



ATS 2013

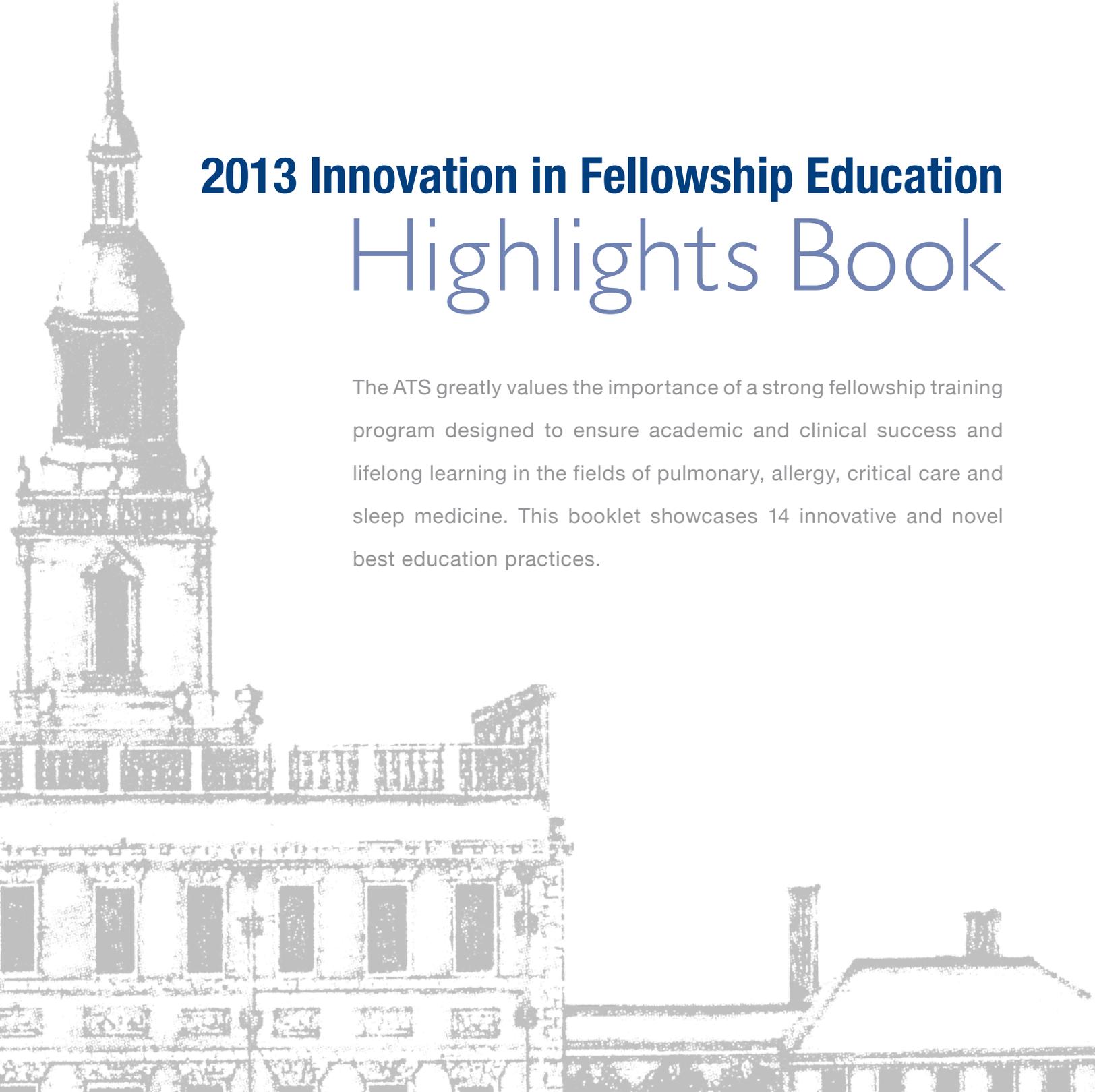
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American Thoracic Society
International Conference
May 17 to May 22, 2013

Philadelphia

2013 Innovation in Fellowship Education Highlights Book

The ATS greatly values the importance of a strong fellowship training program designed to ensure academic and clinical success and lifelong learning in the fields of pulmonary, allergy, critical care and sleep medicine. This booklet showcases 14 innovative and novel best education practices.



PROGRAM BACKGROUND

The **2013 ATS Innovations in Fellowship Education Program** called for all pulmonary, critical care, sleep and allergy programs to submit one innovative and novel best education practice done within their program to the ATS in an effort to 1) honor the top outstanding abstracts that exemplify an environment of educational excellence and 2) share these best practice methods among other fellowship programs.

The **Innovations in Fellowship Education Program** was developed by the ATS Training Committee who reviewed all abstracts and selected **up to** five that they felt were up to exceptional. The committee ranked the abstracts on the following:

- **Innovation:** how unique is the program?
- **Educational Strategy:** how did the program use various educational tenets to develop and implement the educational program (e.g. didactic sessions, case based, simulation training, outcome based learning)
- **Implementation:** how did the program implement this practice and how effective was the implementation?
- **Outcomes:** were any outcome measures reported?
- **Transferability:** how easily might this educational program be able to be used by other programs?

The **ATS Innovation in Fellowship Education Highlight Book** includes abstracts from the following fellowship programs!

- Banner Good Samaritan Medical Center
- Baylor College of Medicine*
- Baystate Medical Center
- Children's Mercy Hospital and Clinics
- Children's National Medical Center
- Emory University*
- Harvard Medical Center*
- Loyola University Medical Center
- Montefiore Medical Center*
- University of Colorado Denver
- University of North Carolina
- University of Southern California

* Indicates the outstanding programs that were selected by the ATS Training Committee



THE ATS CONGRATULATES THE FOLLOWING FOUR OUTSTANDING FELLOWSHIP PROGRAMS

BAYLOR COLLEGE OF MEDICINE

EMORY UNIVERSITY

HARVARD MEDICAL CENTER

MONTEFIORE MEDICAL CENTER

Banner Good Samaritan Medical Center Phoenix, AZ

Program Description	The Banner Good Samaritan Medical Center – Phoenix VA Health Care System Pulmonary/Critical Care Fellowship Program teaches clinical pulmonary and critical care medicine with a strong commitment to research and academics. Our fellowship focuses on teaching strong clinical medicine skills. Graduates from our program work in all aspects of pulmonary and critical care medicine. They also have training in percutaneous needle biopsy, navigational bronchoscopy, EBUS, bronchial thermoplasty, and endobronchial stent placement.
Type of Program	Pulmonary and Critical Care
Number of Fellows in Program	8
Submitter(s) of Abstract	Program Director: Robert Raschke, Robert.Raschke@bannerhealth.com Associate Program Director: David Baratz, dbaratz@aol.com

The Banner Good Samaritan Medical Center – Phoenix VA Health Care System Pulmonary/Critical Care Fellowship Program has developed an online journal for manuscript submission of new research studies, case studies, review articles, board review material, historical articles, and editorials. Over the last few years the time that fellows have to meet clinical competency and produce academic manuscripts has been significantly reduced. The American College of Graduate Medical Education has placed increasing requirements for clinical education in post-graduate medical education while simultaneously increasing the requirements for scholarly activity for fellows and faculty, yet restricting fellow work hours. Fellows are pulled in multiple different directions to learn clinical medicine, new interventional skills, and a broad knowledge base of pulmonary, critical care, and sleep medicine topics. In addition they are required and expected to produce academic manuscripts including innovative research projects, case presentations, and review papers. Outlets for fellows to publish this information are limited and frequently require many months of turn around time to come to press.

The Southwest Journal of Pulmonary and Critical Care Medicine (www.swjppc.com) is an online journal that offers fellows the opportunity to publish academic papers, case reports, and review papers easily and with rapid times to publication. The journal edited by Richard Robbins, has published over 170 new articles with 56 first authored by pulmonary fellows in the past 2 years. In addition the Thoracic Societies from the states of Arizona, California, Colorado, New Mexico have designated the journal as the academic publication for their societies. Academic programs from the University of Arizona, Banner Good Samaritan Medical Center, Harvard Medical School, Maricopa County Medical Center, Mayo Clinic – Scottsdale, Midwestern University, the University of New Mexico and the University of Colorado have submitted papers. In addition international programs from the United Kingdom, Japan, and India have contributed to the SWJPPC. The Journal not only publishes scholarly papers but has sections dedicated to the teaching of medical residents, fellows in pulmonary, critical care and sleep medicine and clinicians in practice. Journal Clubs for pulmonary, critical care medicine, and sleep medicine are published. Case-based teaching has been developed in pulmonary, critical care, and diagnostic imaging to provide a basis for self-based teaching. Board Review Type Questions have also been developed. There are also sections for articles on Medical History and Editorials. A job board is also available. The journal is listed in the Directory of Open Access Journals. Readership has steadily grown to > 9000 hits per month and > 3000 unique hits.

I submit that the Southwest Journal of Pulmonary and Critical Care Medicine is an innovative educational practice that encourages excellence, teaching, and promotes research within our fellowship program. I strongly nominate it to be considered for the ATS 2013 Award for Innovations in Fellowship Education.


Baylor College of Medicine Houston, TX

Program Description	The Pediatric Pulmonology Fellowship Program at Baylor College of Medicine prepares its graduates to have successful careers in academic, private, and community settings. The program provides a wide range of learning opportunities in both common and rare pediatric pulmonary diseases. The program accepts three fellows per year making it one of the largest pediatric pulmonology programs in the US. Fellows develop strong clinical, teaching, and research abilities while also meeting the requirements for subspecialty certification.
Type of Program	Pediatric Pulmonary
Number of Fellows in Program	9
Abstract Title	Integrating an Interactive Respiratory Therapy Curriculum into Pediatric Pulmonology Fellowship Training
Abstract Authors	Jennifer A. Rama, MD, Julia B. Lawrence, RT, Bradley Cross, RT, Miesha Hughes, RT, Lisa Traplena, RT, Marc G. Schechter, MD
Submitter of Abstract	Jennifer A. Rama, MD

BACKGROUND

Fellowship programs should prepare learners to be able to practice in different types of settings, including ones with limited ancillary support. Many pediatric pulmonologists rely heavily on the skills of respiratory therapists (RT), leaving pulmonology fellows less equipped to practice in smaller, community-based outpatient clinics where an RT may not be available. Learners in tertiary care academic centers are particularly vulnerable to receiving less hands-on experience due to widely available resources and staff. Thus, pulmonary trainees should demonstrate competency in basic RT skills in order to treat patients with pulmonary diseases successfully.

GOALS

- Enhance skills and knowledge in:
 - oxygen delivery devices,
 - spirometry,
 - metered dose inhalers (MDI) and
 - airway clearance devices.
- Demonstrate competency in skills that will enable a pediatric pulmonologist to practice independent of an RT in an outpatient setting.

METHODS

A needs assessment survey was sent to incoming and current pediatric pulmonology fellows to determine which RT skills were most necessary to teach and evaluate. The curriculum content was designed based on needs assessment results and focused on airway clearance devices with an additional written exam on airway clearance principles. Instruction was provided according to pre-defined objectives and included didactic and hands-on tutorials. Four general skills were evaluated before and after instruction; 1) providing airway clearance instruction 2) providing MDI instruction 3) selection/connection of oxygen delivery devices and 4) obtaining acceptable spirometry. Fellows performed skills under direct observation of fellowship program leadership and experienced RTs. Checklists of critical items necessary to perform the skill proficiently was completed. Data was analyzed using McNemar's test and Wilcoxon matched pair test. At the conclusion of the course, fellows were asked to complete individual tutorial and overall course evaluations to collect feedback and to determine whether the goals and objectives of the curriculum were met.

RESULTS

The response rate of the needs assessment was 75%. Data revealed a perceived knowledge gap particularly in airway clearance devices and to a lesser extent in aerosolized medication, oxygen delivery, and spirometry. Nine fellows with varying levels of training from first to third year fellowship participated in the curriculum, but only six or seven fellows were included in the analysis depending on the skill station completed. Fellows who did not complete both pre and post assessments were excluded. There was a significant improvement in the medians of written test scores and the percent items performed correctly during instruction of mask and mouthpiece spacers with MDI, acapella, flutter, and threshold positive expiratory pressure device, $p < 0.05$, $n = 7$. Data from completed individual tutorial evaluations, $n = 6$, revealed a significant self-reported improvement in selection of appropriate oxygen delivery devices, differentiation of oxygen interfaces and flow, as well as in coaching patients to perform spirometry according to American Thoracic Society acceptability criteria, $p < 0.05$. Data from completed overall course evaluations, $n = 6$, revealed that the course objectives had been met; one hundred percent of fellows felt that they improved their skills and acquired knowledge in all four areas. Furthermore, all fellows indicated that the curriculum should be offered yearly.

CONCLUSION

This novel and interactive curriculum provides meaningful competency-based assessment of pulmonary trainees in RT skills essential to treat pediatric patients with pulmonary disease. By evaluating fellows' ability to provide instruction to others, the curriculum incorporates the learning pyramid theory which illustrates the best educational method to enhance the most retention is through teaching. Future directions include determining retention time of skills and knowledge acquired from this learning experience.

Baystate Medical Center Springfield, MA

Program Description	The Baystate fellowship is an internal medicine based critical care training program committed to providing excellent clinical training. Fellows are exposed to all aspects of caring for the critically ill, including medical, surgical and neurological patients in a true multi-disciplinary setting. The curriculum is constantly evolving with simulation playing an active role in teaching the various aspects of critical care medicine.
Type of Program	Critical Care
Number of Fellows in Program	4
Submitter of Abstract	Program Director: Patrick T. Mailloux, DO, Associate Program Director: Mark Tidswell, MD

Physicians caring for the critically ill require the ability to think and act quickly to correct abnormal physiology, allowing the patient to stabilize and not only survive their illness but thrive. If mistakes are made the price may be the life of a fellow human being under a doctor's care. Critical care fellows are responsible for assessing and treating the most unstable patients in the hospital, with little margin for error, and often oversee difficult decision making with loved ones. Given the high stakes, it is necessary to develop strategies for recognizing and correcting cognitive errors with a minimization of their impact in the patient care arena. Simulation provides an opportunity for learners to develop the necessary cognitive skills for treating unstable patients in a safe, non-punitive setting.

Using high-fidelity patient simulators, we constructed an innovative, longitudinal curriculum to train first year critical care fellows in common scenarios encountered while treating an ICU patient. The initial session begins with the fellows caring for an unstable, post-operative patient arriving in the ICU after an open repair for a ruptured abdominal aortic aneurysm. The learners must choose to rapidly resuscitate the patient with large quantities of IV fluid, appropriately request and incorporate clinical information, and recognize and respond to the importance of stabilizing the patient in a timely manner. In subsequent simulation sessions, the learners must evaluate and manage the same simulated patient as it experiences typical ICU complications, including abdominal compartment syndrome, peri-operative myocardial infarction, acute renal failure, ventilator associated pneumonia, delirium, ARDS, pneumothorax, cardiac arrest and anoxic brain injury. The fellows must navigate through each issue during the respective session and make appropriate decisions to allow the patient the best chance of recovery. The final scenario involves a human actor portraying a distraught family member. The fellows must guide her through appropriate end of life decision-making. As with other simulation scenarios, learners are not coached during their discussions of decision making. If errors are made the simulated patient experiences the consequences and the fellows' performance is evaluated during debriefing.

Further, to probe cognitive limitations, pitfalls are incorporated into each session. This educational strategy is based upon experiential learning where the fellows reflect on an experience and recognize how to conceptualize and implement important lessons into future situations. The training in the simulation center is designed to be as realistic as possible, and easily translated to the bedside in the ICU with the ultimate goal of improving patient safety and outcomes. This is a novel way for critical care fellows to acquire the skills necessary as they transition to being experts. This strategy for training our critical care fellows is in its third year and continues to evolve as we gain more experience with the process. Our most recent improvement to the simulation training is a focus on a more active role by the learner, with required reading relative to each scenario provided, a debriefing session, written exam questions and opportunity to review a video of each scenario in which the fellow participated. The efficacy of this training method is assessed via a survey of each participant at the end of the sequence, with the questions exploring their perceived overall value of the curriculum, impact on their confidence, ability to enhance their role on the ICU team, realism of the scenarios, and utility of feedback. To date, the learners view the sessions favorably and their feedback is continually incorporated into the curriculum to maximize the impact and efficiency of time spent in this endeavor.

Children's Mercy Hospital and Clinics Kansas City, MO

Program Description	Children's Mercy Hospitals and Clinics/University of Missouri-Kansas City Allergy and Immunology Fellowship Program is a two-year program which provides cross-training in both pediatric and adult allergy and immunology. Our faculty is comprised of seven board-certified allergist-immunologists and one PhD researcher who are involved in fellowship education. Besides a diverse patient population, the fellows have opportunities to work in clinical research, basic-science research, clinical pharmacology and environmental assessments.
Type of Program	Allergy and Immunology
Number of Fellows in Program	5
Abstract Title	Enjoy COLA...Education Begins Here
Abstract Authors	T Federly, S Argo, N Rajee, PJ Dowling, J Portnoy
Submitter of Abstract	Tara Federly, MD

In the age of computers, tablets, smartphones, internet and intranet, it is imperative for medical education to keep up with the times. Our Allergy and Immunology Fellowship Program at Children's Mercy Hospitals and Clinics/University of Missouri – Kansas City is doing just that. In 2008 Conferences Online Allergy (COLA) was established by the American College of Allergy, Asthma and Immunology as a venue for allergists to share information via online conferences. However, for our fellowship program COLA has developed into an interactive didactic curriculum which reaches far beyond the doors of our conference room.

The education of our fellows has always been a priority at Children's Mercy Hospitals and Clinics/University of Missouri – Kansas City. Our fellowship program observes two hours of protected time every Monday and Friday morning for didactic lectures. These lectures are broadcast live on GoToMeeting, an online video and audio conferencing tool. GoToMeeting allows presenters to lecture from our conference room or off-site from their computer to an audience which includes our conference room attendees as well as other attendees logged on from around the country and the world. Attendees can log on for free at www.childrensmercy.org/cola from their Mac, PC, iPad, iPhone or Android. This feature allows fellows to attend lectures while on off-site rotations, on vacation or on personal/maternity leave. Other attendees, including our attendings, past fellows, residents, medical students, fellows from other fellowship programs as well as any interested individuals, can all interact via microphone or keyboard throughout the lecture.

In addition to live viewing, many conferences are recorded and posted to YouTube and iTunes for later viewing. Our fellows use these online venues to watch lectures they have missed or review a previously seen lecture of special interest. COLA currently has 152 videos posted on YouTube. Videos can be accessed by searching YouTube or from our YouTube channel at www.youtube.com/acaicola. Since early October, COLA YouTube videos have had 24,780 views, with 4416 views in the last 30 days. Popular videos include flow cytometry, eosinophilic esophagitis, B-cell activation, Churg-Stauss syndrome and alpha-gal food allergy which have over 1,000 views each. Over 250,000 iTunes videos have been downloaded since January 1, 2012. Popular downloads include billing and coding, angioedema/urticaria and bronchoprovocation with 9000-10,000 downloads each. This year selected COLA conferences have also become available for free CME credit.

The content and quality of our lectures are also top of the line. The first two months of each academic year begins with an orientation series. The series features interactive lectures presented by experts in the field from across the country on specific allergy, immunology, pulmonology and dermatology topics. This provides fellows with a foundation of current and up-to-date knowledge to begin their training. The remainder of the year includes core curriculum topics, journal club, patient management and an in-depth immunology lecture series.

Conferences Online Allergy has provided our fellows with a comprehensive, up-to-date and easily accessible educational tool, which likely represents the future of medical education. Since implementing this curriculum our fellow's pass rate for the allergy and immunology specialty board examination has been one hundred percent. We believe this program has provided our fellows with an educational opportunity that ensures academic and clinical success. Our current fellows will continue to access COLA beyond fellowship training and, who knows, maybe someday one of them will be presenting on COLA from across the country or the world to the fellows of the future.

Children's National Medical Center Washington, DC

Program Description	The Pediatric Pulmonary Fellowship at Children's National Medical Center is a three-year ACGME accredited program that trains individuals to become board-certified pediatric pulmonologists. The program consists of 16 months of clinical training with the rest of time devoted to research activities. Our presented innovative approach is a Lung and Airway Biology curriculum, which provides instruction in cellular & molecular biology, genomics and proteomics of the respiratory system in a format tailored for clinical trainees.
Type of Program	Pediatric Pulmonary
Number of Fellows in Program	6
Abstract Title	Intergrading Lung and Airway Biology to Pediatric Pulmonary Fellowship: A Translational Approach for the Next Generation of Pediatric Pulmonary Pulmonologists
Submitter of Abstract	Geovanny F. Perez, MD

BACKGROUND

Pediatric Pulmonary training programs have two well-defined parallel components: clinical training and project-oriented research activities. The increasing need to translate basic science findings to clinical applications has motivated our Pediatric Pulmonary Fellowship program at Children's National Medical Center (CNMC) in Washington, D.C. to add a third academic component, a Lung and Airway Biology Curriculum, to supplement our educational format, which consists of lectures tailored for clinical trainees. The new curriculum provides basic instruction in cellular and molecular biology, as well as genomics and proteomics, focused on the respiratory system. This innovative training strategy aims to develop a translational educational environment for the next generation of pediatric pulmonologists. At the same time, it provides a clinical view for research faculty, Ph.D. candidates and post-doctoral scholars at George Washington University (GWU). The Lung and Airway Biology curriculum is a multi-disciplinary effort of Dr. Iman Sami, M.D. (Fellowship Program Director), Dr. Mary Rose Ph.D. (Research Director Pediatric Pulmonary Division), Dr. Gustavo Nino, M.D. (Curriculum Coordinator) and a group of faculty (Table 1) conducting lung and airway biology research in the Children's Research institute (CRI) at CNMC and the Department of Integrative Systems Biology (ISB) at GWU.

EDUCATIONAL STRATEGY

The overall goal of the Lung and Airway Biology Curriculum is to connect the clinical and research tracks during pediatric pulmonary fellowship training with translational basic science education. Rather than developing expertise in a specific area, which is best attained with a mentored research project, this curriculum intends to give a practical overview of basic sciences to facilitate the generation of translational approaches by clinical trainees. This educational program also aims to generate direct interactions between clinicians and scientists in CNMC/CRI and GWU/ISB, which may lead to productive research collaborations.

IMPLEMENTATION

The curriculum includes mandatory core didactic sessions in Lung and Airway Biology (once a month on Friday at 8am-9:30 am) and a weekly research lectures attended by fellows during their research time (Mondays at 8:45am-9:45am) with the Airway Biology group at CNMC/CRI and GWU/ISB. Table 2 illustrates the proposed core lecture series and speakers for 2013. The Lung and Airway Biology academic component is independent of other clinical and research educational activities of our fellowship program. Fellows are still required to attend regular lectures that cover clinical and physiology topics. They also identify a mentor/project and a scholarship oversight committee (SOC) that will guide research activities during fellowship.

OUTCOMES

The integration of the Lung and Airway Biology Curriculum to our pediatric pulmonary fellowship program is still in the early stages. In 2009 the Airway Biology group at CNMC/CRI and GWU/ISB invited pulmonary fellows to attend weekly meetings during research time. This group has also provided monthly lecture series on Fridays allowing a connection between clinicians and airway biology researchers. As a result, a more structured Lung and Airway Biology core lecture series has been developed for 2013 (Table 1). Despite its novelty, the integration of airway biology scientists into our pediatric pulmonary fellowship program has already produced positive outcomes including a significant increase in the number of ATS abstracts submitted by

fellows in the last 18 months (Fig 1), which we anticipate will result in publications. Many of these projects use translational research approaches such as genomic, proteomic and phenotypical analysis of human data. We expect research productivity of fellows will increase further next year with the commencement of the Lung and Airway Biology core curriculum.

Fellows Abstract Submissions to ATS and other Pulmonary/Sleep Conferences

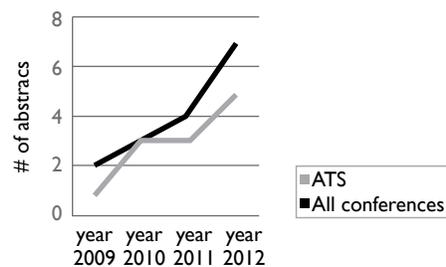


Figure 1: Increase in fellow's research productivity after Airway Biology integration to Pulmonary Fellowship (2009 - 2012).

LUNG AND AIRWAY BIOLOGY CURRICULUM 2013

Table 1. Faculty

FACULTY	DEPARTMENT
Mary Callaghan Rose, Ph.D.	Professor, Departments of Integrative Systems Biology, Pediatrics, and Biochemistry & Molecular Biology, George Washington University. Director of Research, Division of Pediatric Pulmonary and Sleep Medicine, Children's National Medical Center.
Eric P Hoffman, Ph.D.	Professor and Chairman, Department of Integrative Systems Biology, George Washington University. Director, Research Center for Genetic Medicine, Children's National Medical Center.
Robert J Freishtat, MD, MPH	Associate Professor of Pediatrics, Emergency Medicine, and Integrative Systems Biology, George Washington University. Director of Research, Division of Emergency Medicine, Children's National Medical Center.
Diego Preciado, MD, Ph.D.	Assistant Professor of Otolaryngology, Pediatrics and Integrative Systems Biology, George Washington University. Fellowship Director, Division of Pediatric Otolaryngology, Children's National Medical Center.
Anamaris Colberg-Poley, Ph.D.	Professor, Departments of Integrative Systems Biology, Biochemistry & Molecular Biology, George Washington University
Gustavo Nino, MD	Assistant Professor of Pediatrics, Pediatric Pulmonary & Sleep Medicine, and Integrative Systems Biology, George Washington University and Children's National Medical Center.
Dinesh Pillai, MD	Assistant Professor of Pediatrics, Pediatric Pulmonary & Sleep Medicine, and Integrative Systems Biology, George Washington University and Children's National Medical Center.
Juan Ibla, MD	Assistant Professor of Anesthesiology and Critical Care Medicine, Pediatrics and Integrative Systems Biology, George Washington University and Children's National Medical Center.
Judith Owens, MD, MPH	Professor of Pediatrics, George Washington University. Director, Pediatric Sleep Medicine, Children's National Medical Center.
Daniel Lewin, Ph.D.	Assistant Professor and Associate Director of Pediatric Sleep Medicine, Children's National Medical Center.

Table 2. Curriculum

DATE	TOPIC	FACULTY
July/2013	Introduction to Basic Cellular and Molecular Approaches in Airway Biology	Nino/Freishtat/Rose
Aug/2013	Translational Research and Genomic Approaches	Freishtat/Hoffman
Sep/2013	Airway Mucus Regulation	Rose
Oct/2013	Airway Epithelial Biology	Pillai/Rose
Nov/2013	Airway Secretome and Proteomic Approaches	Pillai
Dec/2013	Upper Airway Biology	Preciado
Jan/2013	Airway Inflammation and Smooth Muscle Biology	Nino
Feb/2013	Lung Injury and Repair	Freishtat
Mar/2013	Pulmonary Endothelial Biology and Molecular Effects of Hypoxemia	Ibla
Apr/2013	Viral Respiratory Biology and the Human Microbiome Project	Colberg-Poley
May/2013	Role of MicroRNAs in Lung and Epigenetics Airway Disease	Nino/ Rose
Jun/2013	Sleep and Circadian Biology	Lewin/Owens



Program Description	Our fellowship individualizes the second- and third-year experience to target the career goals of trainees by enrolling them in one of two pathways. Our Clinical Experts engage in a rigorous clinical experience with participation in clinical research and academic writing. Our Clinician-Scientists complete core clinical training prior to joining our NIH-funded Training Grant. These academic pathways provide the necessary protected time to develop a career in either clinical research or basic science.
Type of Program	Pulmonary and Critical Care
Number of Fellows in Program	14
Abstract Title	A Formalized Curriculum for Critical Care Ultrasonography: A Single Fellowship Experience
Abstract Authors	Ahmed Khan ¹ , William Hunt ¹ , David Green ¹ , Timothy Udoji ¹ , Carter Co ¹ , David Quintero ¹ , Eliza Bacot ¹ , Rabih Bechara ¹ , Gautam Kumar ² , David Schulman ¹
Submitter of Abstract	David A. Schulman, MD

BACKGROUND

The portability and low cost of ultrasound make it an important point-of-care tool in modern critical care medicine. Critical care practitioners trained in the use of ultrasound can improve patient safety and obtain key bedside information about patients' volume status, cardiac function, chest and abdominal pathology¹⁻³. The Accreditation Council for Graduate Medical Education (ACGME) currently requires fellows to demonstrate knowledge of "imaging techniques commonly employed in the evaluation of patients...including the use of ultrasound"⁴. To our knowledge, few teaching institutions have employed structured curricula to develop pulmonary and critical care fellows' ultrasound proficiency in accordance with ACGME recommendations. Therefore, we created a formal curriculum designed to foster the acquisition and maintenance of minimal competence in basic critical care ultrasound.

METHODS

A curriculum was structured to provide focused and high-yield learning objectives that met the minimum ultrasound competence outlined by previously-published consensus statements^{5,6}. The instructors constructed the course using a three-phase approach that involved initial core training, maintenance of skills, and immediate and longitudinal evaluation.

Initial training featured 16 hours of combined lecture series and supervised hands-on training sessions with consenting critical care patients. The lecture material reviewed basic ultrasound physics and key learning objectives required to achieve competence with acquisition and interpretation of vascular, abdominal, thoracic, and echocardiography images (Table 1). The value of the echocardiography portion of the course was enhanced by interdepartmental collaboration with the Division of Cardiology and exploration of cadaveric hearts provided by the medical school anatomy lab.

Multiple choice pre- and post-tests and direct instructor observation were used to evaluate the immediate impact of the course on fellows' image interpretation and acquisition skills respectively. A Likert-scale survey was conducted to determine self-reported comfort interpreting ultrasound images. To reinforce initial training concepts, fellows were asked to log ultrasound images acquired during their clinical rotations and present them at monthly review sessions proctored by a course instructor. Long-term concept and skill retention will be assessed using a capstone objective structured clinical examination (OSCE), whereby fellows will be directly observed during a series of patient encounters and provided formal feedback. Finally, fellows will be required to demonstrate procedural competence using ultrasound while performing diagnostic thoracentesis, paracentesis, and central vein cannulation. Each fellow will be required to perform three successful ultrasound-guided procedures in each category, and one procedure must be supervised by a course instructor.

RESULTS

Following initial training, the mean score on the combined vascular, abdominal and thoracic image interpretation test

improved from 72% to 89% ($p < 0.01$) (Figure 1). Less pronounced, but significant increases in the group mean score were achieved on the echocardiogram image interpretation test after initial training (Figure 1).

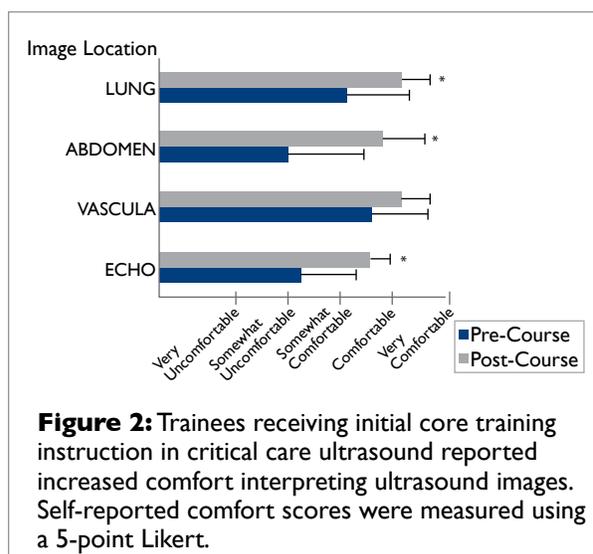
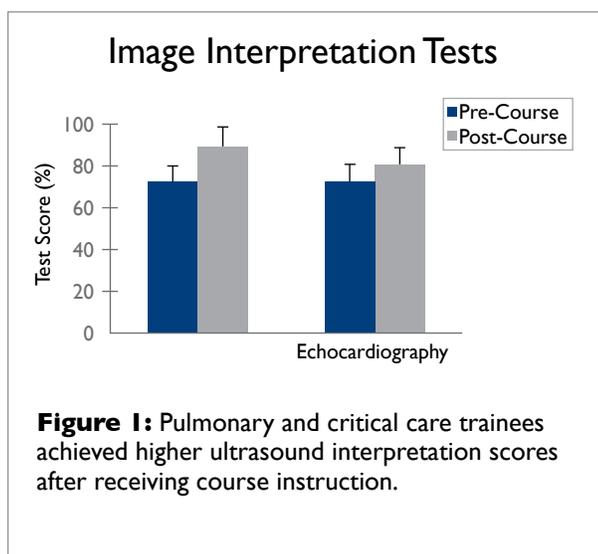
Upon receiving the initial training, all fellows demonstrated competence acquiring and interpreting the vascular, thoracic, abdominal, and four-chamber echocardiogram images highlighted in Table 1. The Likert-scale survey revealed that fellows felt significantly more comfortable interpreting ultrasound images after course instruction (Figure 2).

CONCLUSIONS

We developed a novel curriculum to train and evaluate fellows in basic critical care ultrasonography. As assessed by both objective testing and subjective measures of self-reported comfort, the course increased our fellows' critical care ultrasound competence. This experience should encourage other training programs to establish similar ultrasound competence initiatives for incoming members of the critical care profession.

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Harvard Medical Center (I) Boston, MA

Program Description	Thoracic ultrasound is a necessary skill for the practicing intensivist. Formal training has not been widely incorporated into pulmonary and critical care training programs, and many faculty and fellows are not competent with this technology. We have developed an innovative thoracic ultrasound curriculum that combines web-based didactics and hands-on training. The impact of the curriculum is now being investigated, and we anticipate that our standardized approach will be sustainable and exportable to other training programs.
Type of Program	Combined Fellowship
Number of Fellows in Program	30
Abstract Title	Thoracic Ultrasound training for Medical Intensivists
Abstract Authors	Nancy E. Lange MD MPH ^{2,3} , Jakobl. McSparron MD ^{1,3} , Anthony Massaro MD ^{2,3} , Rebecca M. Baron MD ^{2,3} ¹ Carl J. Shapiro Institute for Education & Research, Beth Israel Deaconess Medical Center and ² Division of Pulmonary and Critical Care Medicine, Department of Medicine, Brigham and Women's Hospital and ³ Harvard Medical School
Submitter of Abstract	Jakob McSparron

RATIONALE

Critical care ultrasound (CCUS) is becoming a necessary skill for the practicing intensivist. With high sensitivity and specificity for identifying the etiology of respiratory failure, thoracic ultrasonography is particularly relevant in the intensive care unit. Furthermore, ultrasound-guided thoracentesis decreases complications and can be performed safely in mechanically ventilated patients. Formal training has not been widely incorporated into pulmonary/critical care fellowships, and many faculty and fellows are not competent with this technology. Research exploring training in thoracic ultrasound is limited with marked variability among training programs. Our innovative curriculum based on available literature that combines web-based didactics and hands-on training offers a standardized approach for programs seeking to implement ultrasound training. We have developed a CCUS curriculum focused on lung/pleural ultrasound and are investigating the impact of the curriculum with pre/post-tests, assessment of skills using simulation, and evaluating the need for periodic refresher training. Skill retention is assessed using follow-up testing at periodic intervals following initial training.

METHODS

This is a prospective interventional pre-post study of 10 attending intensivists and 20 critical care fellows. The curriculum is a combination of interactive web-based didactics, clinical case discussions, and hands-on training. Subjects complete a written pretest and perform an observed thoracentesis on a simulator to evaluate baseline knowledge and skills. A written posttest and simulated thoracentesis is performed upon course completion and at 6 months to assess the impact of the curriculum and retention of skills. Half of the group is randomized to a refresher course at 3 months after initial training. Pre- and post-test scores are compared by individual subjects and in aggregate as well as between subjects who underwent refresher training and those who did not.

RESULTS

Based on a thorough literature review, a thoracic ultrasound curriculum for medical intensivists was created including both a web-based lecture and hands-on skill sessions. We anticipate this short and feasible curriculum will effectively train faculty and fellows in the use of lung and pleural ultrasound, including performance of ultrasound-guided thoracentesis. We expect that those who undergo refresher training will have improved performance on testing than those who do not.

CONCLUSIONS

Ultrasound training is becoming essential for pulmonary and critical care fellowships. Our study assesses the effectiveness of a comprehensive and feasible curriculum for medical intensivists. We anticipate that our innovative design using web-based didactics has the potential to facilitate sustainability from year to year and makes our curriculum easily exported and implemented by other programs.

FUNDING

This project is supported by a grant from the Partners Centers of Expertise in Education.


Harvard Medical Center (2) Boston, MA

Program Description	A needs assessment has demonstrated that our fellows are interested in improving their teaching skills and pursuing careers in medical education. We have designed a dedicated fellow-as-teacher rotation to provide trainees with an introduction to key aspects of medical education while participating in hands-on teaching opportunities. This experience combines observed teaching, OSTEs, and attending-level feedback in order to improve fellows' teaching skills and encourage fellows to explore careers as medical educators.
Type of Program	Combined Fellowship
Number of Fellows in Program	30
Abstract Title	Teaching Fellows to Teach: Developing Medical Education Skills in Pulmonary and Critical Care Fellowship Training
Abstract Authors	Jakob I. McSparron MD, Jeremy B. Richards MD, MA, David H. Roberts MD, Richard M. Schwartzstein MD, and Peter Clardy MD Carl J. Shapiro Institute for Education & Research at the Beth Israel Deaconess Medical Center and the Harvard Pulmonary Fellowship Program, Massachusetts General Hospital
Submitter of Abstract	Jakob McSparron

RATIONALE

Teaching is a core component of academic medical practice, from engaging medical students or residents in clinical settings to educating patients about their health issues and treatments. The role of physicians as teachers is emphasized in the Accreditation Council for Graduate Medical Education's Practice-based Learning and Improvement core competency. Although fellows traditionally receive explicit clinical and research training, instruction on teaching skills is frequently absent from fellowship curricula. Given this context and the strong interest among our fellows in improving their teaching skills, we implemented a novel educational innovation in our Pulmonary and Critical Care Medicine (PCCM) fellowship training program: faculty observation of fellows' morning ICU teaching sessions followed by directed feedback, complimented by a dedicated medical education rotation.

METHODS

We performed a needs assessment by anonymously surveying all PCCM fellows in the four-year Harvard Fellowship Program regarding their attitudes about developing their teaching skills and their career interest in medical education. To address fellows' interest in developing teaching skills as demonstrated in the needs assessment, we implemented dedicated faculty observation of fellows' small group teaching occurring four times a month by two separate attendings with advanced training as medical educators. A standardized assessment tool is used by faculty observing fellows teaching, and dedicated feedback is provided immediately after the observation. Feedback focuses on the key skills of didactic teaching, small group discussion leadership, and reflective practice on teaching strategies and techniques. In some cases, the attending assists the fellow in planning a new educational approach to a particular topic. The culmination of teaching observations, a new "fellow-as-teacher" rotation combines diverse teaching experiences (small group, lecture, simulation, procedural teaching, patient education) with formal didactics led by experts in medical education. During this protected time, fellows are introduced to aspects of education theory, teaching strategies, education research, and learner assessment. A unique component of this rotation is the incorporation of an objective structured teaching exercise (OSTE), in which fellows are observed teaching a standardized student in the simulation center and receive directed feedback during a subsequent debriefing. The OSTE provides the trainee with immediate feedback, and allows for objective evaluation of teaching skills in a standardized environment.

RESULTS

Fellows in our program demonstrate extremely high self-reported interest in developing their teaching skills: 56% of fellows rank teaching skills as "very important", 30% as "important", and 15% as "moderately important". With regard to pursuing a career as a medical educator, 22% of fellows are "very interested" and 33% are "interested". In response to questions about faculty observations of their teaching, 70% of Fellows reported being observed on ICU rotations, and 28% noted that their

teaching was observed on Pulmonary Consult rotations. Fellows feel that dedicated observation of and feedback about their teaching is beneficial; 90% of fellows indicate that they feel more comfortable as teachers from the beginning to end of the academic year.

CONCLUSIONS

Our needs assessment demonstrates that PCCM fellows are interested in improving their teaching skills and a sizeable percentage are interested in pursuing careers in medical education. Dedicated observation of fellows' teaching in small group sessions is both noted and appreciated by fellows, and they feel that focused assessment of their teaching contributes to them becoming better teachers. Our fellow-as-teacher rotation combines an intense introduction to key aspects of medical education with hands-on teaching opportunities. Increasing the frequency of teaching opportunities, observed teaching, OSTEs, and attending-level feedback will improve fellows' teaching skills and encourage fellows to explore careers as medical educators.

Review of Teaching – Observational Checklist					
Fellow Observed:	Clinical Session Observed:				Date:
Observer:	Number of Learners:				
	E	O	NO	NA	Notes
Developing a Learning Climate					
Know the learners	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Listen to the learners	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Encourage learners to voice uncertainty	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Build on learners' previous knowledge	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Engages all learners	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Expresses respect for learners	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Encourages learners to participate actively in discussions	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Demonstrates enthusiasm for teaching	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Encourages group engagement and collaboration	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Shows appropriate non-verbal communication skills	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Handles distractions	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Managing Session					
Communicates clear goals and agenda for session	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Modifies session plans in response to learners' needs	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Organizes the session appropriately	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Keep track of time	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Uses chalkboard effectively	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Includes focused teaching points	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Emphasizes understanding of concepts	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Incorporates clinical correlate	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Concludes session with key teaching points	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Identifying Methods to Improve Learning					
Uses questions appropriately to the level of learners	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Challenges learners' assumptions and explores their reasoning	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Uses didactic techniques effectively	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Acknowledges personal knowledge deficits	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Encourages learners to pursue and critically appraise the literature	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Overall Comments					

These behaviors may occur within a given clinical teaching session. Observe the teaching session and then consider each item carefully and place a check next to your response. (E= Exemplary, O= Observed, NO = Not Observed, NA = Not Applicable)

Loyola University Medical Center Maywood, IL

Program Description	We have a 3 year fellowship program and we take 4 Fellows per year. Loyola University medical Center is affiliated to the Stritch School of Medicine. We are a tertiary care center with a level I trauma center. We have a successful lung transplant program which is the busiest in the state of Illinois. Our fellows do 2 year of clinical work and spend 9-12 months in research.
Type of Program	Pulmonary and Critical Care
Number of Fellows in Program	12
Abstract Title	Increasing Journal Review Among Fellows-In-Training
Submitter of Abstract	Program Director: Sunita Kumar, MD

Many of us are pressed for time when it comes to reviewing all the pertinent publications of our field and restrict reading to one or two journals at the most. Journal reading is an important aspect of Fellowship training to enhance Fellows' ability to critically review the literature. ACGME currently requires Fellows to participate in a monthly Journal Conference. Due to clinical responsibilities, off-site rotations, Fellows are sometimes unable to attend this conference regularly.

Fellows present weekly at Journal Club at our institution where they present 2 articles each, one of which is from the AJRCCM. Each Fellow presents about 2-3 times in the year. However, their exposure to other journals and their self-reading of the monthly core journals appears to be deficient despite this weekly learning activity. I conducted a survey to evaluate Fellows' journal reading practice. 8 of the 12 fellows responded to the survey. The results of this survey were:

- Most commonly read journals were CHEST (87.5%) and AJRCCM (75%)
- 6 out of 8 fellows (85.7%) read less than 3 articles per journal issue
- 5 out of 8 (62.5%) were not at all satisfied, 2 (25%) were somewhat satisfied and 1 was very satisfied with their current reading practice
- All of them (100%) cited lack of time as the most important reason for their limited reading
- 7 of 8 (87.5%) indicated that they were more likely to read a few relevant articles from different journals if these were pointed out to them

I aired the idea of creating an internal publication "Loyola PCCM Journal Watch" to my Fellows. I got a "conditional approval" for 6 months. Some of the Fellows felt that this should replace the weekly Journal Club, but were willing to give it a try. Fellows were assigned to read a different journal each month. They email the summaries of at least 2 articles to me by the 15th of the following month. They also listed interesting review articles worth reading from these journals. For instance, they reviewed the AJRCCM September 1st and 15th issues and submitted their summaries by email to me by October 15th. I would then compile the summaries and release the PDF to all the faculty and fellows. I conducted a follow up survey after 2 summaries went out. 8 of 12 (67%) Fellows responded and the results are shown in Table 1.

The monthly publication was well received among the faculty and the fellows. Personally, I became aware of interesting articles, which I might not have had the chance to review myself, but for this publication. It also allowed the Fellows to review other journals they were not in the habit of reading.

Journal offers a wealth of information, both in terms of original research papers and review articles. Practices established during this period will likely shape the reading habits post Fellowship. This exercise of journal review increased exposure of the Fellows to journals and articles that could not be achieved through a monthly or weekly Journal Club.

Table 1: Results of Survey conducted to assess the impact of "Loyola PCCM Journal Watch"

	Yes	No	I don't know
Do you think Journal Watch should continue?	5 (62.5%)	0	3 (37.5%)
Do you read through the entire publication ?	4 (50%)	4 (50%)	0
Has this increased your exposure to other journals?	7 (87.5%)	1 (12.5%)	0
Do you feel more informed as a result of this exercise?	8 (100%)	0	0
Does this add to your learning beyond the weekly Journal Club	8 (100%)	0	0



Program Description	Our critical care fellowship program consists of 13 fellows: 3 each in the first and second year of a two-year critical care fellowship; 7 are in a one-year critical care fellowship after completing two-year fellowships in pulmonary medicine. We integrated a communication skills training program into a one-month palliative care teaching module with the goal of improving our fellows' skill and comfort with running family meetings in critical care settings.
Type of Program	Critical Care
Number of Fellows in Program	13
Abstract Title	Let's Talk Critical: The Development and Evaluation of a Communication Skills Training Program for Critical Care Trainees
Abstract Authors	Aluko A. Hope ¹ ; Jennifer M. Howes ¹ ; Lindsay A. Dow ¹ ; Adam B. Keene ¹ ; James A. Fausto ² ; S. Jean Hsieh ¹ ; Michelle N. Gong ¹ ¹ Department of Medicine, Division of Critical Care Medicine and ² Department of Family and Social Medicine, Palliative Care Program at Albert Einstein College of Medicine of Yeshiva University, Bronx, New York
Submitter of Abstract	Program Director: Adam Keene, MD

RATIONALE

Even though effective communication with patients and their surrogates has been shown to improve patient- and family-centered outcomes in the Intensive Care Unit, trainees in critical care medicine do not feel adequately trained to conduct family meetings. Time constraints on hospital teaching make integrating communication skills practice into the curriculum particularly challenging. We aimed to develop a communication skills program that could be easily integrated into the teaching module of a U.S. critical care fellowship.

METHODS

We surveyed trainees and faculty members to better understand their attitudes and experiences regarding communication with patients and families in the critical care setting. We developed four simulation cases that we thought provided important communication challenges for the critical care trainees. By consensus, we developed a list of directly observable skills that could be measured to evaluate the trainee during each practice session and rated the skill level (1, 2 or 3) of each observable skill (see table 1). Faculty evaluators were instructed to relate feedback to these specific observable skills. Clinicians were recruited from the division to play the surrogates during the simulation cases. Trainees were given up to 4 different opportunities to practice their communication skills with directed feedback (two cases at the beginning of the month and a different two cases at the month's end). Lectures and case discussion during the month provided opportunity for role playing and trainee reflection (see figure 1). Our primary measure of effectiveness was the fellows' self-reported comfort level with family meetings after the month-long curriculum was completed.

RESULTS

The first simulation at the beginning of the month highlighted important skill deficits in our trainees: performance rates for skills like describing the overall goal of the meeting, summarizing and providing a follow up plan were $\leq 50\%$ (see table 2). In general, trainees showed higher performance rates in most skills during the simulation at the end of the month compared to the beginning of the month, particularly in level 2 skills (see figure 2). All participants reported feeling "slightly more" or "much more" comfortable with family meetings after the month-long curriculum.

CONCLUSION

Communication skills practice can be integrated into the teaching module of a critical care training program and may improve trainees' skill and comfort with running family meetings.

Table 1: Skills Assessment for Case 1

Did the trainee do (or use) any of the following skills* during the simulation? Answer YES or NO.

Level 1 Skills	YES	NO
Introduce self?		
Mention his/her role on the team?		
Describe the overall goal of the meeting?		
Give information to the family regarding the patient's illness?		
Level 2 Skills	YES	NO
Check for the family member's understanding of the illness before providing an update?		
Elicit concerns/questions from the family regarding the patient's illness?		
Summarize what is going to be done next for the patient?		
Provide a follow-up plan (e.g. "Let's meet again in another day to evaluate how things are going.")?		
Level 3 Skills	YES	NO
Ask for the family member's goals for the meeting?		
Naming of emotions (e.g. "It sounds like you are worried about your husband not getting better...")?		
Understanding or validating statements (e.g. "It must be overwhelming having to break this news to the rest of the family...")?		
Respect or praise statements (e.g. "I am very impressed with how well you have taken care of your husband..." OR "You are asking a lot of good questions...")?		
Supportive statements (e.g. "I have given you a lot of information. Our team will be around all night to answer any questions that come up.")?		
Exploring statements (e.g. "This must be a lot to face. What are you thinking?")?		
Describe at least one thing that the doctors will look for to indicate whether the patient is getting better or worse (e.g. The amount of oxygen being used to support him.)?		
*Consensus was reached regarding the level of each observable skill: level 1 skills were considered necessary for effective communication; level 2 were considered intermediate communication skills that could enhance rapport building and effectiveness and could be easily taught; level 3 were considered more advanced skills that were unlikely to accrue with experience alone but could be improved in highly motivated participants.		

Table 2 shows the performance rate* of the key skills during the simulated family meetings

Skills	First Simulation (n=12)	Second Simulation (n=16)
Introduce self	83	94
Mention his/her role	58	75
Describe overall goal of the meeting	50	81
Give information to family regarding illness	100	88
Check for family member's understanding before providing an update	83	81
Elicit concerns/questions	58	63
Summarize what is going to be done next	42	75
Providing a follow up plan	50	81
*The numbers shown are the percent of the total possible times that trainees demonstrated the skill during the simulated family meeting. The first simulation occurred at the beginning of a month-long curriculum and the second simulation occurred at the month's end.		

University of Colorado at Denver (I) Aurora, CO

Program Description	We developed a clinical trial immersion project to expose and teach first year fellows the practical skills of clinical trial design, conduct, data analysis and manuscript preparation. A predesigned study was given to the fellowship class to run with a faculty mentor and timely workshops were implemented to facilitate the core skill sets required to conduct, analyze and publish the results from this clinical trial.
Type of Program	Pulmonary and Critical Care
Number of Fellows in Program	6 per year (18-24 overall)
Abstract Title	An Immersive Clinical Research Experience as a Teaching Tool for First Year Pulmonary and Critical Care Fellows
Submitter of Abstract	Alex Benson, MD

NEEDS

Academic Pulmonary and Critical Care fellows who plan to transition into an academic faculty position need to understand the practical aspects of clinical trial design, conduct, data analysis and manuscript preparation. This is especially true if they will not perform clinical research in their career as the ability to critically appraise clinical trial data is a vital skill as a clinician and is greatly aided by experience with the design and conduct of a clinical trial.

OBJECTIVES

1. To have all six first year pulmonary and critical care fellows to collectively conduct an IRB approved clinical trial of hemodynamic monitoring in septic shock under the guidance of a faculty mentor.
2. Fellows are expected as a group to screen and enroll patients at the hospital they are rotating, implement treatment intervention, collect data, analyze data and prepare a manuscript with appropriately timed workshops to introduce and teach these skill sets.

SUBJECTS AND SETTING

The study consists of a simple physiologic intervention in fluid resuscitated patients with septic shock and is being performed at one medical intensive care unit where a first year pulmonary and critical care fellow is consistently on service. All fellows perform clinical training for 12 straight clinical months during the first year. There are no medical residents at this institution and therefore fellows provide most of the care autonomously with the help of an attending physician.

METHODS

1. A monthly review of our enrollment numbers, adverse events, intervention and design challenges are addressed as a group with a faculty mentor and changes to the study are made based on group feedback.
2. When enrollment is completed (n=50), as part of our career development workshop series we will teach the fellows how to appropriately analyze the data based on the study design.
3. Fellows will then attend a workshop on manuscript preparation and write up the results of the clinical trial. All first year fellows (6) will obtain middle authorship with the exception of the fellow that champions the subsequent project who will be first author.
4. Based on lessons learned from this study and after a workshop on clinical trial design, the current class of first year fellows will design a clinical trial with a faculty mentor for next year's fellowship class and submit for IRB approval.
5. Additionally, a selected fellow with interest in clinical research will mentor the new class in the subsequent clinical research project.

EVALUATION MEASURES

1. Did fellows complete study, analyze the data appropriately and submit a manuscript for publication?
2. The clinical research faculty will qualitatively evaluate the change in critical appraisal skills of clinical trials performed by our upper level fellows during monthly journal club.
3. Qualitative round table qualitative feedback of all first year fellows that participated in the project prior to and after manuscript preparation.
4. Pre and post test of clinical trial design and conduct.

DISCUSSION

Practical experience coupled with workshops that teach clinical trial design, conduct, analysis and manuscript preparation is invaluable and can be used to teach aspiring academic pulmonary critical care fellows the basics of clinical trial research. In addition to obtaining academic currency and exploring this career track, this project will help these future academic physicians better critically appraise manuscript and grant applications as well as published clinical trial data.

University of Colorado at Denver (2) Aurora, CO

Program Description	We developed a progressive multi-modality curriculum to teach first year pulmonary and critical care fellows the skills to independently manage shock syndromes. We began with pathophysiologic case-based workshops and progressed to high-fidelity simulation. Fellows were subsequently evaluated on their ability to lead case-based teaching workshops for internal medicine house staff. Each modality re-enforced base physiologic concepts and introduced new skills and also served to evaluate the effectiveness of the previous modality in teaching core concepts.
Number of Fellows in Program	6 per year/ (18-24 overall)
Abstract Title	Moving Pulmonary and Critical Care Fellows Beyond the Algorithm in Shock Management
Submitter of Abstract	Alexander Benson; Mark Kearns; Janet Corral

NEEDS

Appropriate early recognition and management of shock improves patient outcomes. Effective analysis, diagnosis and management of shock syndromes require that pulmonary and critical care fellows have a strong pathophysiologic understanding of shock. Fellows must be able to communicate their thought processes and rationale clearly and concisely to the house staff treatment team and attending physician, so that shared hypothesis generation and physiologically-based diagnostic and treatment trials can be rapidly implemented.

OBJECTIVES

Our program objectives were to:

1. Create a serial multimodality educational curriculum that facilitates the development of complex pathophysiologic reasoning skills, physiologic hypothesis testing and the ability of our fellows to execute and communicate these processes to a team of internal medicine residents.
2. Utilize performance measures obtained during high fidelity simulation and the observed teaching of resident case conferences to evaluate and improve the effectiveness of these fellow educational sessions.

DESCRIPTION AND EVALUATION

Physiologic case-based learning: We developed and delivered five one hour problem-based learning workshops focusing on pathophysiologic and management of shock.

High-fidelity simulation: After completion of the shock workshops all six fellows participated in three high-fidelity simulation scenarios that were developed by integrating the key pathophysiologic and management strategies discussed in the workshops. During these simulation scenarios, all diagnostic and treatment technology used in a real ICU setting was available including a multidisciplinary team of professionals.

Teaching physiologic based learning: Each of the simulation scenarios (septic shock, obstructive shock due to massive venous thromboembolism and hemorrhagic shock due to massive variceal bleeding) were simplified and altered to create case based 1 hour teaching workshops for the internal medicine house staff. Each first year fellow will be observed running two of these sessions.

EVALUATION MEASURES

Program Evaluation measures include:

Qualitative written and verbal feedback regarding content, teacher, teaching technique and suggestions for improvement immediately after each workshop given to the fellows.

Qualitative feedback ~6 months after the workshops given to the fellows prompting them to remember the most important take home points from each individual workshop. These will be used to revise objectives and feedback to faculty for next year's workshops.

Video review of all three scenarios with the fellows 6 months after completion with an open discussion of how to re-format the scenarios to best integrate and evaluate core concepts.

Learner assessment will include:

Checklist of expected diagnostic and management decisions reviewed during a 30 minute debrief at end of each high fidelity simulation scenario.

Checklist assessing whether the fellow covered the expected content, educational and communication objectives along with qualitative feedback will be completed by observing faculty member for each fellow following their teaching conference

Medicine residents will be surveyed regarding content, teaching effectiveness, format after the second case conference utilizing a qualitative survey.

DISCUSSION

The curriculum described above uses multimodal learning strategies with a goal of transitioning competent learners (fellows) to content experts who are able to integrate knowledge and make appropriate rational decisions in a high-stress environment and communicate this complex information to the novice learner (IM resident) in a clear concise manner. Each step of this curriculum evaluates the effectiveness of the previous learning strategy while introducing, teaching and evaluating important new skill sets required for success as an academic clinical expert. We use this same curriculum to teach respiratory failure and it can likely be used to teach the diagnosis and management of many other complex physiologically based syndromes.

University of North Carolina Chapel Hill, NC

Program Description	Pulmonary and Critical Care Medicine fellowship at large academic medical center.
Type of Program	Pulmonary and Critical Care
Number of Fellows in Program	10
Abstract Title	Effectiveness of a Critical Care Ultrasound Curriculum in a Pulmonary & Critical Care Medicine Fellowship GME Program.
Abstract Authors	Cidney Hulett MD MPH, Lydia Chang MD, Jason Katz, Sean Montgomery
Submitter of Abstract	Cidney Hulett, MDD

PURPOSE

The focused ultrasound examination has become increasingly recognized as a safe and valuable diagnostic tool for the bedside assessment of the critically ill patient. It offers a number of advantages: it can be performed promptly by the treating physician, it does not involve transport of the unstable patient, and it does not involve ionizing radiation. National critical care organizations have advocated for its utilization in ICU care.

There remain significant perceived barriers to integration of ultrasound training into a critical care fellowship as most programs do not offer focused training which leaves these skills to be acquired informally during training.

We implemented a dedicated on-site critical care ultrasonography curriculum with a goal of developing a model for teaching ultrasound skills to critical care medicine fellows.

METHODS

The program was comprised of blended didactic and bedside sessions in the following areas: fundamentals, vascular access and diagnosis, abdominal, thoracic, and cardiac ultrasonography. Formal knowledge and image acquisition assessments were performed prior and following the program to assess success in meeting predefined learning objectives. Additionally, participants completed surveys (on Likert scale 1 to 5) prior and following the program to assess confidence in ultrasonography knowledge and skills as well as their perception as to training effectiveness.

RESULTS

The pre-intervention knowledge and bedside image acquisition scores were 71.4% and 31.5% respectively. The global pre-intervention score was 51.4%. All post-intervention measures demonstrated significant improvement: 89.1% ($p = 0.00119$), 85.6% ($p < 0.0001$), and 87.3% ($p = 0.0001$). The pre-intervention confidence score was 2.96/5 which improved to 4.35/5 ($p = 0.0072$) post-intervention. Participants rated course objectives being as a mean of 4.82/5.

CONCLUSIONS

Pulmonary and Critical Care Fellow knowledge of Critical Care Ultrasound is high at baseline but image acquisition skills are poor. A dedicated educational intervention resulted in highly significant improvements in both subject knowledge and image acquisition skills.

CLINICAL IMPLICATIONS

A formal curriculum dedicated to critical care ultrasonography can be developed de novo on site in an fellowship training program. It can be effectively improve knowledge and skills. This model could be used in development of a national model for similar instruction.

DISCLOSURES

The following authors have nothing to disclose: Cidney Hulett MD MPH, Lydia Chang MD, Jason Katz MD, Sean Montgomery MD

University of Southern California Los Angeles, CA

Program Description	The USC Pulmonary and Critical Care Fellowship Program is one of the largest, most rigorous training programs in the nation. Our 21 fellows cover three hospitals--the Los Angeles County Hospital, Norris Comprehensive Cancer Center, and the Keck Medical Center of USC. Our fellows gain in-depth experience in not only basic MICU and pulmonary consultation services, but also significant training in surgical ICU, lung transplantation, cystic fibrosis, pulmonary hypertension, sleep, lung cancer, and advanced diagnostic bronchoscopy.
Type of Program	Pulmonary and Critical Care
Number of Fellows in Program	21
Submitter of Abstract	Associate Program Director: Ching-Fei Chang

The Los Angeles County Medical Center, one of the largest public teaching hospitals in the nation, provides medical services to thousands of indigent and underserved patients a year. Being a government-run hospital, timely and efficient care is frequently problematic due to limited resources and bureaucratic processes. In our pulmonary outpatient clinic, we identified 3 major obstacles to patient access and continuity of care, which have negatively impacted the outpatient training experiences and education of our fellows for decades. These included an average wait time of 2 years to be scheduled, lack of continuity of providers from visit to visit, and a patient no-show rate of over 50%. A one year program improvement project involving both fellows and faculty, was initiated, using a FISH diagram in which these problems were dissected and solutions developed.

Waiting time was shortened by trimming the pre-existing list of 1000 patients to less than 400 by dropping all referrals over a year old, assuming that either the patient was deceased or the issue was resolved. A computerized system was created for new referrals and was reviewed and triaged daily by the clinic directors to ensure that urgent cases were given priority. As a result, median wait time for an appointment decreased from 2 years to less than 2 months.

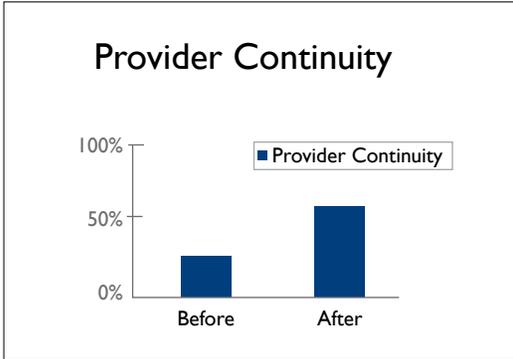
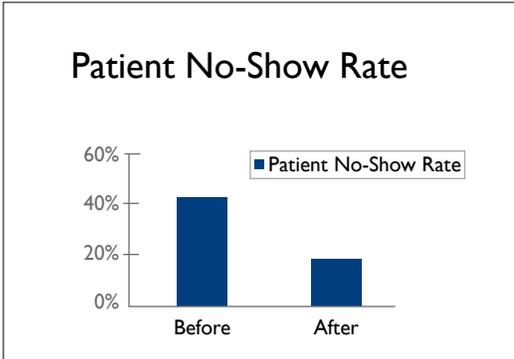
To address continuity, fellow vacation, night, and ICU cross-coverage schedules were provided to the scheduling clerks. In addition, fellows are now paired, and if the initial primary physician fellow is not available to see the patient for a follow-up visit, his/her 'partner' fellow is the assigned default provider. As a result, continuity of care has improved from ~25% to over 70%.

Root causes underlying the high no-show rate were identified as 1) patients being unaware of their appointments and 2) dissatisfaction with the clinic experience. The previous approach of appointment by mail was replaced with phone scheduling and confirmation by a Spanish-speaking clinic staff member. If the patient could not be reached or was unavailable that day, they were rescheduled.

Problems related to patient satisfaction were identified and corrected. In addition to continuity issues, patients were unhappy with the time to discharge from clinic while waiting for orders and referrals to be entered by nursing and clerical staff, who processed paperwork in the order of receipt. Wait time was dramatically reduced by shifting the responsibility to the clinicians who complete this step electronically after seeing the patient.

In addition, number of hospital visits was reduced by providing same-day pulmonary function testing in the clinic, and processing oxygen and non-invasive ventilation equipment requests on-site. As a result of these interventions, patient questionnaires now reveal a 95% "very satisfied" rating, and the no-show rate has improved from greater than 50% to less than 20%.

Our successful project demonstrates a model for improving access and continuity of care issues commonly encountered within government teaching hospitals, while simultaneously enhancing fellow education and training in the context of several ACGME competencies. As a result of their daily involvement with improving clinic efficiency, continuity of care, and patient satisfaction, fellows were educated about professionalism and interpersonal communication, as well as systems-based practice in the context of a multidisciplinary team.





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