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**American Thoracic Society
International Conference**

MAY 16 - MAY 21

San Diego

Innovations in Fellowship Education

2014 Highlights Book

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PROGRAM OVERVIEW

The American Thoracic Society (ATS) greatly values a strong fellowship program as a means of academic and clinical success. In an effort to recognize programs that go above and beyond to implement exceptional practices, the ATS Training Committee developed the Innovations in Fellowship Education Award Program.

All U.S. pulmonary, critical care, sleep and allergy fellowship programs (adult and pediatric) were invited to submit one abstract showcasing a novel and innovation best practice method. Abstracts were reviewed and ranked by the ATS Training Committee based on the following criteria:

- **Innovation:** how unique is the educational program? What is new and different?

- **Implementation / Sustainability:** how was the program implemented and how effective was such an implementation? Was this program able to sustain over time?

- **Transferability:** how easily might this educational program be able to be used by other programs?

- **Outcomes:** are there reported outcomes or plans to measure them?

The goal of this program is to honor those fellowship programs that demonstrated educational excellence and then share these best practice with other programs across the country.

All abstracts that were received are published within this booklet. The ATS Training Committee would like to thank all the programs that submitted an abstract and applauds them for innovative and outstanding work!

The ATS Training Committee would also like to recognize those educational programs that expanded knowledge in areas of heath equality or potentially met the needs of a diverse group of trainees. Those programs are noted with an * in the table of contents and the program itself.

CONGRATULATIONS

The ATS Training Committee reviewed and ranked the abstracts based on four categories of excellence. The committee is pleased to honor the following top programs:

- **Baylor College of Medicine**

- **Case Western Reserve University - MetroHealth Medical Center**

- **Mayo Clinic**

- **University of Colorado**

- **University of Maryland**

☆ Baylor College of Medicine
Houston, TX

Abstract Title: The Pediatric Critical Care "Boot Camp" Curriculum

Program Director: M. Hossein Tcharmtchi, MD
Type of Program: Pediatric Critical Care Medicine
Abstract Authors: Danny Castro DO, Satid Thammasitboon MD MPHE

RATIONALE

Pediatric critical care (PCC) fellows are expected to perform competently in a high-risk environment and during crises immediately after residency, where restrictive duty hours are believed to limit clinical experience. As the invasive procedures commonly performed in the intensive care units are no longer requirements for competency in residency training, it is crucial that the new fellows attain competence within those areas in an accelerated fashion in order to provide care with optimum patient safety.

The emergence of simulation-based training (SBT) affords educators the opportunity to train and assess the learners' critical knowledge and skills without risking patient safety. The integration of SBT into a well-designed curriculum will likely optimize learning and expedite progression towards competence.

This curriculum was implemented to provide incoming first year PCC fellows a safe learning environment to apply the knowledge, skills and behaviors required to perform in a high stakes patient care environment.

METHODS

The PCC Boot Camp, an *in situ* simulation-based orientation curriculum, was developed and implemented in a methodical manner. It included the critical steps of assessing needs, prioritizing content, developing goals and objectives and employing adult learning theories. A systematic program evaluation with subsequent changes for improvement was conducted for three successive years.

Curricular objectives guided the selection of evaluation design, measurement methods and the evaluation questions. The purpose of the evaluation was to determine whether the curriculum addressed the identified and prioritized evaluation questions and whether they made good use of available resources.

A pre-experimental, single group, pretest-posttest design was used. Questionnaires and direct observation with itemized checklists were employed as evaluative methods. Questionnaires addressed both explicit and implicit learning objectives. The use of this evaluation was for formative and summative purposes at both the individual and program level.

RESULTS

Over the three-year period, all 16 fellows completed a course evaluation and both pretest and posttest skill assessments. Based on a 5-point Likert scale questionnaire, the fellows rated a median (IQR) score of 5 (5,5) for the overall value of the curriculum and 5 (5,5) for the extent that this curriculum had improved or will improve their clinical knowledge, skills and behavior. The fellows also reported a significantly higher level of comfort [median (IQR)] after the curriculum in the core skills topics. (SEE TABLE)

LEVEL OF COMFORT	PRIOR Median (IQR)	AFTER Median (IQR)	*p*-value
Airway Management	3 (2,3)	4 (3,4)	<0.01
VASCULAR ACCESS			
Ultrasound (US) use for central venous catheterization (CVC)	1.5 (1, 2.3)	3 (3, 4)	<0.01
CVC placement	1.5 (1,2)	3 (3,4)	<0.01
Arterial catheterization	2 (1,3)	3 (3, 4)	<0.01

Skill assessments for both US-guided CVC and arterial catheterization, utilizing itemized checklists, revealed significant improvement in the group's posttest scores compared to pretest scores. (See Figures 1a and 2a)

Each individual fellow also showed improved scores for US-guided CVC and arterial catheterization. (See Figures 1b and 2b)

CONCLUSIONS

Implicit objectives were achieved as participants found the curriculum to be valuable and felt that it improved/will improve their clinical education. Explicit objectives were also achieved as participants reported an increased comfort level in the core skill topics. Beyond perception, the group, as well as each individual, demonstrated significant improvement in the core skills as shown by their increased itemized checklist scores from baseline after participating in the curriculum. Since its inception, the Boot Camp curriculum has been adapted and delivered to other fellowship training programs throughout the institution.
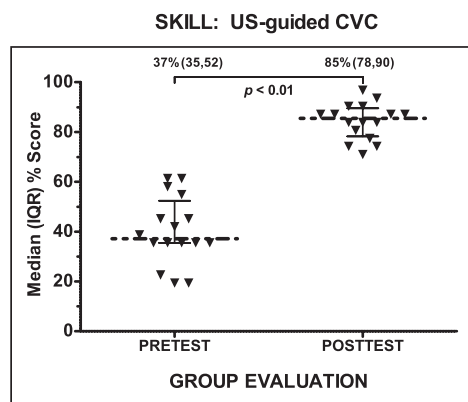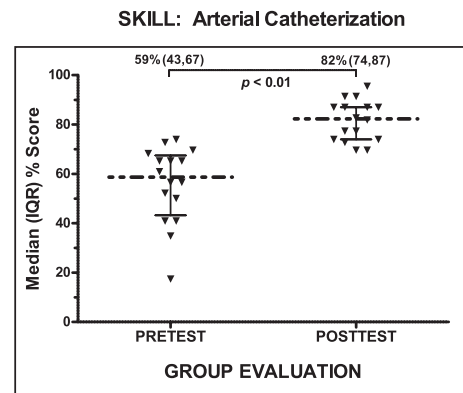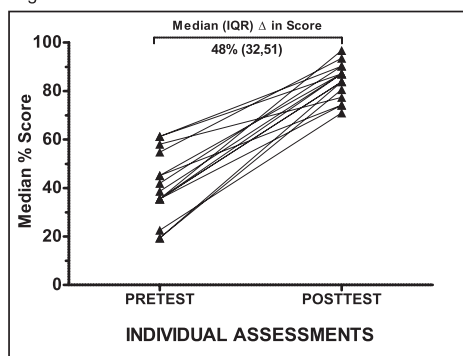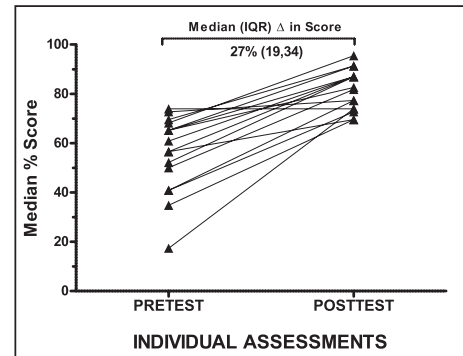

Figure 1a.

Figure 2a.

Figure 1b.

Figure 2b.

⭐ Case Western Reserve University - MetroHealth Medical Center
Cleveland, Ohio

Abstract Title: Standardized Assessment of Academic Productivity During Pulmonary and Critical Care Fellowship Training

Program Director: Ziad Shaman, MD
Associate Program Director: Dennis Auckley, MD
Type of Program: Pulmonary and Critical Care Medicine
Abstract Authors: Daniel Monroy, MD, Ziad Shaman, MD, Dennis Auckley, MD

BACKGROUND

The Accreditation Council for Graduate Medical Education (ACGME) has specific requirements (core, detail and outcome) for Pulmonary and Critical Care Medicine training programs. The requirements include the participation of fellows in scholarly activity and the demonstration of evidence of academic productivity. In the Next Accreditation System (NAS), programs are required to measure and report discrete and observable behaviors that chart the progress of trainees throughout training, known as "Milestones". Milestones for academic and scholarly activity have yet to be established. Metrics by which pulmonary and critical care medicine training programs can measure academic productivity of trainees are lacking. We sought to develop such a tool.

METHODS

At a single academic center, a scoring system for academic productivity was developed. First, a survey was administered to the faculty and fellows of the training program in order to identify areas significant for academic progress. Items of majority consensus were grouped into three domains: Creation of Knowledge (5 items), dissemination of knowledge (7 items) and professional personal development (5 items). A second survey was administered, aimed to assign "mandatory" versus "optional" status of each item within the domains, and to give weight to each item. Areas of controversy were discussed between the authors of this work and consensus was reached. The Pulmonary/Critical Care Academic Scoring System (PASS) was thus created and is shown in attachment 1. The PASS was then applied retrospectively to the program graduates of 3 years prior to the PASS development (Baseline group). The fellows in training were oriented to the PASS and were required to score their academic productivity at each semiannual evaluation that followed that date (Active group). The scores of the Active group were compared to those in the Baseline group using t-test.

RESULTS

The Baseline group (n=6) had an average PASS of 111 points (range 79 to 125, SD 15.6), compared to the active group (n=2) with an average PASS of 134.5 points, (range 111 to 158, SD 23.5, p=0.49). Research projects and Quality Improvement Projects represented the highest proportion of points, followed by Oral Presentations and Medical Certifications. Adherence to "mandatory" items was 87.5 % for all fellows, but 100% in the Active group.

CONCLUSIONS

Establishing a standardized assessment of academic productivity for pulmonary/critical care fellows may be useful in quantifying and comparing academic productivity within and between programs in addition to providing a tool for allowing standardized tracking and reporting of such activity to governing agencies. The observed increase in PASS scores amongst the Active group of fellows in this study may have resulted from a better understanding of academic productivity requirements by the fellows. Improved documentation of academic achievements may have also contributed. Further study with a larger sample size is needed to better understand the validity and utility of this tool.

Pulmonary / CCM Academic Scoring System (PASS)

Domains		Weight	
Creation		**40**	
Research Project	1M	16	Committee approved
QI/QA (or equivalent)	3M	6	End of year presentation
Curriculum Development	O	8	Committee approved
Active IRB	O	4	Each additional >1
Designs/Applications/Patents/Etc.	O	8	
Dissemination		**40**	
Poster Presentation	1m*	2	*
Oral Presentations (core conf./city wide/CWRU)	1m*	2.5	*
Book Chapter	1m**	8	
Research Publication/Review Article	1m**	3	x Impact Factor (Non Peer IF= 1)
Case Report/Case Series	1m**	2	x Impact Factor (Non Peer IF= 1)
Workshop (OSCARs/CWRU)	O	2.5	*
Community Outreach	O	1	
Personal Development		**20**	
CRSP 401 course (Intro to clinical research)	1M	2	Passing grade required
Conference Attendance	4M	2	Each 6 months above 80%
ABIM Cert/CHEST Challenge Playoff	O	6	for each
Medical Society/Committee Active Role	O	2	Institutional x1, Regional/National x2
Special Medical Certification	O	4	Other than Boards/BLS/ACLS

O = Optional   M = Mandatory   m* = only one in the group is mandatory   m** = only one in the group is mandatory   * = Local x1, Institutional x2, Regional x3, National x4

✩ Mayo Clinic
Rochester, Minnesota

Abstract Title: Incorporation of Quality Improvement Education as an Integral Part of Fellows Training

Program Director: Kannan Ramar, MD and Kianoush Kashani, MD
Type of Program: Pulmonary and Critical Care Medicine, and Critical Care Medicine Fellowship programs
Abstract Authors: Kianoush Kashani, MD; J. Christopher Farmer, MD; Kaiser G. Lim, MD; Pablo Moreno-Franco, MD; Timothy I. Morgenthaler, MD; Gene C.Dankbar; Curt W. Hale; Kannan Ramar, MD

RATIONALE

Accreditation Council for Graduate Medical Education (ACGME) requests quality improvement (QI) education incorporation into residency/fellowship training programs. However, this has been a challenge to implement due to multiple reasons and includes little time dedicated to quality, lean, systems, or process improvement training in most medical school programs, and the lack of faculty resources, time, and expertise to teach. Improvement in the quality of patient care and patient safety is not only a moral obligation, it has become a professional and economic necessity in light of the reforms ushered in by the Affordable Care Act and ACGME accreditation changes of 2006, 2009, and 2013. Our external obligations to legislative and accrediting bodies, along with our drive to constantly improve the value of care, compel training programs to plan for explicit training in QI. We conducted an innovative QI education program to incorporate QI training as a required curriculum for our fellows.

METHODS

Our fellowship program collaborated with the Mayo Quality Academy (MQA) to customize and modify the existing Mayo Quality Fellows (MQF) curriculum to meet the curricular needs of our fellows with the help of two quality coaches and teach these in seventeen weekly scheduled sixty minute sessions over five months starting at the beginning of the academic year. The process involved didactic sessions and hands-on workshop sessions. All fellows were to achieve Bronze and Silver certification prior to graduation (Figure 1 and 2). Silver certification required passing four written exams on QI with a score of > 80% and submitting a healthcare related QI project. Five QI projects (twenty fellows grouped into 5 teams) were selected based on Impact-Effort Prioritization matrix and DMAIC methodology was used to complete their projects.

RESULTS

All twenty fellows were Bronze certified and fourteen (70%) were Silver certified by the end of the academic year. All five QI projects were completed and showed positive impacts on patient safety and care. Anonymous surveys on fellows showed improved learner satisfaction and a positive impact on the fellows' QI curriculum. A survey was performed at the end of the QI educational session and close to the end of the academic year. In response to the question "I felt prepared to direct QI activities in my future practice," the fellow's mean rank increased significantly after training from a mean near 2 ("Disagree") to just above 4 ("Agree") on a five-item Likert scale. Using the Wilcoxon sign-rank test this increase was statistically significant (Δmean [SE] = +2.35[0.24], 95% CI: 1.84-2.86, p<0.0001). Graduated fellows also felt the QI training increased their ability to undertake future QI projects, helped with employment and career advancement, the QI curriculum had appropriate content, teaching pace, and did not significantly displace other important clinical core curriculum topics. Subsequent survey data suggest that fellows considered the QI training program to be educationally valuable and it has also measurably improved the care of ICU patients and boosted fellows' academic productivity. Table 1 summarizes the results.

CONCLUSIONS

The QI education was successfully implemented in our fellowship program and now is an established and integral part of the fellowship core curriculum. Although there are no established guidelines for QI education, we have been able to incorporate advanced QI methodology training for the fellows to achieve these goals and successfully complete this necessary education.

REFERENCES

1. IOM committee calls for complete revamping of health care system to achieve better quality. Qual Lett Healthc Lead. Mar 2001;13(3):14-15.

2. Varkey P, Karlapudi S, Rose S, Nelson R, Warner M. A systems approach for implementing practice-based learning and improvement and systems-based practice in graduate medical education. Academic Medicine: Journal of the Association of American Medical Colleges. Mar 2009;84(3):335-339.

Figure 1. Mayo Quality Fellows Program levels

Level	Focus	Intended Audience	Expected Role / Function	No. of QI projects	Process Improvement Project Requirements	Scholarly Activity Requirements	Mayo written exam requirements	External Certification Alignment (not required)
Bronze	Understand Mayo Value Equation, recognize Mayo's quality improvement framework (DMAIC), suggest process improvements & function as an active QI team member.	Consultants, Residents, Fellows, Supervisors, Managers, Nurses & Allied Health staff	QI Improvement team member	none	none	none	Multiple Choice Questions. Open book / notes	Quality Improvement Associate
Silver	Knowledgeable in core QI methods. Select, initiate & prioritize Quality improvements projects and related Project Charters. Commission teams/ projects to impact the Mayo Value Equation. Support, coordinate & monitor QI teams. Conducts project review. Receives support/guidance from QI expert.	Consultants, Residents, Fellows, Administrators, Supervisors, Managers, Nurses & Allied Health staff	QI Project Champions or Process Owners	1	Participation on a QI team	none	Multiple Choice Questions. Open book / notes	Greenbelt
Gold	Apply, facilitate, coach and teach process improvement using QI frameworks including DMAIC / Lean / Six Sigma, applying structured process improvement / new process design methodology, incorporating change management best practices, guiding and encouraging individuals and teams through process improvement initiatives, and spreading successful innovation.	Quality Academy Faculty Members, Analysts, QI Advisors	QI Practitioner / resource	2	Assigned to a QI team as a Leader, Facilitator, or QI Expert	Oral presentation, posterboard presentation or publication of one QI related subject at a public venue	Multiple Choice Questions. Open book / notes	Blackbelt

Table 1. Summary results

Fellows participating	20
Physician Champions participating	5
Quality coaches participating	2
Scheduled formal group teaching sessions	17
Duration of sessions (months)	5
Length of sessions (minutes)	60
Total time commitment to formal teaching (hours)	25.5
Number of Quality Improvement Projects	5
Number of Fellows per Project Team	4
Duration of Projects (months)	5
Number of professional posters presented	5
Fellows awarded Silver Quality Fellowships	14

Figure 2. Silver Quality Fellows courses

☆University of Colorado
Aurora, Colorado
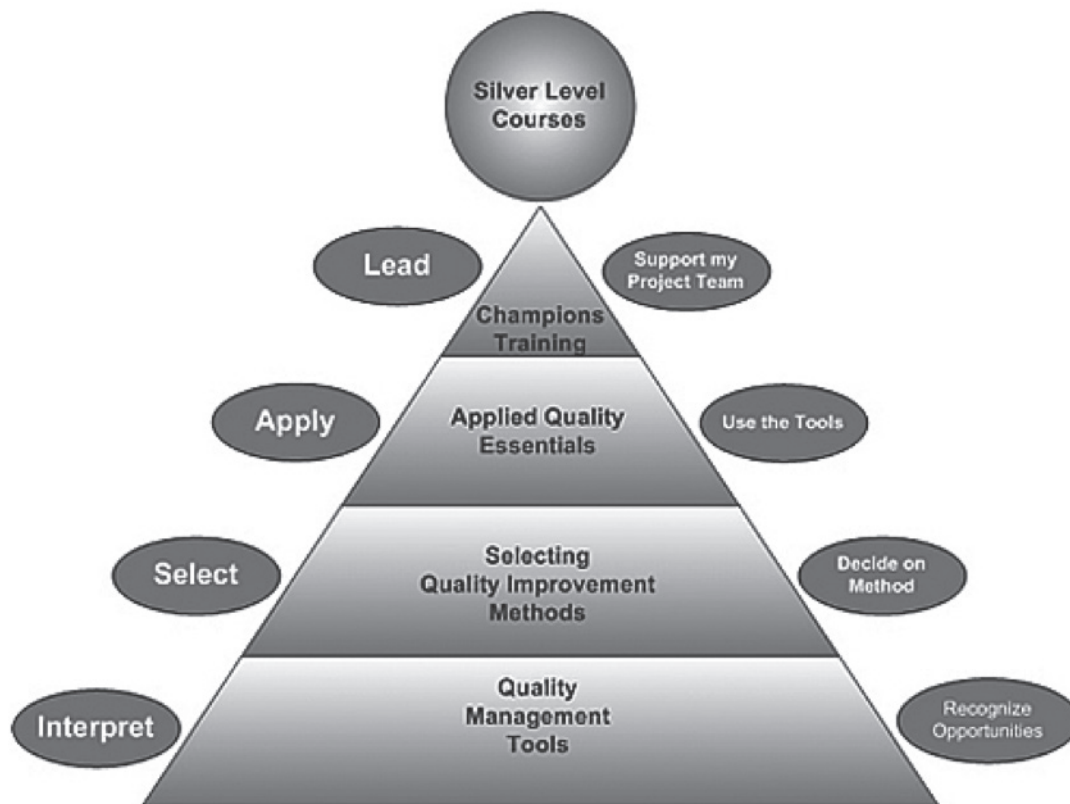
Abstract Title: Addressing Entrustable Professional Activities through a Novel ARDS Curriculum

Program Director: Eva Grayck, MD
Type of Program: Pediatric Critical Care Medicine
Abstract Authors: Angela S. Czaja, MD; Eva N. Grayck, MD, and Todd C. Carpenter, MD

RATIONALE

Although graduate medical education has based its educational curriculum and evaluation tools on core competencies for many years, practical implementation and meaningful assessment remains a challenge. Clinician educators have struggled with evaluating learners based on a list of separate behaviors, rather than their ability to integrate these competencies into real-life professional tasks.

To overcome this barrier, ten Cate and Scheele recommended identifying key EPAs that individuals within a medical specialty would be expected to perform independently. A trainee can then be evaluated based on whether he or she can be trusted to perform a professional activity without supervision, a level only achieved once the essential competencies have been attained. This EPA-based framework has been perceived as more intuitive by both learner and teacher, and is being adopted by organizations responsible for ensuring competency of medical professionals including the American Board of Pediatrics (ABP).

The ABP is actively developing relevant EPAs for each pediatric subspecialty including PCCM. One proposed PCCM EPA is the "acute management of the critically ill patient, including those with underlying chronic disease". Under this broad EPA, more specific activities will need to be defined by PCCM training programs. Anticipating this, we developed and piloted an educational module for a PCCM-relevant EPA which could then serve as a model for other EPAs.

EDUCATIONAL STRATEGY

The EPA selected for this pilot module was "Care of the Patient with Acute Respiratory Distress Syndrome (ARDS)." To achieve competence of this EPA, a fellow would require a solid understanding of physiology and pathophysiology, an ability to apply this knowledge to decision-making under varying circumstances and then integrate these skills into the overall care of patients with ARDS.

Thus, the goal for this module was to impart, in an engaging manner, essential knowledge for the delivery of high level clinical care for an important ICU problem. Our curriculum committee, composed of the program co-directors, core teaching faculty and senior fellows, developed the module. As real-life practice involves a multi-disciplinary team, we sought involvement of colleagues from respiratory therapy, pharmacy, nutrition and our advanced practice team. We outlined the essential topics in the care of a patient with ARDS throughout the ICU course. To maximize effectiveness based on adult learning theory, we integrated diverse teaching methods into the curriculum: didactic sessions with discussion, interactive teaching sessions including hands-on experience (e.g. ventilator), and journal clubs to critically appraise ARDS literature. The courses of three actual ARDS cases were "followed" throughout the module to highlight different clinical issues. Finally, to encourage self-directed learning and independent thinking, selected sessions were facilitated by fellows with faculty mentorship.

IMPLEMENTATION AND EVALUATION

Sessions in the module ran concurrently with the general PCCM curriculum over several months of 1-2 sessions per week. (Table 1) Faculty and fellows were given learning objectives with key scientific papers, and relevant details of each ARDS case with discussion questions were sent ahead of time for the fellows to review.

A formal evaluation of the curriculum is currently in process. However, subjective feedback suggests fellows found this approach to be more helpful in integrating many different pieces into an overall approach in the management of ARDS. Determining the module's impact on supporting fellows in achieving competency in this EPA will take several years. We will follow in-service testing scores while developing and implementing other tools to test trainee knowledge and track actual care delivered and patient outcomes of ARDS cases in our ICU.

Table 1. Curriculum for "Care of the Patient with ARDS" Entrustable Professional Activity

Introductory Curriculum (Pre-ARDS Module)			
Principles of Mechanical Ventilation and Non-invasive Ventilation (Didactic and Hands-on), Basic Respiratory Physiology (Didactic and Interactive), Approaches to Intubation, Cardio-pulmonary Interactions (Didactic and Interactive), Ventilator-Induced Lung Injury (Didactic)			
ARDS EPA Module			
Session	ARDS Topic	Session Format	Primary Facilitator
1	Introduction to ARDS and Case Scenarios*	Didactic with Discussion	Faculty
2a	Non-invasive Ventilation in ARDS – Principles and Evidence Base	Didactic with Discussion	Faculty
2b	Non-invasive Ventilation in ARDS – Applied principles with	Interactive/Hands-on	Faculty
3	Molecular physiology and Biomarkers of ARDS	Didactic with Discussion and Critical Appraisal of Primary Literature	Faculty + Fellow
4	Nutrition in ARDS	Didactic with Discussion	Faculty
5a	Approach to Conventional Mechanical Ventilation (CMV) in ARDS – Principles and Evidence Base	Didactic with Discussion	Fellow**
5b	Applied CMV in ARDS	Interactive/Hands-on with Discussion	Faculty
6	Prone positioning in ARDS – Principles and Evidence Base	Didactic with Critical Appraisal of Primary Literature	Fellow**
7	Alveolar Edema and Fluid Management in ARDS – Principles and Evidence Base	Didactic with Discussion	Faculty
8	Use of High-Frequency Ventilation in ARDS – Principles and Evidence Base	Interactive with Discussion	Faculty
9	Use of Inhaled Nitric Oxide in ARDS – Principles and Evidence Base	Didactic with Discussion and Critical Appraisal of Primary Literature	Fellow**
10	Use of Surfactant in ARDS - Principles and Evidence Base	Didactic with Discussion and Critical Appraisal of Primary Literature	Fellow**
11a	Use of ECMO in ARDS - Principles and Evidence Base	Didactic with Discussion	Faculty
11b	Use of ECMO in ARDS – Applied Principles	Interactive with Discussion	Faculty
12	Recovery from ARDS – Extubation Readiness, Long-Term Outcomes and Rehabilitation	Didactic with Discussion	Faculty

General Critical Care Curriculum (Concurrent with ARDS Module)
Example Topics
Sedation of Mechanically Ventilated Patients, Delirium in the ICU, Critical Illness Polyneuropathy, Chronic Ventilation, Hospital-Acquired Infections

* ARDS case scenarios developed and discussed throughout module

** Fellow facilitators paired with faculty mentor

⭐ University of Maryland
Baltimore, Maryland

Abstract Title: MarylandCCProject.org - Using an E-Community to Enhance Critical Care Fellowship Education

Program Director: Michael McCurdy, MD
Type of Program: Critical Care Medicine
Abstract Authors: James Lantry III, MD, John Greenwood, MD, Nirav G. Shah, MD, Michael T. McCurdy, MD

RATIONALE

In spring of 2013, the University of Maryland Critical Care Medicine (CCM) fellowship directors created a weekly educational forum that would invite experts from our own hospital and around the country to further our fellows' education in core competencies. The University of Maryland's multidisciplinary critical care curriculum and training are the fellowship's greatest strengths, so we attempted to integrate existing fellow lectures from the Pulmonary & Critical Care Medicine (PCCM), Anesthesia Critical Care Medicine (ACCM), Neurological Critical Care Medicine (NCCM), and Maryland Shock Trauma's Surgical Critical Care (SCC) programs into a unified conference series. However, we encountered two major challenges in its creation: 1) ensuring conference attendance for all forty fellows in any of eight intensive care settings; and 2) the lack of a dedicated forum in which fellows could share cases and pertinent clinical information outside of teaching settings.

To address these hurdles, we established a fellow-run, online educational forum where fellows could participate in self-directed, asynchronous learning, review weekly lectures, share educational pearls, and reflect on their own clinical experiences. We hoped to establish an experiential learning opportunity for others to learn in parallel with the author.

METHODS

Starting July 2013, we utilized Camtasia Studio® 8 to record the University of Maryland Multi-Departmental Critical Care Core Curriculum Conference Series. We then created a free-access educational website (MarylandCCProject.org) to post these lectures. The site includes a videocast, lecture slides, iTunes podcasts, and a written summary of each core lecture. Additionally, we invited fellows to create a weekly "clinical pearl" based on interesting cases. Nine fellows (8 CCM and 1 PCCM) participated in authorship of 49 posts over the 6-month period. Two CCM fellows have served as website editors since its inception, ensuring the postings' consistent format and educational value.

Six months after launching MarylandCCProject.org, we sent an online 10-question survey (Table 1) to 38 of the 40 critical care fellows (the two website editors were excluded from participation). The survey assessed the utilization, ease of use, and the content's educational efficacy. Additionally, we asked the fellows to estimate the amount the website materials improved their overall knowledge, skills, and medical practice. Survey completion was at each fellow's discretion, and all answers were anonymous.

RESULTS

All 38 fellows (i.e., 14 PCCM, 13 SCC, 9 CCM, 1 NCCM, and 1 ACCM) completed the survey. On average, each fellow accessed the site on 5 separate occasions (0 to 24), with all but 3 fellows accessing the site at least once (1 SCC and 2 PCCM). Of the 36 fellows using the site, 100% found the site easy to use and navigate, and 75% of fellows watched ≥1 webcasted lecture (27/38), with 24% preferring the webcasted lectures over live lectures (9/38). Almost all (97%; 33/34) felt that the website improved their medical knowledge, with 44% (15/34) strongly agreeing (Table 1). 97% of fellows learned new skills from the website (32/33) and 97% state the website changed the way they practice medicine (28/29).

CONCLUSIONS

Our survey demonstrates that a vast majority of our fellows use the website to supplement their education. Additionally, regardless of the training program, our fellows almost universally felt that the website expanded medical knowledge, taught new skills, and changed how they practice medicine. The next phase of the website will be the inclusion of board review materials. Additionally, off-site training programs in Haiti and the Dominican Republic use the website as the foundation for their critical care teaching. Notably, the website has received 27,493 "hits" from 107 countries in the past 6 months. We hope to increase international participation with postings that highlight interesting cases based in austere environments.

Table 1: MarylandCCProject.org Survey Results

	1	2	3	4	0
	SD	D	A	SA	NA
1) MarylandCCProject.org has improved my medical knowledge	1 (2.6%)	0	18 (47.3%)	15 (39.5%)	4 (10.5%)
2) MarylandCCProject.org has taught me useful new skills	1 (2.6%)	0	17 (44.7%)	15 (39.5%)	5 (13.2%)
3) MarylandCCProject.org is a useful educational resource	1 (2.6%)	0	14 (36.8%)	20 (52.6%)	3 (7.9%)
4) The topics discussed on MarylandCCProject.org are pertinent to my daily practice	1 (2.6%)	0	13 (34.2%)	21 (55.3%)	3 (7.9%)
5) Use of MarylandCCProject.org has changed the way I practice medicine	1 (2.6%)	0	18 (47.3%)	10 (26.3%)	9 (23.7%)

SD: strongly disagree, D: disagree, A: agree, SA: strongly agree

Boston University
Boston, Massachusetts

Abstract Title: Innovative Core Curriculum to Introduce Trainees to Pulmonary and Critical Medicine Research

Program Director: Christine Campbell Reardon, MD
Type of Program: Pulmonary, Allergy, Sleep and Critical Care Medicine
Abstract Authors: Christine Campbell Reardon, MD

BACKGROUND

Residents in training have limited opportunities to pursue basic or translational research projects during their residency years. A number of barriers to research training during residency can be attributed to the implementation of duty hour regulations and admission caps. These regulations require more day hours for patient care for accreditation and limit the scheduling flexibility necessary to permit a resident to participate in a dedicated research block in a translational or basic research project. The resident work schedule now is more conducive for the longitudinal pursuit of a clinical or educational project. As a consequence, pulmonary and critical care fellows who are now entering academic research fellowship programs have little recent exposure to translational or basic research. Despite these limitations, one of the programmatic goals of our fellowship training program has been to develop independent researchers in Pulmonary, Allergy, Sleep and Critical Care Medicine across the spectrum of clinical, translational and basic research.

METHOD

Our program has a curriculum designed to facilitate and support the entry of fellows into research with an emphasis on the translational and basic sciences. Our two-pronged approach includes a dedicated 3-week laboratory course and a seminar series. The seminar series is integrated into the core pulmonary curriculum and precedes the mandatory weekly didactic teaching session. Each week over a 6-month period, a member of our research faculty gives a 30 minute seminar presentation specifically aimed at first year fellows yet to enter research stages of training. During the seminar series, fellows are introduced to the members of the research faculty and their laboratory team of technicians, pre-doctoral and post-doctoral researchers. The faculty member provides an overview of their work along with the specific types of projects available for fellows to join. The faculty member has an early opportunity to engage the interest of a fellow who may not have considered a translational or basic project as a research pathway. The seminar series also serves to illustrate the importance of research in making advances in the understanding and therapy of lung disease.

The laboratory course transitions fellows to the research stage. All Pulmonary and Critical Care fellows participate, along with visiting fellows from other programs. The course is comprised of didactic sessions, lab practicums, attendance at lab group meetings, and dedicated time to meet with potential research mentors. The topics covered include cell culture techniques, immunohistochemistry, DNA and RNA isolation and analysis, micro-RNA, transgenic and knockout mice, in-situ hybridization, proteomics, signal transduction, microarray technology and analysis, protein isolation, viral-mediated gene transfer, flow cytometry, cloning, stem cell biology, lung structure and development, PCR techniques, etc. In addition, the course also contains sessions in epidemiology, statistics, clinical trial study design, clinical research in the ICU, outcomes and comparative effectiveness along with scientific communication and grant writing. The lab course covers ethics in research, guideline methodology, and lab safety (Appendix 1).

RESULTS

Years	Number of fellows	Number of fellows who chose a basic or translational project	Number of fellows continuing basic or translational research after fellowship	Number of fellows continuing clinical research after fellowship	Number of fellows remaining at an Academic Institution after fellowship
2003-2009	35	26 (74%)	9 (26%)	14 (40%)	28 (80%)

DISCUSSION

Early introduction of first year clinical fellows to research faculty, research opportunities along with a 3-week intensive laboratory course promotes fellow matriculation in translational and basic research training, fostering interests in and abilities to succeed with an academic investigative career.

Appendix 1: Laboratory Course Curriculum

Monday July 8

9:30 - 10:00	Introduction
10:00 - 11:00	Fellow/Post-doc Perspective
11:00 - 12:00	RNA analysis (Northern analysis, RNA isolation Nuclear-run-off, RT-PCR)
12:00 - 1:30	Lunch with Developmental Lung Biology Research Group
1:30 – 3:00	DNA I: Introduction and overview — cloning a gene
3:00- 4:00	Genome wide screening strategies

Tuesday July 9

9:30 - 11:00	Lab safety training
11:00 -12:00	Introduction to Cell Culture: Principles and Practice
12:00 - 1:00	Pulmonary Work Rounds (R-3)
1:00 – 4:00	Mentor time (meet with Pulmonary faculty and staff to decide which lab you want to join)

Wednesday July 10

9:00- 10:00	Epithelial Group Meeting (R3 Conference room)
10:00- 11:00	Gene function I: RNAi & micro-RNAs
11:00- 12:00	Processing of Human Biological Samples
12:00- 1:30	Lunch: Research Mentors
1:30- 4:00	Mentor time
4:00- 5:30	Grand Rounds

Thursday July 11

9:00- 10:00	ES & iPS cells
10:00- 11:00	Viral-mediated gene transfer
11:00- 12:00	Clinical-Epidemiology Outcomes
12:00- 1:30	Lunch with Stem Cell Lab Group
1:30- 4:00	Mentor time

Friday July 12

8:30 - 9:30	Work in Progress Seminar
9:30- 10:30	Gene function I: Transgenic and knockout mice
10:30- 12:00	In situ hybridization
12:00- 1:30	Lunch: Epithelial Cell Group
1:30- 2:30	Lung Structure and Development
2:30- 3:30	Organ culture

Monday July 15

9:00- 10:00	Principles of Immunohistochemistry
10:00- 12:00	Immunohistochemistry Practice
12:00- 1:30	Lunch with Mentors
1:30- 2:30	Introduction to Proteins
2:30- 4:00	Microarray Technology and Analysis

Tuesday July 16

9:00 - 10:30	Promoter Analysis and DNA protein interactions
10:30- 12:00	Protein Isolation and Western blotting: Principles and Practice
12:00- 1:00	Pulmonary Work Rounds (R-3 Conference room)
1:00- 4:00	Mentor time

Wednesday July 17

9:00 - 10:00	Epithelial Group Meeting
10:00 - 11:00	Cell Signaling Events
11:00- 12:00	Immune cell signaling
12:00 – 1:30	Lunch with Lung Biology Group
1:30- 4:00	Mentor time
4:00- 5:30	Grand Rounds

Thursday July 18

9:00- 10:30	Clinical Research I: Epidemiology & Study Design
10:30- 12:00	Clinical Res. II: Statistics
12:00 - 1:30	Lunch with Bioinformatics
1:30 – 4:00	Mentor time

Friday July 19

8:30 - 9:30	Work in Progress
9:30 - 11:00	Clinical Research in ICU
11:00 - 12:00	Quantitative PCR
12:00 - 1:30	Lunch with Clinical Epidemiology Group
1:30- 3:00	Clinical Research III: Clinical Trial Study Design

Monday July 22

9:00 - 10:00	Mentor time
10:00 - 11:00	Flow cytometry
11:00 - 12:00	Lab practice and safety
12:00- 1:30	Lunch with Pulmonary Immunology Group
1:30 - 2:30	Office information- Grants Management
2:30- 4:00	Scientific communication & grant writing

Tuesday July 23

9:00-10:00	Core Technologies
10:00-11:00	Faculty Diversity and Development
11:00-12:00	Guideline Methodology
12:00-1:00	Concluding remarks and feedback

Cleveland Clinic
Cleveland, Ohio

Abstract Title: Use of Simulation to Rapidly Increase Airway Management Knowledge, Skills, and Confidence in Critical Care Fellows

Program Director: Eduardo Mireles-Cabodevila, MD (Critical Care Medicine) and Rendell Ashton (Pulmonary and Critical Care Medicine)
Associate Program Director: Aanchal Kapoor, MD (Critical Care Medicine) and Neal Chaisson (Pulmonary and Critical Care Medicine)
Type of Program: Critical Care Medicine and Pulmonary and Critical Care Medicine
Abstract Authors: Kapoor, A, MD, Mireles, E, MD, Duggal, A, MD, Ashton, R, MD, Krishnan, S, MD, Rathz, D, MD, Chatburn, R, MHHS, RRT-NPS

INTRODUCTION

Airway management in the critically ill patient is a core skill for critical care fellows; however, 36-51% of critically ill patients undergoing intubation have life-threatening complications. Airway management training during internal medicine residency is variable, most relying on experiential training. Critical care programs use task simulators, operating room rotations, classroom and bedside teaching, none of which allows uniform or consistent replication of the ICU environment. Simulation in medical education enables learners to practice necessary skills in an environment that allows errors and professional growth without risking patients' safety. To build trainees' skills and confidence in airway management, we developed a course using high fidelity simulators and iterative scenarios. Our experience provides preliminary insight into whether such a course helps fellows reach a uniform knowledge rapidly and increase their confidence in airway management. Ongoing analysis will assess the impact of this training on participants' clinical performance.

METHODS

The course curriculum was developed by a task force of intensivists emphasizing 4 domains: 1) difficult airway assessment and recognition, 2) protocolized decision making, 3) intubation skills, and 4) specific details regarding intubation in critical care patients. Algorithms and scenario test questions were developed based on a review of the literature and Delphi technique discussions. All fellows (N=39) received educational materials (key articles, protocols and content outline) before the course. We used task trainers for skill stations and high-fidelity mannequins to simulate the ICU environment for the intubation scenarios. One faculty member served as the trainer and two others tracked the participants' activities and controlled the mannequins remotely. Knowledge acquisition on each of the 4 domains was assessed with a pretest and posttest on the day of the course and knowledge retention was assessed by repeating the test 2-3 months later. Confidence and attitudes toward intubation were assessed by a survey that was administered to the fellows, nurses and respiratory therapists in the ICU before the course was announced and 3-4 months after the course. Finally, to assess the effects on patient outcome, we are currently reviewing intubation procedure data during 5 month periods before and after the course.

Median test scores were compared using the Mann-Whitney Rank Sum test (p<0.05 considered significant). Chi square test was used to assess proportions of responders of the surveys.

RESULTS

During 2013, 39 fellows (Critical Care Medicine and Pulmonary/Critical Care) took the airway course. Table 1 shows self-reported responses on pre- and post-course surveys. We found a significant decrease in anxiety during intubation, improved recognition of a difficult airway and a better recognition of need for help. In medical knowledge, the median post-test scores improved by 33% (from 70 to 93%, p < 0.001). The repeat post-test showed that the median score dropped by 13% (from 93% to 80%, p < 0.001) at 3 months, while the nurse and respiratory therapist survey reported better knowledge on the airway and positioning (increase from 53% to 76% in the categories "very clear" and "expert"
(P = 0.001)).

DISCUSSION

Our study demonstrates that training on an intubation protocol with a course using simulation is feasible, and leads to rapid knowledge and skill acquisition in a standardized practice, improvement in test knowledge and self-reported trainee confidence. The course is now part of the curriculum. Ongoing study includes assessment of actual clinical outcomes of intubation procedures before vs. after the course, and efficacy of a refresher course 3 months after the first course. The experience has also created excitement among fellows and faculty to design and study the impact of more simulation-based ICU skills courses.

Table 1. Results of the pre and post course survey assessing attitudes of fellows towards intubation

Question	Optimal Answer	Beginner Fellow		Intermediate Fellow		Advanced Fellow	
		Pre	Post	Pre	Post	Pre	Post
What is the percentage of intubations you consider difficult?	<20%	50%	78%*	66%	84%*	100%	100%
How many attempts would you consider appropriate, before asking for help?	<3	50%	89%*	83%	83%	83%	91%*
How anxious do you feel when you have to intubate someone?	Neutral or confident	0%	45%*	67%	88%*	71%	82%
How would you rate your intubation skills?	Good to very good	0%	43%*	66%	88%*	100%	100%
How would you rate your understanding of the airway anatomy?	Very Clear	50%	56%	67%	100%*	57%	91%*
How would you rate your understanding of concepts related to patient positioning?	Very clear	50%	33%	33%	100%*	43%	64%*
How would you rate your understanding of the physiologic and pharmacologic effects of drugs used for intubation?	Good to excellent	50%	88%*	88%	84%	100%	100%

* significant result by Chi square test

Geisinger Medical Center
Danville, Pennsylvania

Abstract Title: Point of Care Critical Care Echocardiography Education in Critical Care Medicine Fellowship

Program Director: Karen Korzick, MD
Type of Program: Critical Care Medicine
Abstract Authors: Alex Bastidas, MD; Abbas Ali, MD; Karen Korzick, MD

Point of care echocardiography has become an invaluable tool in the assessment and management of critically ill patients. Development of national standards for competency in point of care Critical Care Echocardiography is in process; but, at present, a clear consensus on standards for competency and on best practice in educational methods does not exist.

We have developed a program for point Critical Care echocardiography competency and CCM Fellowship education, based on a current read of the literature on the topic. Our curriculum currently consists of:

1) A two day intensive echo and ultrasound symposium conducted in July of each Fellowship year. Data from the symposium conducted in July, 2013, reveals significant improvement in the knowledge of ultrasound physics, image acquisition, and clinical applications among attendees.

2) Completion of a comprehensive on-line echo and ultrasound course during year one of the fellowship.

3) A programmed, six month dedicated curriculum in Critical Care point of care Echocardiography during the two year Fellowship:

   a. Month one: working in Echocardiography lab with Echo techs to learn details of image acquisition and "knobology." This further strengthens knowledge and skills obtained during the two day symposium.

   b. Month two and three: Critical Care Echocardiography. Fellow is assigned to rotation full time for four weeks, and is responsible for conducting Echocardiograms on all Critical Care Service patients for whom a formal Cardiology Echo is ordered.

   c. Month four, five and six: imbedded within the 9 months of ICU rotations during the CCM Fellowship. Fellows are to conduct bedside Echo and ultrasound studies, store them, interpret them, and submit them for expert over-reading.

4) A standardized process for conducting point of care critical care echocardiography has been established, including standards for which Echo images are to be acquired, items to be addressed on interpretation of the Echo study, storage of each study, and expert over-reading of each study.

5) A monthly lecture series on Echocardiography, conducted the fourth Tuesday of each month.

Our goal is that by the completion of our two year CCM Fellowship, point of care echocardiography competency at Level 2 as per ASE recommendations is achieved with a total of 150 studies acquired, 300 studies interpreted with 90% concordance between Fellow interpretation and Expert interpretation.

APPENDIX 1: POINT OF CARE ECHOCARDIOGRAPHY EDUCATION IN CRITICAL CARE MEDICINE FELLOWSHIP
Protocol for Echo months 2 and 3

CRITICAL CARE ECHO/US ROTATION GUIDELINES
The following are guidelines for the Fellow duties/responsibilities during the 2nd and 3rd month of echo/us rotation.

1. Prior to the beginning of the month, the Fellow will meet with Dr. Ali to discuss the objectives and dynamics of the rotation.

2. The Fellow will be responsible to obtain a copy of the daily list of bedside echocardiograms that are being ordered from the AICU. This can be obtained in the echo lab front desk every morning.

3. The Fellow will be responsible to perform a complete Critical Care focused bedside echocardiogram on those ICU patients in whom a formal echocardiogram has been ordered. The minimal amount of views for each study to be will be determined according to a pre-specified protocol that will be given to the Fellow at the beginning of the rotation. The images will need to be saved in DVDs that can be obtained with the CCM program coordinator.

4. The Fellow will be responsible to keep log of the studies performed and will make a report of each of the studies. The report should be written using the provided template.

5. The daily list of bedside echocardiograms, the DVDs, and echo reports should be kept and organized in a binder which will be given to the Fellow by the Program Coordinator at the beginning of the rotation.

6. At the end of the each week, the studies and reports will be sent to Dr. Ali for evaluation.

7. The 4th Tuesday of the month the Fellow will be responsible to present an Echo lecture with a topic and literature assigned by Dr. Ali.

APPENDIX 2: CRITICAL CARE ECHOCARDIOGRAM PROTOCOL

1. Parasternal Long Axis (PLAX):
   - PLAX
   - PLAX deep: identify descending thoracic aorta
   - PLAX: color Doppler on mitral valve (mv)
   - PLAX: color Doppler on aortic valve (av)
   - PLAX: left ventricular outflow tract (LVOT)
   - PLAX: zoom on LVOT and measure its diameter (just proximal to av leaflets)
2. RV inflow: (same position as PLAX with median tilt)
   - RV inflow 2D
   - RV inflow color Doppler (for TR)
   - RV inflow with CW Doppler (for maximal TR velocity)
3. Parasternal Short Axis view (PSAX):
   - PSAX: AV level
   - Zoom on AV
   - Color Doppler on AV
   - Color Doppler on PV
   - Color Doppler on TV
   - CW on TV
   - CW on PV
   - PSAX at MV level
   - PSAX at papillary muscles level
   - PSAX at apex
4. Apical 4 chambers view: A4
   - A4
   - A4 MV color Doppler
   - A4 Pulse Doppler at MV inflow
   - A4 color Doppler at TV
   - A4 CW Doppler at TV
   - A4 tissue Doppler (TDI) at mitral annulus
5. Apical 5 chambers view
   - A5 2D
   - A5 color Doppler
   - A5 pulse Doppler at LVOT (just proximal to AV leaflets insertion)
   - A5 CW Doppler (for AV maximal velocity)
6. A2 2D: Apical 2 chamber view
7. A3 2D: Apical 3 chamber view
8. A3 pulse Doppler (for calculation of SV)
9. SBC 4 chamber: Subcostal 4 chamber view
10. SBC IVC hepatic vein: Subcostal inferior vena cava/hepatic veins view and respiratory variation
11. SBC IVC MM: Subcostal inferior vena cava M mode

APPENDIX THREE: FOCUSED ADVANCED ECHOCARDIOGRAPHY REPORT

1. Description of technical quality of the study
2. LV assessment:
    Qualitative assessment of LV size
    Overall LV systolic function: hyperdynamic, normal, mild/moderate/severe dysfunction
    Diastolic dysfunction (based on PW of MV and mitral annulus TDI)
    Visual evaluation of left atrial size
3. RV assessment:
    Qualitative assessment of RV size
    Qualitative RV function: hyperdynamic, normal, depressed
    Ventricular septum abnormalities (eg. Flattened, paradoxical septal motion)
4. Valve assessment:
    Visual condition of aortic, mitral and/or tricuspid valve (calcification, sclerosis)
    Major valvular regurgitation and/or stenosis suspected
5. Great vessels assessment:
    Inferior vena cava diameter and collapsibility
6. Measurements (done automatically by the machine:
    Mitral valve E velocity: A velocity:
    E/A
    Ea: Aa
    E/Ea   A/Aa
    LVOT: TVI
    LVOT: diameter
    AV maximal velocity
    TV max velocity
    Pulmonary pressure (TR peak velocity and RAP estimation)
7. Pericardium:
    Pericardial effusion, mild/moderate/severe
    Tamponade physiology present or not
8. Pleural effusion if present

Indiana University
Indianapolis, Indiana

Abstract Title: IU Talk: Implementation of an immersive, three-day end-of-life communication skills course for fellow-level trainees

Program Director: Jack Buckley, MD
Associate Program Director: Gabriel Bosslet, MD
Type of Program: Pulmonary and Critical Care Medicine
Abstract Authors: Gabriel Bosslet, MD

BACKGROUND

The imperative for effective communication is amplified in the intensive care unit and oncology settings. Clinicians and families must use medical facts and patient values to come to a principled resolution regarding difficult treatment decisions. While all clinicians may receive training in basic communication skills, most receive little formal training in the advanced communication skills required to support patients and families with serious illness. Many teaching institutions have instituted formal communication curricula, but few have offered intensive, multi-day workshops to focus education on end-of-life communication skills. This project integrates critical care, palliative care, oncology, and nursing educators to implement a simulation-based three day end-of-life communication skills workshop for P/CC, oncology, and pediatric critical care fellows and advanced care practitioners.

METHODS

In 2012, two of the authors (GB, LF) participated as one of ten critical care-palliative care dyads in IntensiveTalk, a teach-the-teacher workshop to learn the techniques of reflective teaching practice, which have been used to teach end-of-life communication. (1) Such pedagogical techniques have been shown to be efficacious in transmission of communication skills. (2, 3) Reflective teaching practice is comprised of small group experiential learning with simulated family meetings surrounding a patient with a critical or terminal illness. Over the course of the three-day learner course, participants follow simulated families through the course of their disease process, from disclosure of diagnosis (of cancer, severe illness, etc) through treatment and difficult decision-making around end-of life issues. Faculty facilitators help learners develop personal goals for improvement of their communication skills, and the small group provides specific, constructive feedback regarding skills. This project has focused on the development of the infrastructure for and implementation of a complicated, interdisciplinary, multi-day workshop utilizing simulated patient actors and reflective teaching practices interspersed with short didactic sessions. Secondarily, we measured learner satisfaction with the learning experience and self-perception of skill ability before and after the training.

RESULTS

We held a two-day actor workshop in May, 2013 with twelve actors from the simulated patient and local acting communities. This workshop established the acting skills important for simulated patient success and introduced the actors to the structure of the learning sessions. Following these sessions, several actors were chosen to participate in monthly, two-hour "small dose" communication skills sessions with volunteer resident learners from the Internal Medicine training program. These "small dose" sessions served as technique practice for facilitators and actors while providing communication skills training to the volunteer learners and garnered local grass roots interest in the sessions.

In August and November of 2013 we held the first and second IU C3 (Critical Care Communication) courses at the Peace Learning Center at Eagle Creek Park in Indianapolis. Each course included twelve participant learners (with a total of twenty P/CC fellows, and four Nurse Practitioners). The authors participated as faculty for this course and held structured feedback sessions regarding the quality, cadence, and learning environment of the course. Iterative revisions were made to the workshop based upon these sessions as well as rigorously collected written learner feedback.

Learners rated the importance of the training as "very important" (4.84/5 point likert scale). Learner self-perception of communication skill levels increased significantly after the course compared to ratings from before the course (see Figure 1- p<0.005 for all measured comparisons).

CONCLUSIONS

We have demonstrated that implementation of a complex, interdisciplinary, multi-day communication skills workshop is feasible and can be integrated into a fellowship training program. Additionally, learners who participated in this workshop found this training to be very important and perceived that their skills improved in all measured areas through this workshop.

FUNDING

REFERENCES

1. Fryer-Edwards K, Arnold RM, Baile W, Tulsky JA, Petracca F, Back A. Reflective teaching practices: An approach to teaching communication skills in a small-group setting. Academic medicine : journal of the Association of American Medical Colleges 2006;81:638-644.

2. Back AL, Arnold RM, Baile WF, Fryer-Edwards KA, Alexander SC, Barley GE, Gooley TA, Tulsky JA. Efficacy of communication skills training for giving bad news and discussing transitions to palliative care. Archives of internal medicine 2007;167:453-460.

3. Boss RD, Hutton N, Donohue PK, Arnold RM. Neonatologist training to guide family decision making for critically ill infants. Archives of pediatrics & adolescent medicine 2009;163:783-788.

Johns Hopkins University School of Medicine
Baltimore, Maryland

Abstract Title: Procedural Simulation Orientation Camp for Incoming Fellows

Program Director: Lonny Yarmis, DO
Associate Program Director: Hans J. Le, MD
Type of Program: Interventional Pulmonology Division of Pulmonary / Critical Care
Abstract Authors: Lee HJ1, Feller-Kopman D1, Ricardo Ortiz1, Akulian J1, Sutorius L1, Yarmus L1

RATIONALE

Interventional Pulmonology (IP) is a procedural based specialty. Incoming IP fellows have variable didactic and procedural skills in advance procedures prior to starting IP fellowship.

High-fidelity and cadaver simulation training provides a zero-risk setting in which skills can be acquired through repetition. This has been shown in medicine and other industries (aviation, military) to steepen the learning curve and optimize safety. We introduced an intense orientation camp prior to patient encounters in advance procedural and didactic learning.

EDUCATIONAL STRATEGY

An intense simulation orientation camp over 1 day was offered to all incoming interventional pulmonary fellows in the US. A computer based 75 multiple choice question exam was offered at the start of the camp followed by didactic lectures from various program directors. This was followed by procedural simulation training using high fidelity simulators (EBUS, Navigational Bronchoscopy, airway stents and valves) and cadavers (rigid bronchoscopy, thoracoscopy, tracheostomy, stent removal, thermal ablation). Fellows had initial demonstration followed by repetitive skills training. 12 months after the orientation camp, the same multiple choice exam was re-administered to all fellows.

RESULTS

14 incoming Interventional Pulmonary Fellows participated in the simulation orientation camp. Initial test scores had a mean of 62% (Range 52-73%). All 14 fellows had an increase in their examination at 12 months with a mean of 74% (SD 5, 61-81%).

CONCLUSIONS

Early simulation training prior to patient encounters may offer an earlier and steeper learning curve for fellowship training.

Louisiana State University Health Sciences Center
New Orleans, Louisiana

Abstract Title: Advocacy and Professionalism in Pulmonary Medicine: A Global Pulmonary Exchange Program.

Program Director: Stephen Kantrow, MD
Associate Program Director: David Taylor, MD
Type of Program: Pulmonary and Critical Care Medicine
Abstract Authors: SP Kantrow, TV Le, TV Ngoc, A Gurgun, N Mogulkoc, J Ali. LSU Health Sciences Center and Ochsner Clinic Foundation, New Orleans, LA, Ege University, Izmir, Turkey, Ho Chi Minh City (HCMC) Medicine and Pharmacy University, HCMC, Vietnam.

Despite restrictions in public exposure to tobacco smoke and decreased smoking prevalence among affluent Americans, tobacco use in vulnerable populations (children, low income, limited education) remains exceptionally high. Health care professionals directly involved in the treatment of tobacco related diseases, including pulmonologists, oncologists and cardiologists, have little training in the current scope of this disease burden or preparation for effective public health advocacy. To address this need, we designed a cross-cultural program for pulmonary fellows to increase awareness of 1) smoking prevalence in vulnerable populations and 2) innovative efforts around the world to decrease tobacco related disease. Trainees in pulmonary medicine are introduced to concepts in comparative health systems, tobacco control and advocacy as mentored observers in instructive international sites. We have established exchange programs with medical schools in Izmir, Turkey and Ho Chi Minh City, Vietnam to support these curricular goals. Expectations for fellows in this program are 1) guided independent study of the economic, cultural and political influences on tobacco use in an international site and in the US, 2) presentation of their comparative analysis to the academic community and 3) participation in a mentored scholarly project in advocacy. This unique graduate medical education experience meets a need for increased professionalism in medicine and provides a path to physician led advocacy to advance health equality.

Mount Sinai St. Luke's Roosevelt Hospital Center
New York, New York

Abstract Title: The Fellows e-Library: An Innovative Model of Education and Mentorship

Program Director: Edward Eden, MD
Associate Program Director: E. Mirna Mohanraj, MD
Type of Program: Division of Pulmonary, Critical Care and Sleep Medicine
Abstract Authors: Wajih Aksamawati Dit Arja MB BCh, Pius Ochieng MD, Sorel Vladu MD, E Mirna Mohanraj MD, Edward Eden MD, Janet M Shapiro MD

RATIONALE

Fellowship programs must evolve to address the new and preferred ways of active learning by fellows. This includes the use of electronic media, the active participation of the fellows in their education and development of an approach to life-long learning. We developed a Fellows e-Library in the Division of Pulmonary, Critical Care and Sleep Medicine. The e-library which was created and directed by a senior fellow, supports the following goals: 1) collecting high-yield and landmark articles that fellows should know in the areas of pulmonary, critical care and sleep medicine, 2) developing a fellow-mentor relationship in the critical review of topics and articles, 3) making available all activities of the division including conference presentation slides, interesting radiology cases, policies, curriculum, guidelines and protocols.

METHODS

The e-library site, created by a fellow, is located on the main hospital intranet site, and only attending and fellows are authorized to access the site. The e-library committee was assembled. This committee is led by the senior fellow, under the supervision of a senior attending, and members include the program director, associate program director and two junior fellows. Criteria were developed for submission of journal articles, including impact on practice, historical and landmark research, and guidelines of major societies. Every quarter, each fellow selects a topic, reviews the literature then chooses the 3 to 4 articles that best address the topic, and writes a small review describing the value of the selected articles. In every step of the process, fellows are mentored by a faculty member with expertise in the field. The e-Library committee meets quarterly to review and approve submissions. Subsequently, these articles are uploaded to an internal website and announced to the division. The other branches of the e-Library site include sections for all departmental conferences, interesting radiology cases with description and differential diagnosis. Access to the e-Library site is password protected and available to all fellows and attending members of the division. The complete site was designed by fellows using Microsoft Office with no extra expense to the division.

RESULTS

The e-Library submissions for 2 quarters have encompassed major topics of pulmonary, critical care and sleep medicine. Fellows have spent dedicated time in journal review with their mentors. The e-Library committee has reviewed the submissions, requested further review if necessary, and recommended new topics. The fellows have accessed the e-Library site for article and guideline reviews.

CONCLUSIONS:

We present the Fellows e-Library — an innovative, fellow-driven educational process that can be easily replicated in any program with minimal expense. The e-library will provide a current reference literature but most importantly, will foster a mentor relationship with faculty and provide the motivation and direction for continued self-learning.

University of California, San Francisco
San Francisco, California

Abstract Title: A Quality Improvement Project Aimed at Reducing Fluoroscopy Time During Bronchoscopy Significantly Decreases Total Radiation Exposure

Program Director: Stephen Lazarus, MD
Associate Program Director: Lori Leard, MD
Type of Program: Division of Pulmonary and Critical Care Medicine
Abstract Authors: Susan Pasnick MD, Maggie Hayes BS, Michael Salvaggio MS, Lorriana E. Leard MD, Mary Ellen Kleinhenz MD

RATIONALE

Fluoroscopy is routinely utilized at our institution for transbronchial biopsies performed during flexible bronchoscopy. The health risks of radiation exposure are thought to follow a linear, non-threshold, dose-response pattern. Best practice is to minimize radiation exposure to the extent possible. Many factors determine radiation dose during fluoroscopy procedures, including patient-to-image intensifier distance, fluoroscopy time, miliamperage and kilovoltage. The fluoroscopy suite at our institution utilizes an Automatic Brightness Control system which automatically adjusts many of these factors. Therefore, we targeted fluoroscopy time as an operator-dependent metric with the aim of reducing total radiation exposure.

OBJECTIVE

To implement educational and systems-based interventions with the goal of completing 80% of fluoro-guided bronchoscopic procedures with under 3 minutes of fluoroscopy time.

METHODS

We collected 1 month of baseline pilot data, including total fluoroscopy time and total radiation exposure for each fluoro-guided bronchoscopic procedure. Then we implemented two interventions. First, the bronchoscopy report template was changed to include mandatory entry of total fluoroscopy time and total radiation exposure. Second, we developed an interactive fluoroscopy teaching workshop for the first-year pulmonary fellows as part of their introductory curriculum. We increased awareness via announcements in the division newsletter and targeted e-mails. For data collection, a monthly report is generated which includes all bronchoscopic procedures during which fluoroscopy is used. By chart review, total fluoro time, total radiation exposure, and complications are collected for each procedure.

RESULTS

During the pilot period, 76% (16/21) of procedures were performed with <3 minutes of radiation time. The mean radiation dose was 764 microgrey (mGy). During the first 5 months post-interventions, 79% (104/132) of procedures were performed with <3 minutes of radiation time (p-value 0.52) with a mean radiation dose of 389 mGy (p-value <0.01). As a result of increased fluoroscopy awareness and education, additional changes in practice (particularly related to frame rates and collimation) have led to a significant decrease in total radiation exposure. Notably, during the last month of data collection, the mean radiation exposure was 177 mGy with 71% (22/31) of procedures having <200 mGy of radiation exposure. This is compared to 15% (3/20) of procedures with <200 mGy of radiation during the pilot period. There have been 2 complications (1 incidence of hemoptysis requiring hospitalization, 1 pneumothorax requiring chest tube placement) in the post-intervention period, which is consistent with our historical rate as well as with the published rate of complications from bronchoscopy procedures with transbronchial biopsies.

CONCLUSIONS

Thus, our quality improvement interventions aimed at reducing total fluoroscopy time have led to improved fluoroscopy awareness and resulted in a significant decrease in total radiation exposure. The reduction in total radiation exposure has important implications for not only the patients, but also for the health care professionals with repeated exposure during procedures. Additional study will be required to assess whether this change in exposure is sustained.

University of Colorado
Aurora, Colorado

Abstract Title: Cotton Club: A Unique Academic Retreat

Program Director: Leland Fan, MD
Type of Program: Division of Pediatric Pulmonary
Abstract Authors: Deborah R. Liptzin, MD

BACKGROUND
The earliest incarnation of the Cotton Club was started in the 1970s as an annual winter retreat to allow the University of Colorado fellows, faculty, invited speakers, and other attendees to meet and review the important trends in the field of pediatric pulmonology. However, interest in and attendance of this meeting slowly faded over time. In 1991, the winter retreat was resurrected and formalized as the current Cotton Club to honor the founder of the pediatric pulmonary fellowship, Ernie Cotton. The new goal of the Cotton Club was to allow fellows to present and have their research reviewed and critiqued.

METHODS
An annual winter meeting is held away from the hospital and the burden of clinical responsibilities in an environment conducive to academic enrichment and recreation. Every year, faculty selects an invited guest speaker with expertise in the field of pediatric pulmonology. The fellows present their research to the invited speaker who critiques the research specifically and the training program overall. Faculty members also give presentations to provide an overview of the Pulmonary Section's diverse research activities. Graduates of the fellowship are invited back to interface with colleagues, learn about the current state of the department, and provide input to the fellows on their institution's approaches to pulmonary medicine.

RESULTS
There have been a total of 23 Cotton Clubs with over 30 invited guests. Recent speakers have included Giuseppe Colasurdo, Andy Bush, Carol Blaisdell, and Jim Hagood. The pediatric pulmonary program has modified itself because of feedback from these outside speakers. Of note, the fellowship has been able to maintain NIH training grant funding for twenty-five years. After graduating from the fellowship, only 11 out of 24 (46%) of the program's graduates from 1976-1990 had academic careers. However, since the reinstatement of the Cotton Club, 30 out of 43 (70%) of the program's graduates currently have faculty appointments in academic programs. Two others began their careers in academic medicine before going into private practice, and two have careers in the Navy.

CONCLUSION
The Cotton Club is a program unique in the field of pediatric pulmonology that serves to guide fellows toward a career path in academic medicine.

University of Tennessee Health and Science Center Memphis, Tennessee and Children's Mercy Hospital and Clinics
Memphis, Tennessee

Abstract Title: Mississippi River Valley Pediatric Pulmonary Case Conference: An Innovative Tool for Fellow Education and Recruitment

Program Director: Dennis C. Stokes, MD, MPH
Associate Program Director: Jane B. Taylor, MD, MsC
Type of Program: Division of Pediatric Pulmonology: Multicenter Monthly Educational Webinar Series
Abstract Authors: Jane B. Taylor MD MsC and Dennis C. Stokes, MD MPH

EDUCATIONAL STRATEGY

The goal of The Mississippi River Valley Pediatric Pulmonary Case Conference (MRVPC) is to provide young faculty and pediatric pulmonology fellows an exposure to oral presentations and aspects of peer-review critiques through discussions after their presentations. It is an internet-based case conference that occurs on the second Wednesday of each month from 12 to 1pm CST. The conference uses the WebEx software platform with telephone audio conferencing capability. 10 mid-western pediatric academic centers participate and present on an alternating schedule. Two cases are presented each month with subsequent group discussion from all participating centers after each case. The majority of the presenters are pediatric pulmonology fellows and residents about to enter fellowship programs. The cases are recorded and archived on a website indexed by presenter and can be listed on the presenter's curriculum vitae. The conference discussion helps provide an aspect of peer-review for the presentation and exposure to oral presentation skills and formal academic discussion afterwards. CME credit is provided for physicians who participate.

INNOVATION

Pediatric pulmonology is a relatively new, and thus small, subspecialty. The residents and fellows in each training program do not have exposure to a large variety of subspecialty providers; thus, limiting their exposure to different teaching styles and experiences. There is also a geographic limitation on exposure to different patient populations. To overcome these limitations, the pediatric pulmonology community has had to expand past traditional teaching methods and expand its reach thru technology to allow their trainees to have a more exhaustive educational experience.

IMPACT AND OUTCOMES

5 residents who presented in the MRVPC went on to pediatric pulmonology fellowships. Many others went into closely related fields like pediatric intensive care or neonatology. Many fellows use the MRVPC to practice their upcoming case presentations for national conferences like the North American Cystic Fibrosis Conference or the American Thoracic Society Conference and gain feedback from a diverse group of pediatric pulmonology faculty.

University of Vermont
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Abstract Title: A Structured Training Program in Basic Critical Care Echocardiography Incorporating Didactic, Simulation and Bedside Teaching to Promote Clinical Competence

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RATIONALE
Echocardiography has become an essential tool for the assessment and care of critically ill patients, and fellows must demonstrate competence. However, academic faculty often lack formal training in critical care echocardiography, and short intensive courses available for faculty or trainees may not result in competency required to teach and perform echocardiography.

METHODS
Guided by current literature on training standards, we developed a 12 month institution-based focused bedside critical care echocardiography curriculum for faculty and fellows consisting of 3 components; lectures, standardized patient exams, and weekly bedside practice sessions. The curriculum is supervised and taught by established local Medicine and Anesthesia experts in focused critical care echocardiography. The first 6 months of the curriculum are focused on image acquisition technique and the second 6 months on image interpretation. Participants are required to attend all lectures, participate in a 2 hour standardized patient session, and attend 7 one-hour bedside practice sessions. Once these components are complete, participants are required to perform 30 independent exams documented by a case log. Competency of individual participants will then be assessed by a written final exam and two directly observed bedside exams where they will be evaluated for image quality and interpretation.

RESULTS
10 faculty and 6 fellows are participating in our training curriculum. Six months into our training curriculum, all lectures and simulation lab sessions are complete and have been attended by 100% of participants. One-hour bedside practice sessions are occurring weekly in our ICU, and faculty and fellows have completed an average of 2 of the 7 required sessions ranging from 0 to 7 session completed individually. We expect final assessments to begin on June of 2014.

CONCLUSIONS
Implementation of our curriculum is feasible and has provided uniform training in focused basic critical care echocardiography for faculty and fellows. Successful completion of the course will confirm competency of the participants and will provide a foundation for institutional credentialing and long term maintenance of competency. Future directions include determining if training in critical care echocardiography impacts utilization of formal echocardiograms and provides long-term competence.

REFERENCES

1. Audrey De Jong, Nicolas Molinari, Nicolas Terzi, Nicolas Mongardon, Jean-Michel Arnal, et al. Early Identification of Patients at Risk for Difficult Intubation in the Intensive Care Unit, Development and Validation of the MACOCHA Score in a Multicenter Cohort Study. *Am J Respir Crit Care Med* 2013;187(8):832–839.

2. Yasuharu Okuda, MD, Ethan O. Bryson, MD, Samuel DeMaria Jr, MD, et al. The Utility of Simulation in Medical Education: What Is the Evidence? *Mount Sinai Journal of Medicine* 76:330–343, 2009 330

3. Pastis NJ, Nietert PJ, Silvestri GA; American College of Chest Physicians Interventional Chest/Diagnostic Procedures Network Steering Committee. Variation in training for interventional pulmonary procedures among US pulmonary/critical care fellowships: a survey of fellowship directors. *Chest* 2005;127(5):1614-1621.

4. Snyder CW, Vandromme MJ, Tyra SL, et al. Retention of colonoscopy skills after virtual reality simulator training by independent and proctored methods. *Am Surg* 2010;76:743E6.

Notes

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