AOS. CNMC uses a general pediatric service while CHLA uses a subspecialty service. Primary objectives of both models include helping students develop presentation skills, age-specific exam skills, and appropriately complete differential diagnoses. On the AOS team at each site, a teaching attending responsible for a limited number of patients is available to provide extensive feedback and education during morning rounds, supervised bedside examinations, and in depth discussions of differential diagnoses. Afternoon teaching sessions involve core didactics, continued bedside teaching, direct observation and feedback on presentations, and exam skills and at CNMC simulation training. The afternoon sessions provide the opportunity for student reflection on the morning rounds and determination of additional learning needs in order to improve skills.

69 student evaluations were collected at CNMC from 2008-2010, 79% responding; "overall educational experience" was rated 4.6 on a 5-point Likert scale (5=Outstanding). Comments from students included "Great Teaching Attendings" "Tremendous one-on-one teaching," and "Love the Attending interaction." The CHLA curriculum was implemented in the fall of 2010, and evaluation is ongoing.

**Discussion:** Both institutions developed curricula for third year students, taking advantage of the unique qualities of AOS, while optimizing students' learning experiences. Initial satisfaction scores of students are high. Future research could compare shelf exam scores, satisfaction, and specialty choices with students on traditional services.

### Poster 13

#### SIMULATION TECHNOLOGIES IN THE PEDIATRIC BASIC CLERKSHIP: THE FEBRILE NEONATE

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**Background information:** Fever is the most common pediatric complaint in healthcare settings. National (COMSEP) medical student curricular objectives include: 1) the problem solving skill of developing an age-appropriate differential diagnosis for a patient with fever 2) the ability to outline a diagnostic plan based upon this differential 3) the ability to interpret the results of commonly used diagnostic tests 4) the ability to formulate a therapeutic plan and 5) the ability to inform the health care team of the relevant thought process and decisions. The purpose of this session is to help medical students develop an approach to evaluating pediatric fever.

**Objective(s) or goals:** Students will recognize and list the important historical information and physical findings in the evaluation of an infant presenting with fever and develop an age-appropriate differential diagnosis. Students will also demonstrate the ability to perform the essential diagnostic and therapeutic procedures in an infant presenting with a fever. Students will interpret the results of diagnostic tests, recognizing the age-appropriate values for laboratory tests. Students will formulate an appropriate therapeutic plan and be able to articulate their clinical reasoning

**Program Description:** Students are assigned pre-reading prior to the workshop (Approach to the Febrile Neonate [www.uptodate.com](http://www.uptodate.com)). Students then participate in a 20 minute lecture using audience response system (ARS) to assess their knowledge and understanding.

Students are divided into small groups (5-6 students) to attend four stations each lasting 20 minutes:

- 1) Lumbar puncture
- 2) IV placement and phlebotomy
- 3) Bladder catheterization
- 4) Interpretation of laboratory results

**Results:** One hundred thirty one students evaluated this module. One hundred percent of respondents agreed that the session increased their clinical skills. Students rated this exercise highly with 100% agreeing (91% strongly agreeing) that this session was educationally valuable. Students completed pediatric procedures with faculty feedback in a simulation environment that promoted active learning and appears to be an effective way to engage learners.

**Discussion:** As part of a series of structured educational workshops we utilized ARS and partial task trainers to teach medical students an approach to pediatric fever. The workshop is highly rated by medical students.

## Poster 14

### DELIBERATELY PRACTICING TO SAVE A LIFE: INCORPORATING THE DELIBERATE PRACTICE METHODOLOGY IN RESIDENT SIMULATION

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**Objective:** Deliberate Practice is a demanding, repetitive process that requires high levels of focus and concentration and is designed specifically to improve performance. It requires continuous feedback on results and involves self-observation and self-reflection. Our objective was to incorporate the Deliberate Practice methodology in our pediatric resident simulation sessions. We evaluated the impact of this educational intervention in two ways: first on the usefulness of feedback provided during debriefing following the scenario and second on resident understanding of the clinical problems presented.

**Methods:** We conducted a monthly resident only simulation session at our Simulation lab. Three pediatric residents participated in every session. A scenario library representing common pediatrics emergencies was used. Each resident assumed the role of leader, airway / breathing or circulation. We had a structured debriefing using the Gather, Analyze and Summarize methodology to encourage the learners to think about what they did, how they did it, and how they can improve. We ran the same scenario again with the residents in the same roles and debriefed again. Each resident rotated twice through each of the three roles with debriefing after each scenario. The aim was to identify, analyze and close performance gaps during debriefing. At the end of the simulation session the residents completed an evaluation. We evaluated the scores (Likert scale from 1-5 with 1 being Strongly Disagree and 5 being Strongly Agree) to assess the usefulness of feedback during debriefing following the scenario, and the impact on improving resident understanding of the clinical problems.

**Results:** The evaluations from 26 residents who participated in the deliberate practice simulation sessions over nine months showed an average score of 4.735 when asked if they received useful feedback during debriefing following the scenario, and an average score of 4.7 when asked if they had a better understanding of the clinical problem presented after the session.

**Conclusion:** Incorporating the Deliberate Practice methodology in resident simulation appears to provide useful feedback during the debriefing following the scenario and improves resident understanding of the clinical problem presented.

## Poster 15

### IMPROVING KNOWLEDGE RETENTION: COMPARING TEAM-BASED LEARNING WITH LECTURE IN A PRE-CLINICAL PEDIATRIC CURRICULUM

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**Background:** Team-Based Learning™ (TBL), through its use of pre-class preparation™, individualized and group readiness assurance tests and application sessions, has emerged as a successful active education model in health sciences. Historically, the pre-clinical pediatrics course at Washington University School of Medicine consisted of 16, one-hour didactic sessions. Student attendance was variable, and students frequently complained about overlap. In response, TBL was introduced into the course to increase student attendance and increase the use of active learning models.

**Objective:** The effect on long-term retention following TBL has not been reported. We compared the effect of a lecture-plus-TBL pre-clinical pediatric curriculum on knowledge retention to a lecture only curriculum.

**Methods:** Historical controls completed the pre-clinical pediatric course (16 hours of lectures) in the 2007-2008 academic year. The course changed in 2008-2009 (7 hours of lectures and 10 hours TBL). Students in both groups completed multiple-choice knowledge-based exams before and after the pre-clinical pediatrics course and again before and after the pediatric clerkship. Changes in knowledge (percent correct) were compared between groups using repeated-measures analysis of variance, controlling for number of weeks between the pre-clinical course exams and beginning of the pediatrics clerkship.

**Results:** Baseline knowledge did not differ significantly between control (n=73) and TBL (n=72) groups (45% vs. 49%, respectively; p=.216). Knowledge improved after the pre-clinical course for both groups (p<.001), but increased more in the TBL group (62% vs. 80%; p=.002). Knowledge declined in the control (n=40) and TBL (n=59) groups before the pediatrics clerkship (49% vs. 55%; p=.026) controlling for number of weeks since pre-clinical exam. Nevertheless, retained knowledge remained higher in the TBL than control group before the clerkship (p<.001). Knowledge increased in both groups to similar levels (74%) after the clerkship (p=.292).

**Discussion:** Lecture-plus-TBL pre-clinical pediatrics curriculum was associated with greater gains and retention in pediatrics knowledge compared with lecture-only curriculum. However, lecture-plus-TBL did not demonstrate significantly improved long-term retention despite increased absolute knowledge.

## Poster 16

### LOOK BEFORE YOU LEAPP!

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While the literature on pediatric procedural distress has grown, this knowledge has not been widely applied in practice. Collaboration among all members of the health care team is integral to procedure success and reduction of patient pain and anxiety. LEAPP is an evidence-based, multidisciplinary approach to standardize how pediatric procedures are performed in an inpatient setting. LEAPP is an acronym that stands for Listen, Evaluate, Anticipate, Plan and Proceed.

The goal of this program is that all members of the medical team provide a consistent level of care to all children undergoing procedures in the inpatient setting using a unique protocol and procedural planning tool.

Real-time observation tools were created to survey the nurse, caregiver, physician and child life specialist regarding procedural planning and performance. Fifty medical procedures assessed prior to LEAPP implementation indicated a need for quality improvement intervention. Implementation for resident physicians and mid-level providers was conducted via a required education module, which included a 10-minute video and post-test. Nurses and child life specialists received similar education. Post-implementation assessment is currently ongoing and is using the same observation tools to assess attitudes and practice change.

Education is anticipated to enable easier completion of the procedure and improve physician satisfaction. Expected outcomes include more appropriate use of non-pharmacological interventions for pain and anxiety, and greater patient and family satisfaction.

LEAPP promotes a multidisciplinary approach that facilitates nurse/physician collaboration and positive patient/family outcomes. The educational tools and clinical protocols can be used in any setting in which procedures are performed on pediatric patients. This program has been accepted throughout the hospital and supported by department chairmen and the director of nursing. Education has raised awareness of procedure management issues and the need for baseline education regarding pediatric pain. Procedure outcomes cannot be predicted but there are certain facets, including pain, patient anxiety, and provider preparedness that can be addressed and controlled. Implementation and acceptance of a project like this does not happen overnight but can lead to a culture change within an institution. Collaboration among members of the medical team is crucial for its success.

## Poster 17

### LEARNING TO BE A PRIMARY CARE PROVIDER IN YOUR NON-NATIVE LANGUAGE: RESIDENT EXPERIENCES CARING FOR SPANISH-SPEAKING FAMILIES

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**Background:** During pediatric residency training, many residents provide care in their non-native language to Spanish-speaking families in their continuity clinic. Despite growing numbers of residents in this circumstance, educators have focused little attention on understanding resident perceptions of this unique experience.

**Objective:** To explore non-native Spanish-speaking pediatric residents' perceptions of their continuity clinic experience in providing care in Spanish and how this experience relates to their training and professional development.

**Design/Methods:** Qualitative study involving data from 10 interviews of pediatric residents. Semi-structured interviews explored perceptions of their continuity clinic experience. The Johns Hopkins Institutional Review Board approved this study.

**Results:** Participants were 1st-3rd year non-native Spanish-speaking residents caring for mainly Spanish-speaking families in their continuity clinics. On a scale of 0-5, all ranked their Spanish skills 3. Analysis of the interviews showed that experiences caring for this population were greatly influenced by perceived linguistic and cultural barriers. Nearly all participants reported an ongoing sense of self doubt in the quality of care they provided to Spanish-speaking families because of their perceived limitations in Spanish. Most recognized specific health topics, including behavior and social issues, in which their communication was more limited. Many reported dissatisfaction with their own understanding of the culture and beliefs of this population. Despite these perceived barriers, most were satisfied with their experience. A small minority felt that their professional development was negatively impacted in specific areas of medical knowledge and patient-doctor communication skills. Participants identified key supports needed for training including linguistic and educational tools as well as feedback regarding their language skills.

**Conclusions:** Residents using their non-native language skills to care for Spanish-speaking families experience a unique training opportunity. Results emphasize the need for further study to understand the outcomes, including perceived limitations in their linguistic and cultural competence, feelings of self doubt, and satisfaction related to providing care to Spanish-speaking families. Educators must explore support mechanisms that ensure that such training experiences promote well-trained residents to choose to care for this population in the future.

## Poster 18

### EDUCATING FELLOWS IN PRACTICE-BASED LEARNING AND SYSTEMS-BASED PRACTICE: THE VALUE OF QUALITY IMPROVEMENT IN CLINICAL PRACTICE

*William Carey, MD; Gretchen Matthews, MD; Christopher Collura, MD; Christopher Colby, MD, Neonatal-Perinatal Medicine Fellowship, Mayo Clinic, Rochester, MN*

**Background:** The ACGME requires that trainees receive education in six core competencies. Among these, practice-based learning (PBL) and systems-based practice (SBP) are the most challenging for trainees and educators alike. Many find that PBL and SBP are difficult concepts to grasp. Consequently, it may be difficult for training programs to educate and assess their trainees in PBL and SBP, which by some are considered the least important among the core competencies.

**Objective:** Quality improvement (QI) projects require those involved to utilize skills that form the basis of PBL and SBP. Therefore, we sought to educate our fellows in these competencies by involving them in division-level QI projects. We assessed their competence by direct observation of their efforts and their ability to communicate their results both within and beyond our institution.

**Description:** Our fellows are active members of our NICU Quality and Safety Committee (Q&S). This committee is responsible for identifying those clinical outcomes most in need of improvement in our NICU and for developing QI projects to address them using the Plan-Do-Study-Act model.

Our fellows sought to reduce the incidence of bronchopulmonary dysplasia (BPD) among our premature neonates. Under the supervision of our fellowship's program directors, our fellows: compared our patients' historical rates of BPD to national averages; identified and critically reviewed the systems involved in our respiratory practice; used best-available evidence to develop a standardized approach to respiratory management of these patients; and compared the resulting patient outcomes to historical control data.

**Results:** Our fellows were effectively engaged in the QI project, which resulted in a significant reduction in the rate of BPD. What is more, our fellows have presented this work at national meetings (including the AAP NCE), along the way earning Maintenance of Certification credit from the American Board of Pediatrics.

**Discussion:** We found that involving fellows in QI was an effective way to teach PBL and SBP. Our fellows valued their experience because it directly improved patient outcomes. Additionally, our fellows benefited from presenting their work publicly and from earning credit toward board certification.

## Poster 19

### LESSONS LEARNED FROM IMPLEMENTATION OF A CAREER FOCUSED LONGITUDINAL BLOCK FOR THIRD YEAR RESIDENTS

*Tai Lockspeiser, MD; J. Lindsey Lane, MD; M. Douglas Jones Jr., MD; Adam Rosenberg, MD, Department of Pediatrics, University of Colorado, Denver, Aurora, CO*

**Background:** Current pediatric residency training is structured primarily around one month rotations with curricular content and patient exposure that is generally not directly determined by a resident's career goals. Opportunities for prolonged mentorship and specific focus on skills needed for post-residency career are limited.

**Objective:** To describe lessons learned from initial implementation of a career focused longitudinal block – developed as part of the Initiative for Innovation in Pediatrics Education (IIPE) –where residents individualize clinical experiences based on their career path.

**Description:** Third-year residents elect to participate in the program for 4 months. Their schedule is tailored to meet their needs based on individual learning goals and consideration of Entrustable Professional Activities (EPAs). Each resident receives structured mentoring and observation (with feedback). The first cohort of 11 residents began the program in 2010-2011 with 5 residents in primary care, 2 in hospitalist pediatrics, and 4 in pediatric subspecialties.

**Results:** Formative program evaluation after one year revealed 4 key lessons:

- 1) Individualization of schedules can rarely be done by residents alone and requires considerable faculty time.
- 2) Residents easily identify broad areas in which they need to focus learning, but have difficulty developing and completing more specific learning goals and perceive this process as busywork.
- 3) Residents and faculty understand and like the concept of EPAs but only rarely use them for schedule development or mentorship.
- 4) Structured mentoring and observation is difficult to sustain over 4 months.

**Discussion:** These lessons have prompted program changes for the second resident cohort. Specifically:

- 1) Each resident's schedule will be developed using administrative personnel with faculty consultation, rather than exclusively by faculty.
- 2) Learning goals will be reframed as a cognitive process that guides residents from broad areas of learning to a specific focus.
- 3) Instructions regarding use of EPAs will be more accessible and specific.
- 4) On-line tracking and reminders will be used to prompt mentoring sessions and completion of observations.

## Poster 20

### PRIMARY CARE PASSPORTS: GUIDING THE JOURNEY TO COMPETENCY IN GENERAL PEDIATRICS

*Robyn Strosaker, MD, Rainbow Babies and Children's Hospital, University Hospitals Case Medical Center, Cleveland, OH*

**Background Information:** Recent literature has suggested that practicing pediatricians feel that their training was inadequate in many areas relevant to pediatric primary care. ACGME duty hour limitations have forced pediatric residency programs to carefully balance multiple competing needs which has resulted in the elimination of some continuity clinic sessions.

**Objectives:** To create a primary care track for pediatric residents using a novel method of learner-driven, primary care specific rotation objectives ("Primary Care Passports") to enhance resident self-efficacy in primary care, self-directed learning skills and the number and preparedness of residents entering pediatric primary care.

**Description:** The primary care track will use increased time in the primary care setting, directed faculty mentorship and "Primary Care Passports" to promote longitudinal self-directed learning for the residents.

Residents will utilize a "Primary Care Passport" which will outline rotation-specific primary care learning objectives for all rotations. Residents will be encouraged to use existing rotation goals and objectives as a framework to build their individualized "Passport" with their community mentor. Residents will document exposure to the objectives and quantify both their method of learning and competence while caring for patients in their primary care experiences. The "Passport" will be a fluid document that is reviewed and revised during mentorship meetings.

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**Planned Analysis:** Baseline and outcome measures will include surveys of resident and faculty perception of competency in primary care topics and self-directed learning skills, the percentage of residents graduating from our residency program entering primary care and a survey of employer perceptions of our recent primary care graduates. Planned process measures include qualitative and quantitative feedback from the residents and faculty. Electronic passports will be designed to measure the additions and revisions and well as the documentation of competency in the learning objectives.

**Discussion:** This novel utilization of learner-centered rotation objectives with the documentation of competency in the primary care setting may help to improve the primary care education of pediatric residents. This method, if proven effective, could be translatable to other subspecialty career choices as well as other levels of pediatric education.

### Poster 21

#### FIRST YEAR MEDICAL STUDENT INTRODUCTION TO RURAL HEALTH: A PILOT PROGRAM

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**Introduction:** Efforts to train physicians to provide care in rural communities have been documented in the international academic literature. The need to understand factors in all types of communities influencing access and barriers to care and community based risk factors for health have been described. Many medical schools have 3rd and 4th year electives in community practice, with some acclaimed rural programs. Didactics in agro-health have been described. We describe a pilot program in rural health for first year medical students.

**Methods:** Thirteen students responded to an invitation to participate in a rural health selective at a school in 2010-2011. Families recruited by the school nurse included children with special health care needs. Faculty mentors came from primary care, social work, and chaplaincy disciplines from the tertiary center 12 miles away which serves as the primary medical school teaching site. Groups of two or three students and their mentor met monthly with their assigned family in the school cafeteria at night. Using semi-structured format with materials developed to facilitate conversation, students helped families consider their own health issues. Students worked with families to identify resources and strategies for improving health. One hour monthly debriefing sessions allowed reflection on strengths and opportunities for improvement in communication and included didactic materials on community resources, health care financing, and communication strategies, especially related to sensitive issues including poverty, substance abuse, and compliance with medical recommendations.

**Results:** Students provided written feedback highlighting at least 3 things that they had learned and 3 suggestions for improvement. Remarks were overwhelmingly positive for the experiences in facilitated communication and awareness of community impact on health. They suggested that this become a longitudinal program with medical students maintaining contact with families and mentoring new students.

**Conclusion:** Preclinical medical students benefit from community based health instruction and experience communicating with families. Expansion is planned to include other communities, age groups and trainees from other disciplines. Enhancement will provide more rigorous evaluation and opportunities for independent study.

### Poster 22

#### RESIDENT BOARD PREPARATION USING TEAM BASED LEARNING

*Judith Rowen, MD; Marney Gundlach, MD; Marcia Moreira, MD, Department of Pediatrics, University of Texas Medical Branch, Galveston, TX*

**Background:** Team Based Learning (TBL) is an interactive instructional strategy which maintains the benefits of small groups even in classes with high student-faculty ratios. TBL involves a three step process: preparation, readiness assurance, and participation in

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content application exercises. While TBL has been used in undergraduate medical education, to our knowledge, its use as a longitudinal pedagogy in residency education has not been reported.

**Objective:** Implement TBL for resident board preparation.

**Methods:** Residents prepare for sessions with assigned readings. The first week, a 15-question quiz is taken individually and as a team (individual and group readiness assurance tests, IRAT/GRAT). The next week, cases related to the reading material (application activities) are discussed.

Trainees remain with their 7-8 member team throughout residency. GPA and USMLE scores of incoming interns are used to balance the teams. Availability both electronically and in print, compact size and readability have made Pediatrics in Review the most successful choice for assigned reading. Creation of the IRAT/GRAT is the most time consuming factor – USMLE style questions must relate directly to the assigned reading and should be sufficiently difficult that performance on the individual quiz is between 50-75% correct. Application cases meet the “4 S’s” of TBL – significant problem, same problem, specific choice, simultaneous report. We create novel cases or use published case reports and have the teams answer questions on a white board, with simultaneous revealing and subsequent discussion. Anonymous annual surveys of residents are distributed and tabulated.

**Results:** 100% of residents (68% response rate) replied “agree” or “strongly agree” to the statement “I like Team Learning as a format for Board Review.” 89% replied affirmatively to the statement “I feel Board Review helps me prepare for the Pediatric boards.” 100% read the material before the sessions at least half of the time – an improvement from 40% when a textbook was assigned. The pass rate on the American Board of Pediatrics certifying examination improved from 43% of first-time takers to 85%.

**Discussion:** TBL is a valued and effective method for teaching residents board review topics longitudinally, over the length of their residency training program.

### Poster 23

#### THE IMPACT OF A WEB-ENHANCED, INTERACTIVE MODULE ON PEDIATRIC RESIDENTS CLINICAL REASONING SKILLS.

*Noemi Adame, MD; Michelle Arandes, MD, Pediatrics; Mary Agnes Manwell-Jackson, PhD, Long Distance Learning, University of Texas Health Science Center San Antonio, San Antonio, TX; Jean Petershach, MD, Pediatrics, University of Texas Health Science Center, San Antonio, TX*

**Background:** Clinical reasoning skills are essential for the effective physician. Pediatric Residents struggle with developing clinical reasoning skills. The Script Concordance Test (SCT) is an objective, feasible, reliable, and validated tool to assess clinical reasoning skills across the continuum of clinical practice. The primary aims of this project are to determine if pediatric residents receiving routine instruction while engaging in an interactive, web-based curriculum improve clinical reasoning skills, as evidenced by their scores on the SCT and oral presentation quality, as compared to residents receiving routine instruction.

**Description:** An objective needs assessment of 10 residents via direct observation documented the need for improved oral presentation and clinical reasoning skills while a self-assessment survey of PL-1-3 residents revealed lack of insight into their need for improvement. To meet educational needs in an era of reduced duty hours we designed a web-based Clinical Reasoning Skills Curriculum utilizing the Blackboard® Course Management System, consisting of four sub-modules focused on problem representation by use of key features and abstract qualifiers, diagnostic accuracy, clinical decision-making, and development of a learner portfolio. Faculty and educational design specialists evaluated and affirmed the accuracy and validity of content. The chief resident and six PL3 residents (now graduated) piloted the module for ease of navigation, clarity, perceived usefulness, workload, and time investment.

**Evaluation:** Three resident pilot respondents evaluated the module as useful in teaching clinical reasoning and improving oral presentation skills, intuitive, and easy to use by survey, and the narrative, qualitative evaluation by all six pilot residents was positive. Changes were made to the curriculum to reflect the feedback of the pilot group. The current residents (PL1-3) have been randomized for either participation or no participation in the online curriculum while concurrently receiving routine instruction. Curriculum efficacy via the SCT, oral presentation quality, reflective journaling, and self-assessment will be assessed before and after implementation of the curriculum.

**Conclusion:** Baseline data demonstrates a need for improvement of oral presentation quality and higher-order clinical reasoning skills. A pilot group suggests that our Clinical Reasoning Skills Curriculum will positively impact these skills.

## Poster 24

### INTER-RATER RELIABILITY OF AN ORAL CASE PRESENTATION RATING SCALE TO ASSESS PEDIATRIC CLERKSHIP STUDENTS

*Lorraine Beraho, MPH, MD Program; Linda Lewin, MD, Division of Pediatric Education/Department of Pediatrics, University of Maryland School of Medicine, Baltimore, MD*

**Background:** Assessment tools are used extensively in medical education to evaluate students' progress towards honing the skills clerkships aim to develop and foster. Assessment data, like any form of scientific experimental data, must be reproducible in order to be an accurate reflection of student performance (Downing, 2002). However, the reliability of most assessment tools used in medical student education is unknown.

**Objective:** The aim of this study was to use statistical analysis to evaluate the inter-rater reliability (IRR) among raters using an Oral Case Presentation Rating Scale to evaluate Pediatric clerkship students at the University of Maryland School of Medicine.

**Research methods:** After IRB approval, 15 third year medical students each recorded one oral case presentation for an inpatient he/she cared for. The presentations were assessed independently by three trained pediatric attending physicians using a new Oral Case Presentation Rating Scale. Intraclass correlation coefficients (ICC) were used to determine the IRR of rater responses.

**Results:** The IRR expressed by the calculated ICC coefficient was  $ICC(3,k)=0.90(95\% \text{ CI } 0.79, 0.96)$  for the overall scale. ICC coefficients for grouped items ranged from  $0.63(95\% \text{ CI } 0.35, 0.84)$  for the Assessment and Plan section to  $0.87(95\% \text{ CI } (0.73, 0.95)$  for the Physical Examination and Diagnostic Study Results section.

**Discussion:** The inter-rater reliability coefficient of the overall scale indicates a low degree of measurement error with an intra-class correlation indicative of a very high level of agreement. Out of the 7 sub-categories that the scale entails, 4 sections had an ICC coefficient falling within the range of almost perfect inter-examiner agreement, 1 section with strong agreement, and 2 sections with moderate agreement (Portney, 2000). We conclude that the Oral Case Presentation Rating Scale is sufficiently reliable to serve as a useful medical education tool at the level of the entire scale (17 items) for the evaluation of Pediatric clerkship students.

## Poster 25

### PARTICIPATION IN AN ONLINE JOURNAL CLUB IMPACTS CLINICAL PRACTICE

*Emily Webber, MD, Pediatric Hospital Medicine, Indiana University School of Medicine, Riley Hospital for Children, Indianapolis, IN*

**Background information:** Traditional journal club meetings are valuable mediums for discussion<sup>1</sup>; however, time and geographic constraints can make regular attendance difficult.<sup>2</sup> An online forum can provide a way for faculty to review medical literature and discuss clinical practice.

**Objectives:** Our objective was to establish an online journal club for our group of pediatric hospitalists to promote discussion of medical literature. Secondary objectives were to determine if the online club increased review of the literature or informed clinical practice. Our institution does not currently have a journal club for general pediatric faculty.

**Research methods:** We created a blog with open source software from [www.wordpress.com](http://www.wordpress.com). 22 members of the pediatric hospitalist faculty were assigned to select and review an article in the first 12 months. The blog editor posted each review, including a poll question, and monitored poll votes and comments. In the first year, 27 articles were reviewed and posted. The blog has had over 2600 visits since initiation. Visits are more frequent at the time of new posts (on average between 2 and 10 views daily). Participants provided the editor with ongoing feedback and completed an IRB-approved survey after 6 months.

**Results:** All participants visited the site at least once in the first 6 months, 81.8% of participants reported between 1 and 10 visits, and 9.1% had over 10 visits. 90% of participants voted in a poll and 40% left a comment. 31.8% of participants reported reading more medical literature, and 72.7% reported participating in the journal club impacted their clinical practice.

**Discussion:** The journal club blog is an efficient forum for discussion of medical literature for our group. The majority of survey respondents reported that participation in the journal club blog impacted the counseling or medical decision making, suggesting significant potential for the impact of this forum. This type of program could be used for medical student and resident education as well as faculty.

**References:**

1. Linzer, M. "The journal club and medical education." *Post Med J* 1987; 63: 465-478.
2. Alguire, P. "A review of journal clubs in postgraduate medical education." *J Gen Intern Med* 1998; 13: 347-353.

**Poster 26**

TEAM-BASED LEARNING IN A PEDIATRIC CLERKSHIP

*Andrew Mutnick, MD, College of Physicians and Surgeons; Dorene Balmer, PhD; Boyd Richards, PhD, Center for Education Research and Evaluation; Marc Foca, M.D., College of Physicians and Surgeons, Columbia University, New York, NY*

**Background:** Due to major changes in the curricular structure at Columbia University's College of Physicians and Surgeons in Fall 2009, the number of students on clinical rotations doubled from January–June 2011. Seeing this increase in student volume as impetus for educational innovation, we implemented team-based learning (TBL) in the pediatric clerkship. TBL is an instructional strategy well-described in health science education and primarily utilized during preclinical years. TBL capitalizes on the effectiveness of group problem-solving and efficiently uses resources when student: faculty ratio is high (Searle, 2003).

**Purpose:** To describe the development, implementation and students' perceptions of a TBL curriculum for a pediatric clerkship.

**Methods:**

- Development: We divided core pediatric topics among 4 TBL sessions (fever, common infections, abdominal emergencies, diarrhea/constipation) that mirrored our core curriculum. We engaged content and education experts to collaborate in development of readiness tests and application cases.
- Implementation: TBL curriculum was introduced in January 2011 and delivered 1 session/week over 4 weeks of our 5-week clerkship. Students prepare for TBL by completing assigned readings that map to learning objectives for each session. They are given individual and group readiness tests, and then participate in application cases. Students receive feedback throughout the exercises. Their individual and group test scores are included in final evaluations.
- Evaluation: Students are surveyed about the perceived value of learning opportunities on the pediatric rotation at the completion of the clerkship. When possible, faculty peers observe TBL sessions and provide formative feedback to TBL faculty/facilitators.

**Preliminary Results:** The number of students who value TBL (36/55; 65%) is only slightly less than the number who value outpatient care activities (42/55; 76%), but substantially greater than the number who value didactic case presentations (20/55; 36%). Student comments underscore the impact of TBL on helping them identify learning preferences and improve teamwork skills.

**Discussion:** To date, our experience shows that TBL is an appropriate and feasible instructional methodology for pediatric clerkships. While we are encouraged that students perceive TBL to be a valuable compliment to learning in clinical settings, we plan to extend the evaluation and assess the impact of TBL on learning performance.

**Poster 27**

RESIDENT-AS-COACH: TEACHING RESIDENTS TO TEACH CLINICAL SKILLS

*Kimberly Gifford, MD, Residency Program; Leslie Fall, MD, Pediatrics, Children's Hospital at Dartmouth, Lebanon, NH*

**Background:** While medical educators recognize the necessity of ensuring that learners develop lifelong learning skills, effective methods to teach these skills are not well defined. Doctor Coach is an innovative resident-as-teacher curriculum for resident teaching of clinical skills with a focus on lifelong learning principals for both the resident teachers and their learners.

**Goals:** To improve resident use of effective clinical teaching techniques and to improve student perceptions of learning, with a focus on teaching and learning physical exam (PE) skills.

**Methods and Evaluation:** A three year longitudinal resident-as-teacher curriculum was implemented at the Children's Hospital at Dartmouth Residency program. The curriculum consisted of five 45 minute workshops per year focused on tools for residents to use when teaching students that were integrated into standard clinical rotations. PL2-3 residents (N=14) reported their use of teaching strategies at the end of years 2 and 3. Medical students, who were blinded to the resident intervention, evaluated each resident with whom they worked at the end of their rotation. Responses were rated on a Likert scale (1=never, 3=sometimes, 5=always) and T-tests were used to compare pre- vs. post-intervention response means.

**Results:** Most residents (72-100%) reported having tried each of the teaching strategies introduced. Relative to pre-intervention students, post-intervention students reported that residents did more direct observation (4.32 vs. 3.65,  $p=0.014$ ) and that the students received more "relevant feedback regularly" on their PE skills (4.06 vs. 3.32,  $p=0.008$ ). These teaching strategies also translated into post-intervention students reporting that overall residents helped them to perform more accurate PE (4.16 vs. 3.62,  $p=0.050$ ). Qualitatively, residents perceived that their own lifelong learning skills improved through participation in the curriculum and most residents (92-100%) reported that they tried the teaching strategies for their own learning.

**Conclusions:** The resident-as-Coach curriculum is a resident teaching intervention that increased resident use of effective teaching techniques and improved student learning. Additionally, residents reported improvements in lifelong learning skills. Costs of curricular implementation at another institution would include training of the resident-as-teacher instructor, time in the conference schedule for workshops and buy-in from relevant clerkship and rotation directors.

## Poster 28

### DIRECT OBSERVATION OF 3RD YEAR PEDIATRIC STUDENTS BY TEACHING FACULTY

*Stephanie Israel, MD; Joseph Gigante, MD; Amy Fleming, MD, Pediatrics, Vanderbilt University, Nashville, TN*

**Background:** Although direct expert observation with feedback is the gold standard for improving learner performance in clinical practice it often does not occur. We implemented a program designed to facilitate individualized observation and feedback by pediatric faculty members for 3rd year medical students during their pediatric rotation.

**Objectives:** To determine the benefit and feasibility of a dedicated program for direct student observation, the faculty time requirement and satisfaction, and the type of feedback faculty provide to the students in the six ACGME competencies.

**Design:** Twenty-seven teaching faculty were selected into a teaching society based on their history of excellence in teaching. They were asked to directly observe students. Students were divided into small groups and met with teaching faculty to perform a focused History and Physical on their own patients. Each student examined their patient while observed by the group. Immediate feedback was given to the student after the observed encounter. Faculty used a direct observation form covering the domains of patient care, medical knowledge, professionalism and communication skills. Free text comments were evaluated by the researchers and categorized into positive versus negative comments and ACGME competencies.

**Results:** In just over a year, 117 students have participated in this non-graded, but required, component of the pediatric rotation. 104 observation forms were completed. Faculty spend on average 30 minutes per student. Comments from faculty in free text were predominantly encouraging with 78% positive feedback. Free text comments were categorized as follows: 55% on communication skills, 32% on patient care, 8% on medical knowledge, 4% on professionalism, 1% on practice based learning, 0% on systems based practice.

**Conclusion:** Using a group of teaching faculty we were able to create a program where every 3rd year pediatric clerkship student receives direct faculty observation and feedback about a clinical encounter. Most of the feedback given was positive in nature. Constructive feedback occurred in 22% of the feedback comments. In Vanderbilt's class of 110 3rd year students, 55 faculty hours were dedicated to this project. Faculty and students have verbally described satisfaction with the program. Future formal satisfaction surveys are planned.

## Poster 29

### TRANSFERRING MEDICAL STUDENTS KNOWLEDGE TO CLINICAL ACTION: CASE IN STUDY - FAILURE TO THRIVE (FTT)

*Vinita Kiluk, MD, Pediatrics; Dawn Schocken, MPH, Center for Advanced Clinical Learning; Judith Ranells, MD, Pediatrics; Kristina Eichmann, MEd, Educational Affairs, University of South Florida, Tampa, FL*

**Background:** Introduction to key pediatric clinical activities, e.g., assessing weight and length charts of an infant, provides a basis for the interpretation of critical data needed to diagnose FTT early in the course of the child's development. This skill is essential in optimizing the child's health and a core competency during year three of medical school.

**Objectives:** The goal of this project is to ensure medical student mastery of a core competency in the pediatric curriculum, recognition of Failure to Thrive (FTT).

**Methods:** During a didactic session on FTT, 120 3rd year medical students on primary care clerkship reviewed a case on psychosocial FTT. Additionally, each student completed the CLIPP case for FTT. At the end of year three, all students complete a twelve station comprehensive clinical exam (CCPX) that includes the same psychosocial FTT case using a different patient name.

**Results:** Despite intentional redundancy in training and assessments, 89 (74%) students failed to recognize FTT on the growth chart provided; this resulted in failure to provide appropriate medical management. In response, we aggressively revised our educational strategies for this critical core objective. Prior to the classroom presentation, the students will listen to a five-minute podcast about FTT, review a didactic slide set, followed by practice plotting growth curves and performing formula calculations. Student pre-lecture participation will be documented via social media. The classroom session will include an interactive discussion on FTT with a standardized patient and infant (manikin) who presents in the clinic with FTT. This represents an innovative approach to achieving educational objectives for FTT. Mastery of this core competency will be assessed with a mid-clerkship exam. Retention of knowledge and skills will be measured during the end of year CCPX using the psychosocial FTT case.

**Discussion:** This innovative module incorporates educational strategies addressing a wide variety of learning styles and will be initiated with our rising year three students. Our education team continues to develop robust interactive programming to address core competencies and track student retention of knowledge and skills.

## Poster 30

### INCORPORATION OF A HIGH-FIDELITY SIMULATION SESSION INTO A PEDIATRIC MEDICAL STUDENT CLERKSHIP

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**Background:** High-fidelity simulation involves the use of a computer based life-sized mannequin that can simulate patient responses based on the actions of learners. It is becoming increasingly used in medical education, although its role in undergraduate education is still unclear. Studies have shown that medical students' acquisition of critical assessment and management skills may be superior through the use of simulation-based learning as compared to traditional learning methods. With this concept in mind, an innovative high-fidelity simulation session was introduced into the pediatric clerkship at the University of Alberta.

**Objective:** The purpose of incorporating a high-fidelity simulation session into the pediatric clerkship was to provide students with a hands-on, interactive, real-time training experience on the initial assessment and management of a critically ill child. The focus was on improving their comfort with the effective handling of resuscitation equipment, applying previously taught acute care pediatric knowledge and skills to the clinical setting, and to practice team communication.

**Innovation and Methods:** A 2-hour simulation session was incorporated into our third year pediatric clerkship in 2009. Following an orientation to the human patient simulator, a brief review of resuscitation skills, including the use of pediatric resuscitation equipment and team communication, was provided. Groups of 3-5 students then worked through two 20-minute scenarios using the human patient simulator. Structured performance feedback, including the use of video review, was provided after each scenario.

**Evaluation:** Students each completed an evaluation form immediately following the session. In addition, a 7-item student survey is being distributed to all current fourth year medical students who participated in the simulation session during their third year pediatric clerkship. This survey will examine lasting perceptions of the learning activity.

**Results and Discussion:** Current feedback from the students has been extremely positive with many students recommending more high-fidelity sessions in their clerkship. The results of our survey will help identify important positive and negative aspects of the session, which in turn will help guide further use of simulation in our pediatric clerkship and in other programs where high-fidelity simulation is being used.

### Poster 31

#### TEACHING THE CHILD ABUSE ASSESSMENT INTERVIEW TO PEDIATRIC RESIDENTS

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**Background:** In post-graduation surveys, former residents from our program identified interview skills for cases of suspected child abuse as a potential area for improvement. Review of the educational literature revealed a paucity of resources for teaching the requisite communication skills for these interviews.

**Objective:** We sought to build the factual knowledge base and practical skill set used in the abuse assessment interview through multiple modalities (independent study, small group learning, and experiential learning).

**Description:** To develop the Child Abuse Assessment Resident Education module, we

- 1) identified a journal article for independent study
- 2) created a teaching guide on the content and techniques for abuse assessment interviews
- 3) adapted a simulation case of suspected child abuse with a “standardized parent” for interview by residents

During an inpatient general pediatrics rotation, PGY2 and PGY3 residents are provided with the journal article. Faculty members, chief residents, or fellows use the teaching guide to lead pairs of residents through small-group learning of the abuse assessment interview. Residents then perform an observed abuse assessment interview (“encounter”) in the Vanderbilt Center for Experiential Learning and Assessment. Residents receive observer feedback immediately following their encounter. Residents complete a pre-survey, post-survey, and self-evaluation of the encounter. Encounter observers and standardized parents complete assessments of the resident.

**Results:** Collection of survey and encounter data is ongoing. Quantitative analysis including comparisons of pre- and post-survey scores and encounter assessments across individuals (interviewer, standardized parent, and observer) will be completed when adequate data are collected. Informal resident critique is positive, with nearly all learners stating the module is a valuable experience. Individual residents have repeated the module to enhance their skills.

**Discussion:** We created a novel, multi-modal module to teach factual knowledge and practical skills relevant to the parent interview in cases of suspected child abuse. Survey data will enable assessment of module efficacy. Analysis of encounter observations will identify common interview pitfalls and enable refinement of pre-encounter teaching. This module can serve as a template for other learning modules.

### Poster 32

#### DEVELOPMENT AND IMPLEMENTATION OF A PEDIATRIC ADDICTION TRAINING PROGRAM FOR USE IN PEDIATRIC GRADUATE MEDICAL EDUCATION

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**Background:** High risk behaviors, such as alcohol and substance abuse, are commonly established in childhood and adolescence, and extend into adulthood. These behaviors are preventable if identified and treated. Training the next generation of pediatricians and adolescent medicine specialists to intervene at the early stages of substance and alcohol use is crucial to decrease the morbidity and mortality associated with these harmful practices.

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**Objectives:** The Pediatric Addiction Training Program (PATP) was developed by a team of experts in addiction medicine and pediatric graduate medical education with the support of a grant from the Caron Foundation. The program's goal is to provide information, resources, and skills practice for effective prevention, diagnosis, intervention, and referral of alcoholism and other adolescent addictions.

**Methods:** PATP is an 8-hour course offered to pediatric residents and adolescent medicine fellows during two evening sessions. The sessions are facilitated by faculty with expertise in addiction medicine from institutions in the NY Metropolitan area. The key elements of the addiction training curriculum are achieved using a combination of didactic sessions and experiential learning. This includes: attendance at an Alcoholics Anonymous (AA) meeting with an affected teen and his/her family; pairing with an AA Teen Buddy; instruction and practice in motivational interviewing. Pre and post test evaluations of knowledge, skills and attitudes toward addiction are administered to participants.

**Results:** Over the past 6 months, approximately 8 trainees from academic centers in NY have participated in this pilot program. Pre and post test evaluations will be analyzed at the end of the current academic year. Exit interviews with participants conducted by individual program directors have been very positive. One of the most valued experiences for the trainees is the pairing with an AA Buddy because it allows an in-depth look into the alcoholism recovery experience.

**Discussion:** PATP is an innovative educational program for pediatric residents and fellows and provides information, tools and skills needed to help physicians effectively identify and provide care for adolescents with alcohol and drug addiction.

### Poster 33

#### EXPERIENTIAL BILINGUAL CURRRICULUM IN PROFESSIONALISM FOR MEDICAL STUDENTS AND RESIDENTS

*Yvonne Blasini, MD, Pediatrics, Ponce School of Medicine, Ponce, PR; Luisa Alvarado, MD, Pediatrics Residency Program, Hospital Episcopal San Lucas, Coto Laurel, PR*

Professionalism is an essential competency of a practicing physician that must be developed and nurtured along the continuum of medical education. To assure that medical students and resident graduates achieve this competency, we must develop the strategies to teach and evaluate it in a structured manner, both for the purpose of formative and summative evaluation. Our Department of Pediatrics has modified its third year curriculum to include experiential activities to foster the development of professional and cultural competence for medical students (2009) and residents (2010) in a bilingual environment. Our goal is to improve the learner's professional competence in order to provide sensitive and respectful care that is culturally effective and ethically sound. After the experience the learners must demonstrate:

- Adherence to ethical principles
- Bilingual communication skills that are patient-centered, respectful and sensitive
- Self awareness of cultural competence and knowledge of cultural values
- Increased awareness and practice of culturally-effective care

The professionalism curriculum offers: pre activity self-assessment in cultural competence (Health Attitude Survey), interactive presentation on communication skills based on cultural video of "Puerto Rico" culture; followed by cultural and ethics case discussions. Assessment of short term impact includes: a post-self assessment survey, a written reflection, and satisfaction ratings for the activity. Longer term changes in behavior are assessed by an OSCE (English and Spanish speaking standardized patients) at the clerkship and residency level.

Pre and post self assessment surveys demonstrate an increase in cultural competence items of 20% from baseline. A qualitative analysis of the written reflection and the curricular evaluation comments suggest improved awareness of the patient's perspective and learner satisfaction. The 3rd year Clerkship's OSCE shows positive results in the professionalism, cultural competence and language proficiency items, which are in process. Pediatric resident's OSCE results are also in process and so far are consistent with those of the medical students.

The results of our curricular innovation suggest that it is possible to teach professionalism in experiential activities that are effective and satisfactory to the learner. Long term assessment suggests that the professionalism and cultural competence gains persist in the learners' professional behavior.

### Poster 34

#### PEDIATRIC RESIDENT BEHAVIOR IN SIMULATED PRIMARY CARE OF CHILD WITH LIFE-LIMITING DISEASE

*Megan McCabe, MD, Yale-New Haven Pediatric Residency Program; Cecilia Thompson, MD, Fellow, Pediatric Critical Care Medicine, Yale University, New Haven, CT; Janet Serwint, MD, Harriet Lane Pediatric Residency Program, Johns Hopkins Children's Center, Baltimore, MD*

**Background:** It is unknown how residents perform when providing primary care for children with life-limiting diseases.

**Objective:** Assess resident performance in primary care of a child with a life-limiting disease across training levels.

**Methods:** PL-1 to PL-3 residents were videotaped performing a simulated 2-week visit for a baby with Trisomy 18 living at home with NG tube feeding and visiting nurses. Primary parental concerns were weight and NG tube care. If queried, actors raised concerns of sibling coping, postpartum depression, and need for psychosocial support. Videos reviewed for primary care topics (baby sleep position, car seat use, reasons to call doctor, assess psychosocial support, post-partum depression, sibling adjustment) and care of a child with life-limiting disease (review Trisomy 18 diagnosis, offer psychosocial support, review code status, offer hospice referral, demonstrate NG tube placement).

**Results:** 29 videos were reviewed, (11 PL1, 9 PL2, 9 PL 3) Reviewers had very good concordance ( $\kappa=0.84$ ). Hand washing on entering the exam room was 100%.

**Primary care performance:** 82% of PL1s versus 44% of PL3s discussed sleep position. 63% of PL1s versus 44% of PL3s discussed car seat position. 64% of PL1s versus 67% of PL3s reviewed reasons to call doctor. 82% of PL1s and 67% of PL3s assessed psychosocial support. 45% of PL1s versus 55% of PL3s screened for postpartum depression. 100% of PL1s versus 78% of PL3s assessed sibling adjustment.

**Scenario specific performance:** 90% of PL1s reviewed Trisomy 18 diagnosis versus 44% of PL3s. 27% of PL1s offered psychosocial support as did 30% of PL3s. 18% of PL1s and 33% of PL3s discussed code status with the parent of a baby who was listed as DNR in the chart. No PL1s offered hospice referral, 1 PL3 did. 18% of PL1s and 22% of PL3s demonstrated NG tube placement.

**Conclusions:** Pediatric residents need further education to integrate the health care needs of children with life-limiting diseases with routine primary care. The decline in primary care topics in the PL3 group may be specific target for intervention. Qualitative review of the videos may give more insight into encounter content.

### Poster 35

#### ONE YEAR EXPERIENCE WITH PRECEDE: A PEDIATRIC CLERKSHIP CLINICAL SKILLS CURRICULUM

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**Background:** The AAMC Task Force on the Clinical Skills Education of Medical Students recommends a longitudinal and developmental clinical skills program for all medical schools. All schools have formal clinical skills instruction early in medical school but many lack an explicit clinical skills curriculum during the clerkship years. We developed the PRECEDE (PRE-Clerkship Educational Exercises) curriculum to address this need.

**Description:** PRECEDE consists of a series of skills building workshops that focus on essential pediatric clinical skills delivered during 3 days preceding the clerkship and 2 days at the mid-point. Topics for workshops were chosen based on a formal needs assessment. Ten workshops were created; interpretation of pediatric growth patterns, interpretation of pediatric vital signs and lab values, neonatal examination, well child care interview, communication with adolescents, ear examination, fever in a neonate, cardiac murmurs, respiratory distress and clinical reasoning. Workshops are delivered in small groups (5 students: 1 faculty) using various teaching modalities; standardized patients, volunteer pediatric outpatients, partial task trainers, modified team-based learning, and high fidelity simulation.

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**Results:** We have delivered this comprehensive series of workshops to 123 medical students. For each of the ten workshops, >97% of medical students agreed / strongly agreed that their skills increased relative to the topic and that the session would improve their ability to function on the wards. In assessing the program a whole, summative student evaluations demonstrated that >98% of students agreed/ strongly agreed that the workshops made them more confident to see patients, taught them clinical skills useful for the clerkship, and increased their ability to function as a student in the clinics/ward. The overwhelming majority of students (>98%) stated that the tradeoff of less clinical time on the wards / clinics was worthwhile to allow for structured, standardized skills education.

**Discussion:** We successfully implemented a 5-day series of pediatric clinical skills building workshops. Students highly value the structured standardized teaching and rate these workshops as useful in building their confidence and increasing their skills to evaluate pediatric patients.

### Poster 36

#### PEDIATRIC PULMONARY FELLOWSHIP BOOT CAMP

*Debra Boyer, MD, Division of Respiratory Diseases; Peter Weinstock, MD, PhD, Department of Anesthesia; Craig Lillehei, MD, Department of Surgery; Dennis Rosen, MD, Division of Respiratory Diseases, Children's Hospital Boston, Boston, MA*

**Background:** Limitations in direct patient contact due to duty hour restrictions and increasing societal expectation for attending level involvement, has lead to wide and unpredictable variation in the educational experiences of pediatric pulmonary fellows with regards to clinical exposure, teaching, procedural training, as well as formative/summative feedback.

**Objectives:** We sought to develop a unique simulation-based training 'boot camp' for pulmonary fellows to improve consistency and quality of education across expertise gradients.

**Research methods:** In April of 2010 a needs assessment was performed throughout the Children's Hospital Boston (CHB) pediatric pulmonary fellowship (current CHB fellows, attendings, recent program graduates) as well as national pediatric pulmonary fellowship directors. The e-administered 50-item survey identified gaps in subspecialty training and responses were categorized by theme. Training gaps included inconsistencies in (1) clinical exposure, (2) teaching experience, and (3) procedural training. Boot camp course content was thus derived from these and divided among three general teaching modalities (i.e. didactics, simulation, task training).

**Results:** A pediatric pulmonary boot camp curriculum was devised as three 4 hour sessions including mixed-modalities tailored to specific learning objectives (e.g., skills training such as chest tube placement, flexible bronchoscopy complication management, respiratory failure in the cystic fibrosis patient, and team responses to acute medical crises). Each course included introductions, icebreakers, didactics, partial task training and full-scale high fidelity simulation. Scenarios included professional actors to provide patient and family interactions—providing practice and feedback around difficult conversations with patients and families.

**Discussion:** Our approach is concordant with the American Board of Pediatrics efforts to ensure competent training in critical elements known as “entrustable professional activities” (EPAs). (O ten Cate 2007) The described Pediatric Pulmonary Fellows Boot Camp offers on demand opportunities for practice/preparation in numerous EPAs and therefore may offer a new paradigm to standardizing effective fellowship training curricula across programs.

### Poster 37

#### TEACHING FUTURE CLINICIAN SCIENTISTS AND SUPPORTING THE RESEARCH INFRASTRUCTURE OF AN ACADEMIC MEDICAL CENTER

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**Background:** Supporting clinical research is a national priority. Clinician scientists are rare and undergraduate students interested in medicine often lack opportunities for clinical research. Clinical trials in academic medical centers (AMC) rarely meet enrollment goals because of infrastructure expenses.

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**Objective:** We describe an innovative undergraduate course that exposes students to clinical research through didactic and practical experiences while providing assistance to clinician scientists conducting research in an AMC.

**Methods:** The course, Clinical Research Methods and Practice, is offered each semester by the Department of Pediatrics. The curriculum was developed with input from medical ethicists, the Institutional Review Board, and the Clinical Trials Office. Students receive didactic sessions on the principles of clinical research during an 8-hour orientation and subsequent weekly sessions throughout the semester. Students devote 6 hours/week in a hospital setting enrolling patients into clinical studies to provide coverage 18 hours/day. Clinician scientists prepare standardized materials on specific research related tasks, and are available for student questions, reviewing related research articles, and teaching clinical correlations. Course performance is based on 1) professionalism during clinical research shifts, 2) informed consent proficiency, 3) screening and enrollment accuracy, and 4) examinations that assess students' knowledge of clinical research principals including informed consent, privacy, and research studies.

**Results:** Eighty-six students during 5 semesters have completed the course. Students have assisted in 18 clinical studies located in the emergency department, intensive care unit, inpatient wards, and outpatient clinics. They identified and screened eligible patients for 14 of 18 studies, monitored clinical data for 12 studies, performed informed consent for 11 studies, and helped transport specimens for 4 studies. Several research studies were top enrollers in the US because of student participation. Both students and investigators had a high level of satisfaction with the program and several students have continued in clinical research roles.

**Conclusions:** The Clinical Methods and Practice class addresses barriers to clinical research in AMC. This may be a model for institutions committed to mentorship of students early in their career and developing infrastructures for clinical research.

### Poster 38

#### SERVICE LEARNING: LEARN AND PRACTICE ANTICIPATORY GUIDANCE AND ADVOCACY WITH A TEDDY BEAR CLINIC

*Ivonne Galarza, MD, Pediatrics, Ponce School of Medicine and Health Sciences, Ponce, PR; Luisa Alvarado, MD, Hospital Episcopal San Lucas, Hospital Episcopal San Lucas Residency Program, Ponce, PR*

**Background:** Medical education has long recognized the importance of medical students serving the community. Infant and children mortality continue rising in our nation and the AAP has advised us to educate parents about unintentional injuries, which is the leading cause of death in children<sup>1</sup>, through our medical homes. For example, Puerto Rico has no laws requiring the use of helmets while riding a bicycle. For this reason, we decided to train medical students, parents, children and teachers about Anticipatory Guidance and Advocacy on Injury Prevention. At Ponce School of Medicine our students get involve in many community activities. Our Medical School ranked among the highest in terms of its social mission.<sup>2</sup> The Teddy Bear Clinic is a clinic for children's stuffed animals, where injury prevention anticipatory guidance is offered. They have been implemented in our Pediatric Curriculum since 2008.

#### **Objectives:**

- Understand Advocacy and become an advocate for families.
- Learn age appropriate anticipatory guidance and provide it to children, teachers and parents, using interactive games.
- Facilitate pediatrician-children interactions by avoiding the fear of doctors.

**Research:** Students are trained about Advocacy and Injury Prevention using TIPP.<sup>3</sup> Children bring their written consent and a stuffed animal to the Teddy Bear Clinic for a doctor's visit. While rotating through "clinical" stations, education and reinforcement is received about injury prevention and medical students practice communication skills under the supervision of pediatric teaching staff.

**Results:** We have received informal positive feedback from all participants. In 2011, a survey will be given to measure its outcome. Results will follow.

**Discussion:** With Service Learning students' not just is an observer, but also an active participant. The success of a program is measured not only by what the student learns, but also by the usefulness of the students' work to those served. Students learn about where their patients live by participating in service-learning activities and through this may gain a better understanding of community resources for their patients.

**References:**

1. Annals of Internal Medicine Vol 152 #12, June 15, 2010.
2. PEDIATRICS Vol. 119 No. 1 January 2007, pp. 202-206.
3. TIPP – The Injury Prevention Program by the American Academy of Pediatrics.

**Poster 39**

DEVELOPING PHYSICIAN LEADERSHIP IN QUALITY IMPROVEMENT SKILLS BY EMBEDDING A QI CURRICULUM IN A PEDIATRIC RESIDENCY PROGRAM

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**Background:** Residency programs represent an ideal testing ground for a curriculum designed to embed quality improvement skills (QIS) into the daily work of patient care. Skills include: identifying quality gaps, utilizing QI methodology, employing data analysis, testing changes, and ensuring improvement sustainability. Although the ACGME requires residents to complete quality improvement (QI) training, few residencies offer a structured program teaching the skills and techniques necessary to drive improvement.

**Objectives:** The goal is to develop an innovative QI curriculum, teaching QI methodology, data analysis and interpretation, team work and leadership within a QI project framework to hardwire QIS into physician practice.

**Description:** Each residency level pursues a different curriculum stage. Didactics include lectures, readings, handouts and IHI modules. Requirements include a Personal Improvement Project and Reflective Practice Project (1st year), participation on a clinical QI project (2nd year), culminating with an academic presentation and transition to a leadership role (3rd year). Graduating residents outline project sustainability plans.

A key feature is one-on-one support for residents from the QI coach, data analyst, QI faculty mentor, and QI staff. This helps residents incorporate an unfamiliar process seamlessly into practice, to ensure QIS application in clinical settings and on hospital teams.

**Results:** Evaluation consists of annual knowledge/competency assessments and engagement appraisals. Feedback is sought through face-to-face meetings with residents' QI mentor as well as focus groups.

After two years of programming, resident involvement in hospital-wide QI projects increased from 1 in 2007 to 36 in 2010, demonstrating full engagement. Current second years, who have received one year of the curriculum, showed a minimum 50% increase in all QIS areas. Third years also showed significant improvement in ability to design and implement a QI project. The 2010 graduates' QIS self-rating increased 50% in planning, testing and implementing changes.

**Discussion:** The implementation of this program has dramatically increased the number of residents working on hospital-wide QI projects. Experience driving improvement through teamwork will be invaluable in their future careers. A leveled curriculum to teach QIS can be successful in the residency setting in increasing knowledge, competency and developing QI leadership skills.

**Poster 40**

THE "TO ERR IS HUMAN" STUDY : DO IMPLICIT THEORIES OF INTELLIGENCE AFFECT RATES OF CLINICIAN ERROR REPORTING?

*Mithila Jegathesan, MD; Yaffa Vitberg, MD, Pediatrics; Matrin Pusic, MD, Pediatric Emergency Medicine, Morgan Stanley Children's Hospital of New York-Presbyterian Columbia University Medical Center, New York, NY*

**Background:** An age old issue arises of why people fare differently from each other in life and achievement. Carol Dweck's research has illustrated that people can be classified as either "fixed" or "growth" mindsets and that the view one adopts may affect how people learn from errors made throughout their life. A physician may be constantly called upon to confront challenges or threats to their abilities, skills or clinical reasoning, such as in the case of medical errors. A physician's mindset may be an impediment to the challenges that one hopes will foster a lifetime of learning.

**Objectives:** To determine if post-graduates are of the "fixed" or "growth" mindset and whether their individual mindset affects perception of medical error reporting.

**Methods:** An anonymous electronic survey was distributed to 349 pediatric residents, attendings, and fellows over a 4 week period at MSCHONY-Presbyterian. It was divided into inclusion criteria, medical error reporting, intelligence theory items, and demographics. Incremental theory items were reverse scored and a mean theory of intelligence score was calculated, with (1) representing pure entity theory (i.e. fixed mindset), and (6) agreement with an incremental theory (i.e. growth mindset).

**Results:** Theory of intelligence scoring for 171 respondents showed that 49.41% of respondents were of the "fixed" mindset and 51.18% of the "growth" mindset. In 84 "fixed" mindset providers, self reports of actual medical errors was 0.9 vs. 3.98 observed reports of actual medical errors. In 87 "growth" mindset providers, self reports of actual medical errors was 0.85 vs. 4.01 observed reports of actual medical errors.

**Discussion:** If Pediatric post-graduates hold the "fixed" conceptualization of intelligence, they would be predicted to underreport their rate of medical errors compared to clinicians holding a "growth" mindset. Therefore, encouraging a "growth" mindset could lead to an educational environment more conducive to formative feedback and addressing medical errors constructively. Our findings show that Pediatric trainees/attendings do not differ in their likelihood to report errors, but differ by their implicit theory of intelligence (fixed vs. growth).

## Poster 41

EXTENDING THE OVEREXTENDED RESIDENT: A NEW ROLE FOR NURSE CLINICIANS IN THE ACADEMIC PEDIATRIC INPATIENT SETTING  
*Candice Burns, MD; Klint Schwenk, MD; Sara Multerer, MD; Michelle Stevenson, MD; Jeffrey Grill, MD; Kimberly Boland, MD; Theresa Dahl, RN, Department of Pediatrics, University of Louisville, Louisville, KY*

**Introduction:** In 2011, the Accreditation Council for Graduate Medical Education (ACGME) has further limited the amount of time a resident can spend in-house in order to reduce resident fatigue and increase patient safety. Residents will be required to reach the same medical competency as their predecessors in fewer and shorter on-duty intervals. By redirecting traditional ancillary duties to a physician extender, time can be maximized for patient care and education. We present a pediatric inpatient physician extender model utilizing registered nurses as hospitalist nurse clinicians and their impact on resident duty hour violations, educational opportunities, and team efficiency.

**Methods:** A total of 108 pediatric residents received an 11 question electronic survey in May of 2010 (n=80) and May of 2011 (n=84) to compare work load concerns before and after the implementation of nurse clinicians as physician extenders on the inpatient ward teams at an academic tertiary care children's hospital. Questions included the frequency of duty hour violations, missed core conferences, concerns for patient safety, and perception of efficiency. Patient volume data and duty hour violations were compared during these respective time frames.

**Results:** The 2010 and 2011 survey groups were comparable in training level ( $p=0.352$ ), number of ward months completed ( $p=0.466$ ), and number of patients per intern days ( $p=0.617$ ). From 2010 to 2011, there was a statistically significant decrease in the reported frequency of working >80 hours/week ( $p=0.004$ ), working >30 hours on a continuous shift ( $p=0.014$ ), and missing core conferences due to work load ( $p=0.045$ ). Residents reported spending a greater percentage of time performing direct patient care ( $p=0.027$ ) and an increase in the perceived efficiency of the discharge process ( $p=0.001$ ). Official duty hour logs from July 2010 to April 2011 confirm a significant decrease in the number of violations pertaining to working >30 hours on a continuous shift in comparison to the 2009-2010 academic year ( $p=0.043$ ).

**Conclusion:** The addition of registered nurse clinicians as physician extenders to the pediatric ward teams of an academic tertiary care children's hospital significantly reduced resident duty-hour violations and missed core conferences, while increasing proportion of direct patient care and efficiency.

## Poster 42

### THE COMBINATION OF THEMED DIDACTIC AND IN SITU SIMULATION SESSIONS TO ENHANCE PEDIATRIC RESIDENT LEARNING IN THE EMERGENCY DEPARTMENT

*Corinne Bria, MD; Daniel Schumacher, MD; Matthew Mittiga, MD, Emergency Medicine, Cincinnati Children's Hospital Medical Center, Cincinnati, OH*

**Background:** Trainee acquisition of competence in caring for patients with acute illness and injury requires development of both cognitive as well as procedural skills. Deliberate practice is an effective technique for achieving advanced and reproducible performance. Simulation, both high and low fidelity, provides opportunity for deliberate practice.

#### **Objectives:**

1. Utilize in situ simulation to provide an opportunity for deliberate practice of skills required for the care of pediatric acute illness and injury.
2. Link the deliberate practice simulation sessions with didactic and simulation debriefing sessions.
3. Provide formative feedback to the trainees during the deliberate practice sessions.

**Description:** All trainees on the PED rotation were encouraged to participate in bimonthly education sessions lasting three hours each. Trainees were excused from patient care responsibilities in the PED to attend sessions. Attendance did not result in work hour violations. Session format included didactic teaching followed by related in situ simulation in the PED resuscitation suite. Trainees performed procedures with coaching until able to perform independently without prompts. Real-time feedback was provided, and trainees evaluated sessions at the conclusion. The themed sessions included upper airway obstruction (UAO)/high fidelity simulation of UAO, bag valve mask (BVM) ventilation and airway adjunct use/low fidelity BVM and airway adjunct deliberate practice, head and neck trauma/low fidelity cervical spine immobilization/clearance simulation, crisis resource management/high fidelity code simulation with focus on team communication and establishing a shared mental model.

**Results:** Trainees demonstrated competence in management of all session topics/clinical scenarios while also familiarizing themselves with equipment and gaining comfort in the PED resuscitation suite. Sessions were rated highly by trainees with frequent requests for additional similar sessions. Simulation provided ample opportunities for real-time formative evaluation of trainees.

**Discussion:** Themed sessions utilizing in situ low/high fidelity simulation to allow for deliberate practice in combination with lecture, discussion, and debriefing were highly rated by learners and allowed for provision of formative feedback by facilitators. This venue allowed learners to demonstrate skill mastery with procedural performance from start to finish without prompts.

## Poster 43

### RESIDENT ASSESSMENT OF THE SOCIAL HISTORY: CAN IT BE INFLUENCED BY VIDEO SIMULATION?

*Melissa Klein, MD; Jennifer O'Toole, MD, Cincinnati Children's Residency, Cincinnati Children's Hospital Medical Center, Cincinnati, OH*

**Background:** Pediatric residents often treat socially complex families; however, the skills to assess and treat these social health risks are rarely taught in traditional medical curricula. Additionally, the majority of residents were not raised in a culture of poverty so cannot rely on prior experience.

**Objective:** To examine the change in 2nd year pediatric residents' knowledge and social history screening practice regarding public benefits, food security, housing and maternal depression after a facilitated case-based video simulation curriculum.

**Methods:** A cross-sectional study of 30 pediatric residents from 2 continuity clinic sites that serve predominately an underserved patient population was performed. Residents were assigned to control (no video simulation curriculum) and intervention (video simulation curriculum) groups based on their availability to attend. All residents completed pre- and post-educational intervention

surveys that addressed their socio-economic background, confidence obtaining a social history and perception of their social screening practices regarding public benefits, food security, housing and maternal depression. A sample of both control and intervention residents were directly observed in their continuity clinic, pre- and post-intervention, to elicit screening practices and time spent obtaining a social history.

**Results:** Pre- and post-intervention surveys were completed by (26/30) residents. The majority of residents (75%) were raised in households with zero social hardships. The educational intervention improved residents' confidence asking about public benefits ( $p=0.02$ ) and their practice related to food insecurity ( $p<0.01$ ) and maternal depression ( $p=0.01$ ). Following the intervention residents were noted to spend more time obtaining a social history (2 minutes vs. 4 minutes). Although a greater percentage of residents asked about food stamps (46% vs. 77%), cash assistance (8% vs. 23%), hunger (69% vs. 92%), housing conditions (46% vs. 69%), utilities (23% vs. 69%), and provided resources to families (8% vs. 23%) after the intervention, none of these values reached statistical significance.

**Conclusions:** A video simulation curriculum focused on social determinants of health can affect residents' confidence, practice patterns, and time spent obtaining a social history. Since the majority of residents were raised in households with zero social hardships, intensive training on these topics is essential.

#### Poster 44

##### INTER-PROFESSIONAL SIMULATION CURRICULUM FOR SENIOR MEDICAL STUDENTS AND NURSING STUDENTS TO EMPHASIZE TEAMWORK AND COMMUNICATION

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**Background:** Curriculum designed to emphasize the importance of improving teamwork and communication amongst healthcare professionals has demonstrated improved outcomes in patient safety. While there is evidence to support inter-professional collaboration reduces clinical errors and improves patient outcomes, there is a paucity of curriculum demonstrating the benefits of implementing this training during undergraduate medical education.

**Objectives:** The University of North Carolina School of Medicine and School of Nursing have developed a simulation curriculum designed to emphasize the importance of teamwork and communication amongst medical professionals. The objective is for maternity nursing students and senior medical students to use their assessment and clinical reasoning skills, in addition to TeamSTEPPS communication techniques to provide comprehensive medical care. TeamSTEPPS (Team Strategies and Tools to Enhance Performance and Patient Safety) is a program developed by the Department of Defense's Patient Safety Program in collaboration with the Agency for Healthcare Research and Quality.

**Description:** The Birthing Simulation is an inter-professional simulation involving two emergent birthing case scenarios in which students must effectively communicate the details of the case, care for the laboring mother, facilitate the birth of the infant, and resuscitate the infant. Nursing students are enrolled in the 3rd or 4th semester of the BSN program. Senior medical students have completed the Neonatal Resuscitation Program. Prior to participation in the simulation experience, both groups of students complete an online module on TeamSTEPPS training.

**Program Evaluation:** 32 nursing and medical students completed a pre- and post-test on self efficacy, knowledge, and attitudes about teamwork and communication. Knowledge and attitudes were measured using a t-test based on a 5-point Likert scale. Attitude scores for both nursing ( $n=15$ ) and medical ( $n=17$ ) students increased significantly from pre-test to post-test ( $p<.001$ ); while the knowledge scores improved, the change was not statistically significant ( $p .060$ ).

**Discussion:** Inter-professional collaboration and educational curriculum is beneficial in improving attitudes regarding collaboration and teamwork. Interpersonal and communication skills are a core competency endorsed by the Accreditation Council for Graduate Medical Education (ACGME).

## Poster 45

### EVENING REPORT: AN APPROACH TO PEDIATRIC NIGHTTIME EDUCATION IN THE MODERN ERA OF DUTY HOUR REFORM

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**Background Information:** ACGME 2011 updated duty hour standards will require creative approaches to maintain high quality resident education. Implementation of these requirements will necessitate most Pediatric training programs to increase nighttime resident coverage, but a recommended approach to teaching nighttime residents is lacking. Interactive educational conferences such as morning report are an essential component of residency education nationwide. The creation of interactive educational opportunities that are practical and efficient for night residents is vital as resident workloads intensify and an increasing proportion of training is spent on night float due to increasingly restricted duty hours.

#### **Objectives:**

1. To pilot a regularly-occurring "evening report" (ER) session
2. To evaluate the feasibility and role for ER in a Pediatric residency curriculum

**Methods:** Once-weekly ER sessions attended by night residents (up to six per night) and facilitated by hand-picked volunteer faculty were held for 10 weeks in the spring of 2011. An informal small group setting without set didactics was intentionally maintained to allow for discussion focused upon management of newly admitted patients in real-time. Pre- and post-intervention surveys of residents and invited faculty as well as weekly surveys of ER participants were conducted.

**Results:** A strong level of support existed at baseline for ER with 54% of residents and 69% of faculty strongly or very supportive to the addition of regularly-occurring session to the curriculum. 52% of residents and 41% of faculty found discussion at ER sessions to be very beneficial to their education. Support for ER remained high after the trial with a majority of residents (51%) and faculty (71%) strongly or very supportive. The opportunity for case discussion in an informal setting was most enjoyed by participants, while time constraints and interruptions were the least enjoyable aspects.

**Discussion:** Strong support exists amongst Pediatric residents and faculty for the addition of regularly-occurring ER sessions to the residency curriculum. Though no significant change in the level of support was shown, this novel evening interactive educational conference was shown to be feasible and a potential approach to educating residents at night.

## Poster 46

### PRELIMINARY EVIDENCE SUPPORTING THE VALIDITY OF A NOVEL PEDIATRIC-SPECIFIC STRUCTURED CLINICAL OBSERVATION TOOL FOR ASSESSMENT ACROSS THE CONTINUUM OF MEDICAL EDUCATION

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**Background:** Currently available direct observation tools lack validity for encounters with children and use a rating scale that does not allow for rating performance on a continuum that can discriminate from novice to expert. In addition, the psychometric properties are not sufficiently established to allow the high stakes decision-making necessary for competency-based advancement. To fill this gap, we developed and established the content validity of a novel pediatric-specific structured clinical observation tool (Western PedSCO). We are now piloting it at 8 institutions in the Western United States.

**Objective:** Perform a preliminary assessment of the construct and criterion validity of the newly developed Western PedSCO tool.

**Methods:** From July 2010 to March 2011, medical students and residents were observed during pediatric patient encounters and evaluated using the Western PedSCO tool. Internal consistency of the four domains of the Western PedSCO (medical interviewing and data gathering, physical exam skills, medical decision making, and patient counseling) was examined using Cronbach's alpha. We established criterion validity using mixed effects regression analysis to evaluate the ability of the tool to discriminate among learners at different levels of training, and by comparing the distribution of scores among trainees at different levels.

**Results:** Our preliminary analysis was conducted on observations of 97 encounters of 64 trainees. Cronbach's alpha within each domain was high (.95 - .97). Second and third year residents scored significantly higher than medical students in medical interviewing and data gathering ( $P=.034$ ), medical decision making ( $P=.047$ ), and patient counseling ( $P=.019$ ). Scores were distributed over the entire 7-point scale without a ceiling effect.

**Discussion:** The Western PedSCO assessment tool has high internal consistency. Score distribution and regression analysis demonstrate that faculty raters were able to use the tool appropriately to discriminate among learners (i.e. criterion validity). Additional data collection and analysis is ongoing and will include confirmatory factor analysis and more complete regression modeling to further establish construct and criterion validity.

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### THE SURFBOARDS RISK SCORE[SRS]: A TOOL TO IDENTIFY RESIDENTS AT-RISK FOR POOR PERFORMANCE ON THE GENERAL PEDIATRICS CERTIFYING EXAMINATION

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**Background:** Successfully passing the General Pediatrics Certifying Examination (GPCE) on the first attempt is a shared goal of residents and residency programs. The United States Medical Licensing Examination (USMLE) Step 1 and In-Training Examination (ITE) scores correlate with GPCE pass rates. Additional markers may predict GPCE performance and a calculated score based on combined markers may identify residents at-risk for failing the GPCE.

**Objective:** To create a tool identifying residents at-risk for poor GPCE performance.

**Methods:** A retrospective chart review of a 3-year cohort of residents graduating between 2008-2010 was conducted. A cumulative risk score [SRS] was created by: a) Assigning risk points per score on each of the following exams (USMLE1, USMLE2, ITE1, ITE2, and ITE3) based on prior literature and local expert opinion b) Summing the risk points for USMLE1, USMLE2 and the resident's most recent ITE to generate a cumulative score yielding four risk groups (low, mild, medium, and high). The odds ratio for GPCE success at each level was evaluated utilizing a bivariate analysis with a 95% CI. The difference in the proportion of residents passing the GPCE in each cumulative risk group was analyzed using Fisher's exact test.

**Results:** Sixty-seven residents took the GPCE for the first time in our cohort. The proportion of residents passing the GPCE was significantly different in the four risk groups: low risk (93%), mild risk (80%), medium risk (63%), and high risk (33%) ( $p=0.008$ ). Odds ratios for passing the GPCE were significantly higher for residents excelling in the USMLE2 (6.5, CI 1.1-37.5) and ITE2 (12, CI 1.1-133.6). Those who excelled on the ITE3 had a 100% pass rate for the GPCE, which significantly differed from those with fair or poor ITE3 performance ( $p<0.001$ ).

**Discussion:** A cumulative risk score based on USMLE and ITE performance effectively stratified residents into groups with increasing levels of risk for failing the GPCE. Next steps include score utilization to identify at-risk residents who are candidates for customized interventions proportional to risk level to optimize GPCE performance.