ORIGINAL RESEARCH

Development of a National Academic Boot Camp to Improve Fellowship Readiness

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ABSTRACT

Background: Pulmonary and critical care medicine (PCCM) fellowship requires a high degree of medical knowledge and procedural competency. Gaps in fellowship readiness can result in significant trainee anxiety related to starting fellowship training.

Objective: To improve fellowship readiness and alleviate anxiety for PCCM-bound trainees by improving confidence in procedural skills and cognitive domains.

Methods: Medical educators within the American Thoracic Society developed a national resident boot camp (RBC) to provide an immersive, experiential training program for physicians entering PCCM fellowships. The RBC curriculum is a 2-day course designed to build procedural skills, medical knowledge, and clinical confidence through high-fidelity simulation and active learning methodology. Separate programs for adult and pediatric providers run concurrently to provide unique training objectives targeted to their learners' needs. Trainee assessments include multiple-choice pre- and post-RBC knowledge tests and confidence assessments, which are scored on a four-point Likert scale, for specific PCCM-related procedural and cognitive skills. Learners also evaluate course material and educator effectiveness, which guide modifications of future RBC programs and provide feedback for individual educators, respectively.

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Results: The American Thoracic Society RBC was implemented in 2014 and has grown annually to include 132 trainees and more than 100 faculty members. Mean knowledge test scores for participants in the 2019 RBC adult program increased from 55% (±14% SD) on the pretest to 72% (±11% SD; $P < 0.001$) after RBC completion. Similarly, mean pretest scores for pediatric course attendees increased from 54% (±13% SD) to 62% (±19% SD; $P = 0.17$). Specific content domains that improved by 10% or more between pre- and posttests included airway management, bronchoscopy, pulmonary function testing, and code management for adult course participants, and airway management, pulmonary function testing, and extracorporeal membrane oxygenation for pediatric course participants. Trainee confidence also significantly improved across all procedural and cognitive domains for adult trainees and in 10 of 11 domains for pediatric course attendees. Course content for the 2019 RBC was overwhelmingly rated as "on target" for the level of learner, with <4% of respondents indicating any specific session was "much too basic" or "much too advanced."

Conclusion: RBC participation improved PCCM-bound trainee knowledge, procedural familiarity, and confidence. Refinement of the RBC curriculum over the past 7 years has been guided by educator and course evaluations, with the ongoing goal of meeting the evolving educational needs of rising PCCM trainees.

Keywords:
medical education; simulation; boot camp; fellowship; active learning

Pulmonary and critical care medicine (PCCM) fellowship training is a demanding endeavor that requires trainees to gain competency in procedural skills and specialty-specific clinical decision-making in as little as 18 clinical months (1). Even the

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most competent learners possess training gaps at the start of fellowship because of variations in residency educational curricula and clinical experience, which can provoke anticipatory anxiety and negatively impact trainees' clinical performance. Changes in care delivery, such as the creation of specialty procedural services and recent work hour restrictions, further limit resident exposure to PCCM-related training in the clinical environment (2–4). As a result, the knowledge and skills that an individual brings to fellowship are variable, whereas the demands of the position are consistently high.

Efforts to standardize incoming PCCM trainee knowledge and technical skills have led to the development of academic "boot camps" that provide an immersive and often hands-on experience for trainees before starting clinical service. Initially popular in procedurally focused surgical specialties (5–15), academic boot camps have since appeared across a variety of nonsurgical specialties in which procedures are a part, but not the primary focus, of training. Recent examples include internal medicine (16–20), pediatrics (21, 22), radiology (23), and emergency medicine (24, 25) as well as nonprocedural disciplines, such as psychology (26). Boot camps have also been applied across different training levels, from first-year medical students (27, 28) to newly minted fellows (29, 30). Befitting a PCCM audience, boot camps are effective at teaching procedural and nonprocedural topics (18, 22) and improving clinical competency in both the short and long terms (9, 14).

Despite the implementation of academic boot camps by PCCM fellowships, orientation and introductory training practices vary widely by program (31). Although some programs are able to offer immersive introductory boot camps to their fellows, comprehensive programs are often limited to larger fellowships or to collaborations between multiple fellowship programs within a close geographic area (32). Many programs, because of program size; clinical, educator, or cost constraints; or geographic isolation, are unable to provide a comprehensive boot camp program. Thus, development of a national, well-resourced, experiential boot camp opportunity for rising fellows has potential to greatly enhance trainee exposure to PCCM-related skills while relieving the academic and financial burdens of duplicating boot camp efforts within each fellowship program.

To meet this need, in 2014 the American Thoracic Society (ATS) created a resident boot camp (RBC) with the goals of enhancing core clinical and procedural skills and improving learner confidence to alleviate anticipatory anxiety for incoming fellows. Because of its popularity, in 2015, the ATS RBC expanded to include a pediatric pulmonary and critical care curriculum and, in 2017, to include a virtual boot camp for attendees unable to participate in person (Figure 1). Here, we describe the creation of the ATS RBC curriculum, its impact on trainee knowledge and confidence, and its evolution over 6 years based on educator and trainee feedback.

CURRICULUM DESIGN AND NEEDS-BASED ASSESSMENT

The initial RBC curriculum was developed in 2014 by a group of clinician educators, who included current and former fellowship program directors, and members of ATS Training Committee tasked with providing strategic guidance to the ATS on fellowship training-related issues. Curricular content centered around the question, "What should all trainees know on Day 1 of fellowship?" A list of

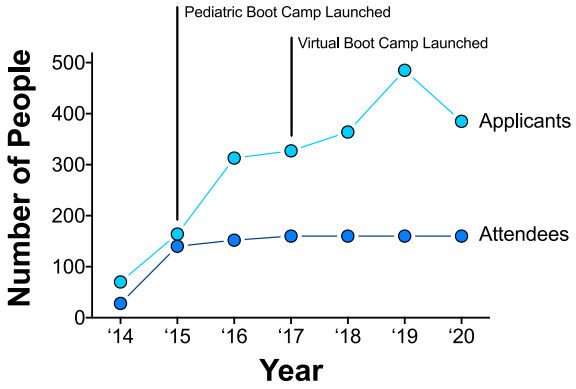

Figure 1. Total applicants and attendees of the American Thoracic Society resident boot camp by year. The resident boot camp was created in 2014 for incoming trainees of adult pulmonary and critical care medicine fellowships and was expanded in 2015 to include a separate curriculum for trainees in pediatric medicine. Total applicants have consistently exceeded available positions. In 2017, a virtual boot camp curriculum was added to engage applicants not able to attend in person.

potential topics was refined by the ATS Training Committee based on feedback from a brief needs and interest assessment completed by members of the Association of PCCM Program Directors (Table E1 in the data supplement). The resulting educational goals were defined as follows:

1. Understand basic techniques and principles of mechanical ventilation, airway management, and bronchoscopy (indications, techniques, and limitations);
2. Attain technical skills in vascular, thoracic, and pleural ultrasound image acquisition for ultrasound-guided procedures and diagnosis (pneumothorax, thoracentesis, central venous catheter placement, right ventricular dilation/dysfunction, and volume status);
3. Improve knowledge of cardiopulmonary physiology;
4. Develop strategies to successfully manage common clinical emergencies;
5. Increase trainee confidence and reduce anxiety related to clinical care of critically ill patients.

Based on these goals, a course was developed for PCCM-bound trainees in adult medicine that consisted of two 10-hour days (Figure 2) scheduled immediately before and in the same location as the annual ATS International Conference. In 2015, a separate pediatric course was also developed to meet the unique educational needs of pediatric pulmonary or critical care–bound trainees. Adult and pediatric courses run concurrently in adjacent space, using separate educators. Though the content differs, the adult and pediatric courses use the same structure, teaching methods, and feedback systems. Each day's curriculum is divided equally between hands-on simulation stations and group sessions that include small group breakouts and large group sessions (Figure 2). In 2015, because of the rising number of applicants, the adult course was split into two matching tracks in which half of the participants start with hands-on content and the other half start in group sessions, then switch at midday.

Active Learning Methodology and Session Formats

The RBC course uses active learning methods that require learners to frequently reflect and respond to material throughout the session (33–35). Active learning encourages bidirectional interactions between educators and learners with the goal of maximizing learner engagement and knowledge retention. In turn, educators can assess learner comprehension in real time and tailor their teaching focus to

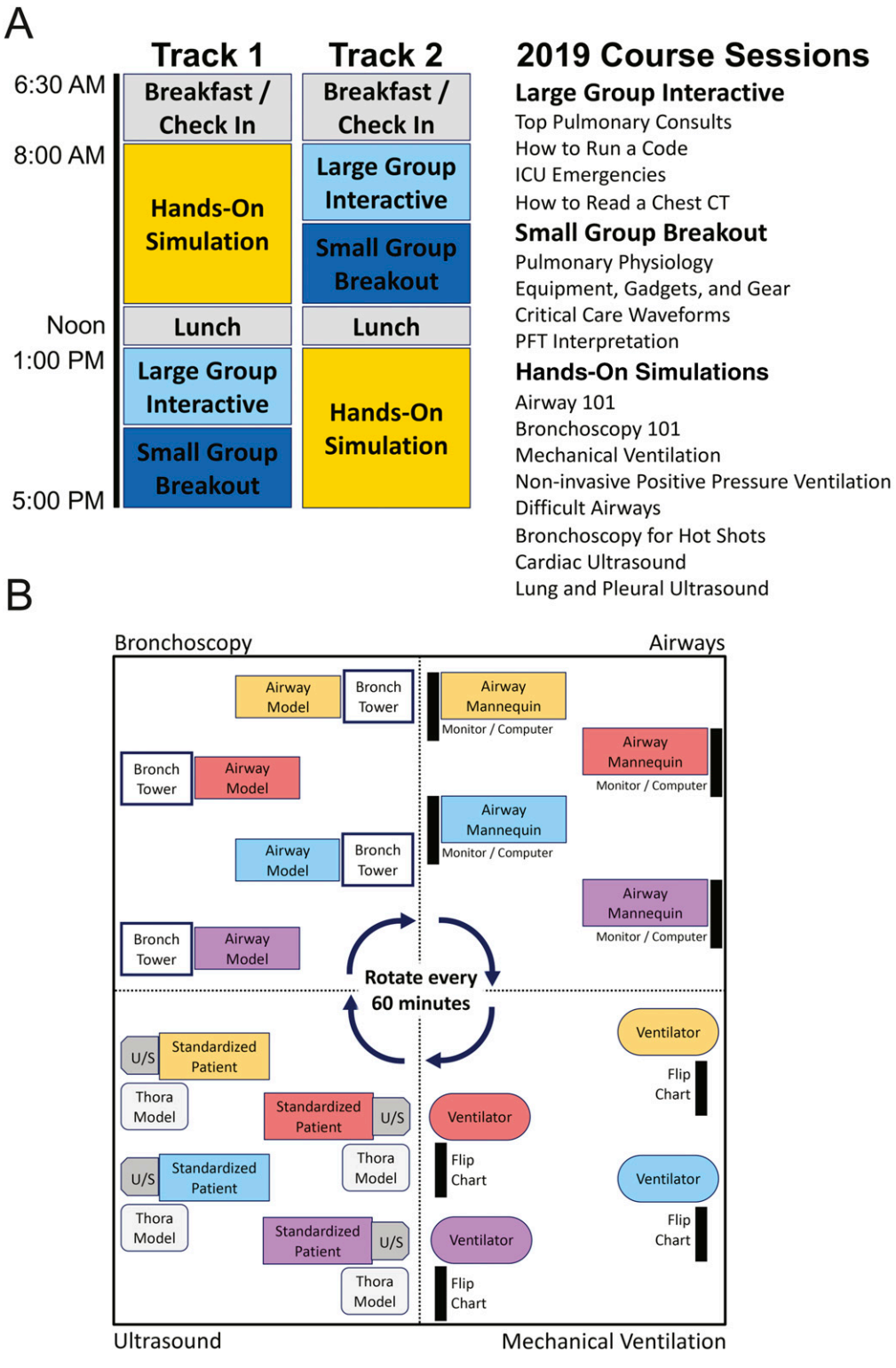

Figure 2. A 2019 resident boot camp adult course schedule overview. (*A*) Daily sessions include hands-on simulation, large group interactive sessions, and small group breakout sessions covering a mix of procedural and cognitive competencies. To accommodate a greater number of learners, the adult course was split into two counter-directional matching tracks. (*B*) Overview of the hands-on simulation environment. Learners rotate at 60-minute intervals between stations. CT = computed tomography; ICU = intensive care unit; PFT = pulmonary function testing; U/S = ultrasound.

challenging concepts based on the group's specific needs (36). This focus on active learning reflects an intentional evolution of the curriculum, based on learner and educator feedback from the first few years of the RBC, away from traditional, passive, lecture-based learning that was prone to learner disengagement. Thus, most current RBC sessions are constructed using a case-based format covering three to five cases or clinical problems in each hour-long session. Questions associated with cases are designed to be open ended or have multiple possible solutions to encourage discussion. To maximize learner engagement, RBC attendees are preassigned to work in breakout groups of four to eight trainees depending on the particular session, with each led by one to two educators. Faculty educators are paired with a second- or third-year PCCM fellow educator who coteaches throughout the session with the goal of fostering the next generation of PCCM medical educators.

Planning and management of sessions is broadly distributed across an RBC leadership structure (Figure 3). In addition to the RBC Chair and Vice Chair, a pillar chair for each session format contributes to content development, educator organization, and learner feedback. Pillar chairs are further supported by section or station lead educators who assist with organization and teaching during the RBC. Benefits of this multilevel leadership structure include leveraging the collective strengths of multiple educators, providing more comprehensive planning and oversight for each RBC session, and gathering a broader pool of feedback to drive future curricular modifications.

Hands-on Simulation

Hands-on simulations consist of four stations, each with a specific content focus (Figure 2B). Participants at each station are divided into four working groups to achieve an educator to trainee ratio of 1:4, with the goal of maximizing hands-on simulation time for each learner (37). The two primary foci of hands-on stations are procedurals skills, including bronchoscopy, endotracheal intubation, and ultrasound, and ventilator management, including invasive and noninvasive devices. Attendees spend 60 minutes at each station and rotate through four stations in a half day. Each 60-minute session includes 10 minutes of educator-led case-based instruction that highlights three to four learning objectives for the station, followed by 50 minutes of hands-on experiential practice. Achieving the highest possible simulation fidelity is a guiding principle for the session (38–40). In most cases, this involves models such as airway mannequins. However, in the case of cardiovascular and

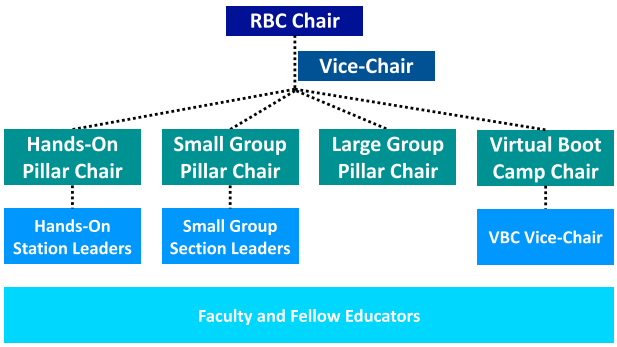

Figure 3. Resident boot camp leadership structure. RBC = resident boot camp; VBC = virtual boot camp.

lung ultrasound, human actors are hired to serve as standardized patients.

When applicable, sessions on Day 2 are designed to build on Day 1 educational material, which allows for a review of Day 1 concepts and reduces set-up time for Day 2 stations. Examples include:

a) Bronchoscopy: Day 1, "Bronchoscopy 101," focuses on airway anatomy, scope manipulation, and lavage. Day 2, "Bronch for Hot Shots," focuses on forceps and needle biopsy and endobronchial ultrasound.
b) Airway: Day 1, "Airway 101," focuses on airway assessment and endotracheal intubation. Day 2, "Difficult Airways," focuses on adjunctive tools for intubating including fiberoptic intubations, laryngeal mask airways, and use of bougies.

Instructive feedback on procedural technique occurs throughout the session using both educator–trainee and trainee–trainee interactions.

Large Group Interactive Sessions

Large group sessions comprise two hour-long didactics that use clinical case-based problem solving and mini breakout groups (Figure 2A). Each session delivers four to five "high-value" PCCM topics that trainees are likely to encounter early in fellowship. Unlike traditional large group lectures, trainees within the session work in teams of eight to solve commonly encountered clinical problems posed in the form of clinical vignettes. Vignettes are presented by a lead educator with support from PCCM fellows assigned to each team, who help guide discussion and elicit input from all group members. This format is particularly well suited for clinical problems that offer more than one potential solution, in which perspectives from multiple learners can be debated to reach a common consensus.

After short breakout periods, each team presents their group's conclusions to the larger audience using a modified think-pair-share active learning model (41). Educators may also use an audience response system to elicit real-time answers from all learners simultaneously between breakout discussions. Examples of recent sessions include "Top Pulmonary Consults," "How to Run a Code," "Top Intensive Care Unit Consults," and "How to Read Chest Computed Tomography" (Figures 2 and E1 and E2).

Small Group Breakout Sessions

Small group sessions are intended to deliver more complex content in a format that allows learners to process and practice both individually and within a small group to maximize active learning and learner comprehension. Trainees are paired with an attending educator in a 1:8 ratio. This learner-centered format affords a flexible pace during the session, particularly when dealing with more challenging topics and when a more detailed understanding of a topic is required. By incorporating various devices relevant to the educational topic during the session, small group sessions also provide opportunities for hands-on training. Recent examples from the 2019 adult course include "Pulmonary Physiology" and "Pulmonary Function Testing Interpretation," in which trainees were taught to interpret tests and were provided portable spirometers to perform and supervise testing. Other examples include "Critical Care Waveforms," in which interpretation of arterial waveforms are paired with various catheters (e.g., Swan-Ganz catheters), and "Devices, Gadgets, and Gear," in which learners experience a mix of hands-on and didactic training in inhaler technique, cough assist devices, and home-use continuous positive airway pressure devices.

Virtual Boot Camp

Given the tremendous rise in applicants and the finite capacity for hosting an in-person RBC (Figure 1), in 2017 a virtual boot camp (VBC) curriculum was developed for applicants who were not selected to attend. VBC content is streamed online and incorporates a mix of prerecorded sessions and live sessions with RBC expert educators (Figure E3). Acknowledging that virtual learners' educational needs differ slightly from in-person RBC participants, the VBC also includes live question and answer sessions with RBC faculty to discuss concerns about starting fellowship and how to prepare for Day 1 of fellowship. The VBC format is also an ideal opportunity for longitudinal and ongoing self-directed learning in that all sessions are recorded and cataloged online (*see*: https://www.thoracic.org/professionals/career-development/webinar-podcast/virtual-bootcamp.php).

FELLOW AND FACULTY RECRUITMENT AND SELECTION

The RBC uses both passive and active means for recruitment. An advertisement with a registration hyperlink is placed on the ATS website under the section for early career professionals, and an e-mail is sent to training program directors nationwide encouraging their promotion of the RBC to incoming fellows. Advertising also occurs via social media, including Twitter and Facebook, and e-mail newsletters. Moreover, word of mouth from prior attendees remains a vital part of RBC recruitment, reflecting favorably on former attendees' RBC experience and highlighting the growing network of RBC-connected physicians.

Because applications have consistently exceeded the RBC capacity since its inception (Figure 1), applicants are selected using a weighted lottery system that balances enrollment based on residency program size, geographic region, and gender diversity. Former residents who previously entered practice and are now restarting training in a fellowship are also eligible to apply. At least one future fellow is selected from each fellowship program that applies to ensure broad representation from PCCM fellowships. Selected trainees receive a stipend to reduce potential financial barriers related to RBC travel and lodging costs.

Educators are recruited through directed mailings to the Association of PCCM Program Directors, the Pediatric Pulmonary Training Directors Association, the ATS Training Committee, the ATS Education Committee, the ATS Members in Transition and Training Committee, the ATS Assembly on Pediatrics, and the ATS Section on Medical Education. Similar to trainees, educators are selected to ensure broad geographic and institutional representation. By using an international group of expert educators, the RBC is able to provide a unique learning environment beyond what any single institution or program can easily replicate. Educators who have previously applied but were not selected are given preference in the upcoming year. On average, approximately half of the selected educators have taken part in the RBC previously to ensure a balance of educator continuity and turnover from year to year.

LEARNER ASSESSMENTS AND COURSE EVALUATIONS

Knowledge Assessments

Each attendee is asked to complete an online knowledge pretest and posttest that comprise 20 multiple-choice questions created by the RBC leaders. For 2019, the

pretest response rate for adult course participants was 71%, with a mean pretest correct score of 55% (±14% SD) (Figure 4A). For pediatric course attendees, participation was 100%, with a mean pretest score of 54% (±13% SD) (Figure 4B). Pretests and posttests were optional, and as expected, posttest response rates decreased, with 43% of adult course and 31% of pediatric course participants completing the second exam. For adult course attendees, the mean posttest score increased significantly to 72% (±11%; $P < 0.001$). The mean posttest score for pediatric participants also increased to 62% (±19%), although given the limited number of posttest respondents, this difference did not meet statistical significance ($P = 0.17$). Nonetheless, overall test results suggest the RBC experience has a positive impact on attendee knowledge. Specific content areas that improved >10% between pretest and posttest scores included airway management, bronchoscopic skills, pulmonary function testing, and code management for adult course participants and airway management, pulmonary function testing, and extracorporeal membrane oxygenation for pediatric course participants.

Learner Confidence

Before attending the RBC, trainees are asked to rate their level of confidence

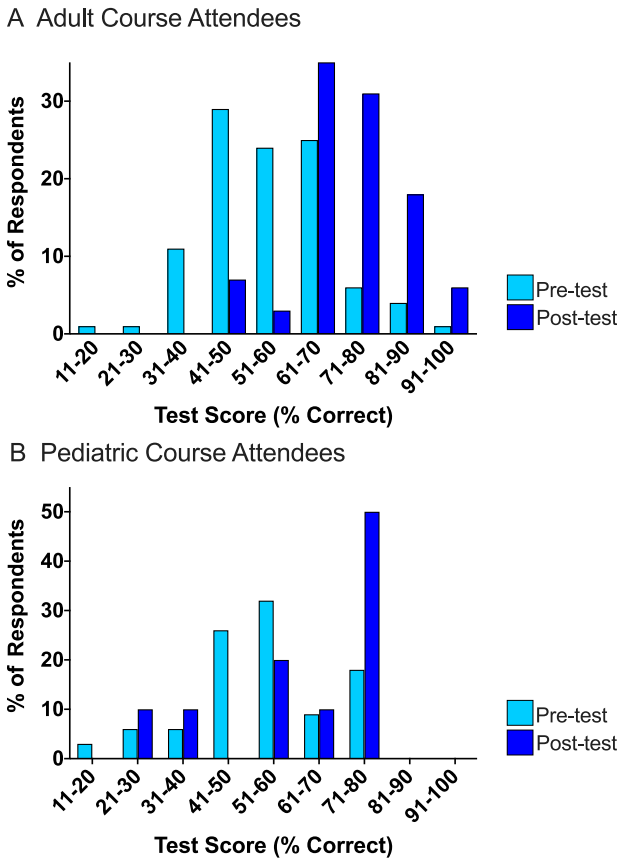

Figure 4. The 2019 Attendee pretest and posttest knowledge assessments. Results from a 20-question knowledge assessment completed before and after resident boot camp participation. Pretest (left bars, light blue) and posttest (right bars, dark blue) scores are represented according to scoring decile. (*A*) Scores of the attendees of the adult course improved between pretest and posttest assessments from an average ± SD of 55% ± 14% to 72% ± 11% ($P < 0.001$; $n = 114$ and 68, respectively). (*B*) Pediatric course attendees similarly improved between pretests and posttests from 54% ± 13% to 62% ± 19%, although this difference did not meet statistical significance ($P = 0.17$; $n = 34$ and 10, respectively). Pretest and posttest means were compared using an unpaired Student's *t* test.

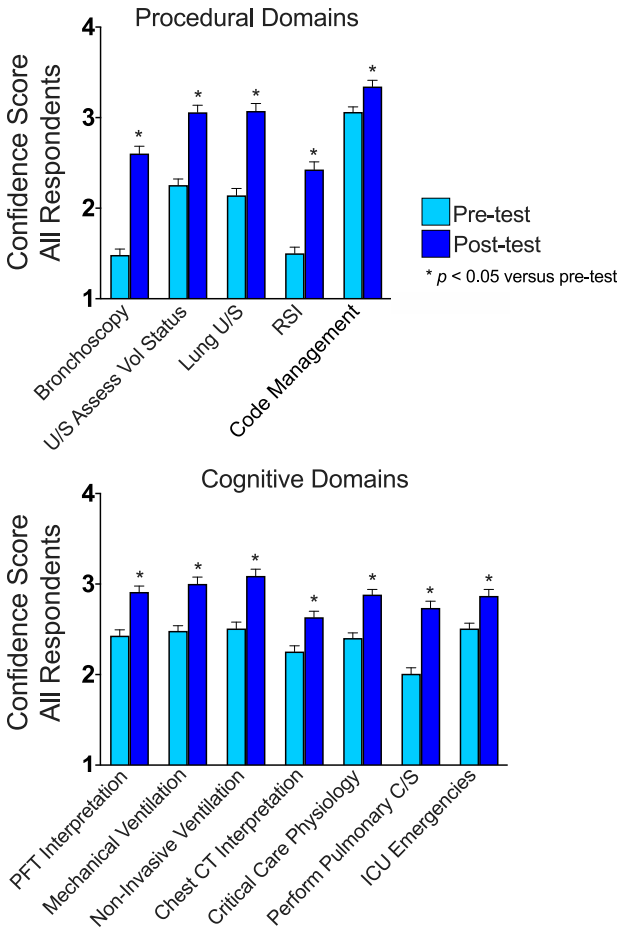

Figure 5. The 2019 adult course attendee pretest and posttest confidence assessments. Attendee confidence was assessed for 12 procedural and cognitive skills before and after participating in the adult course. Responses were recorded on a four-point Likert scale from very uncomfortable (1 point) to very comfortable (4 points). (Top) Posttest confidence scores significantly improved in all areas (*$P < 0.05$). (Bottom) Skills with the greatest increase in responses in the top two quartiles (i.e., confident or very confident) after resident boot camp participation included bronchoscopy, lung ultrasound, and assessment of volume status (also *see* Figure E4). Mean confidence scores for each skill were compared using a Wilcoxon rank-sum test. C/S = consult; CT = computed tomography; ICU = intensive care unit; PFT = pulmonary function testing; RSI = rapid sequence intubation; U/S = ultrasound; Vol = volume.

in PCCM-related skills on a four-point scale from "very unconfident" to "very confident" (1 = very unconfident, 2 = unconfident, 3 = confident, and 4 = very confident) (Figures 5 and 6 and Table E2). Four survey response options were chosen with the intentional omission of a "neutral" response to increase the dichotomy of results while also balancing adequate survey reliability and greater respondent discriminative capacity (42). Questions address attitudes related to procedural skills (e.g., "how confident are you in your ability to perform an airway exam with a bronchoscope?") and cognitive processes (e.g., "how confident are you in your ability to interpret a chest computed tomographic scan?"). In 2019, baseline responses for adult course participants before attending the RBC were highly variable. However, for most content domains, less than half of participants responded as "confident" or "very confident." In procedural domains, such as bronchoscopy and rapid sequence intubation, participants were particularly unconfident, likely owing to the

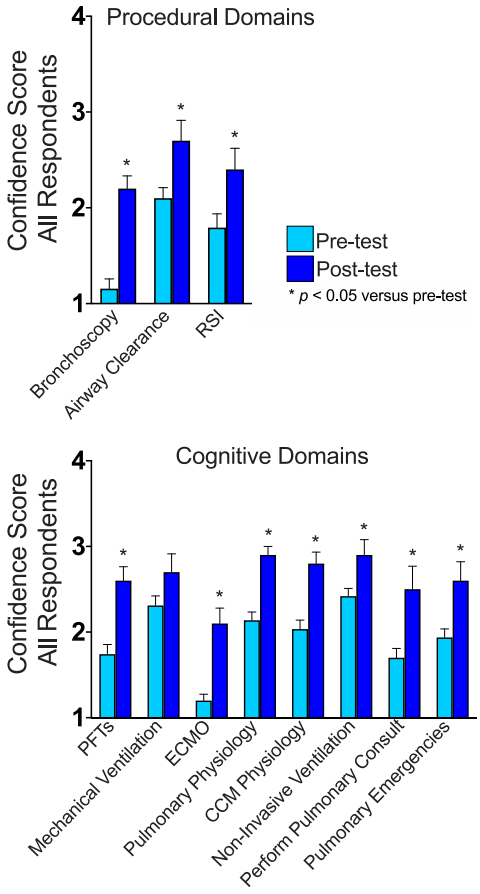

Figure 6. The 2019 pediatric course attendee pretest and posttest confidence assessments. Attendee confidence was assessed for 11 procedural and cognitive skills before and after attending the pediatric course. Responses were recorded on a four-point Likert scale from very uncomfortable (1 point) to very comfortable (4 points). (Top) Posttest confidence scores significantly improved in all domains with the exception of mechanical ventilation (*$P < 0.05$). (Bottom) Skills with the greatest increase in responses in the top two quartiles (confident or very confident) after resident boot camp participation included pulmonary physiology and critical care physiology (also *see* Figure E5). Mean confidence scores for each skill were compared using a Wilcoxon rank-sum test. CCM = critical care medicine; ECMO = extracorporeal membrane oxygenation; PFT = pulmonary function testing; RSI = rapid sequence intubation.

limited experience with these common PCCM-related procedures during residency. After completing the RBC, attendees were asked to repeat the questionnaire. Learner confidence improved in all domains, with greater than two-thirds of adult course participants reporting feeling "confident" or "extremely confident" in all content areas, with significant increases in mean confidence scores for all metrics (Figure 5; $P < 0.005$). The greatest improvement in confidence scores involved material taught during hands-on simulation sessions, including bronchoscopy, lung ultrasound, cardiac ultrasound, and assessment of volume status (Figure E4).

Pediatric course attendees were similarly unconfident in most domains before attending the RBC (Figure 6). Scores in the lower two quartiles ("very unconfident" and "unconfident") occurred more commonly in cognitive skills compared with adult course respondents but were also common in procedural domains. After the pediatric course, learner confidence significantly increased in all domains ($P < 0.005$) with the exception of

"mechanical ventilation," which increased but did not meet statistical significance because of relatively high confidence scores on the pretest assessment. Notably, the greatest improvement in pediatric learner confidence occurred in cognitive skills related to pulmonary physiology and critical care physiology (Figure E5).

Course Evaluations

At the conclusion of each session, attendees are asked to complete an anonymous two question online survey on *1*) the effectiveness of the session leader as a teacher, and *2*) the appropriateness of the material to their level of training. Educators are scored on a five-point scale from aspirational to poor (1 = aspirational, 2 = great, 3 = good, 4 = fair, and 5 = poor) with specific criteria listed for each scoring level. Courses are also evaluated on a five-point scale from "much too basic" to "much too advanced" (Figure 7). As Figure 7 responses illustrates, the 2019 RBC content was overwhelmingly "on target" for the level of learner. Less than 4% of respondents indicated that any specific

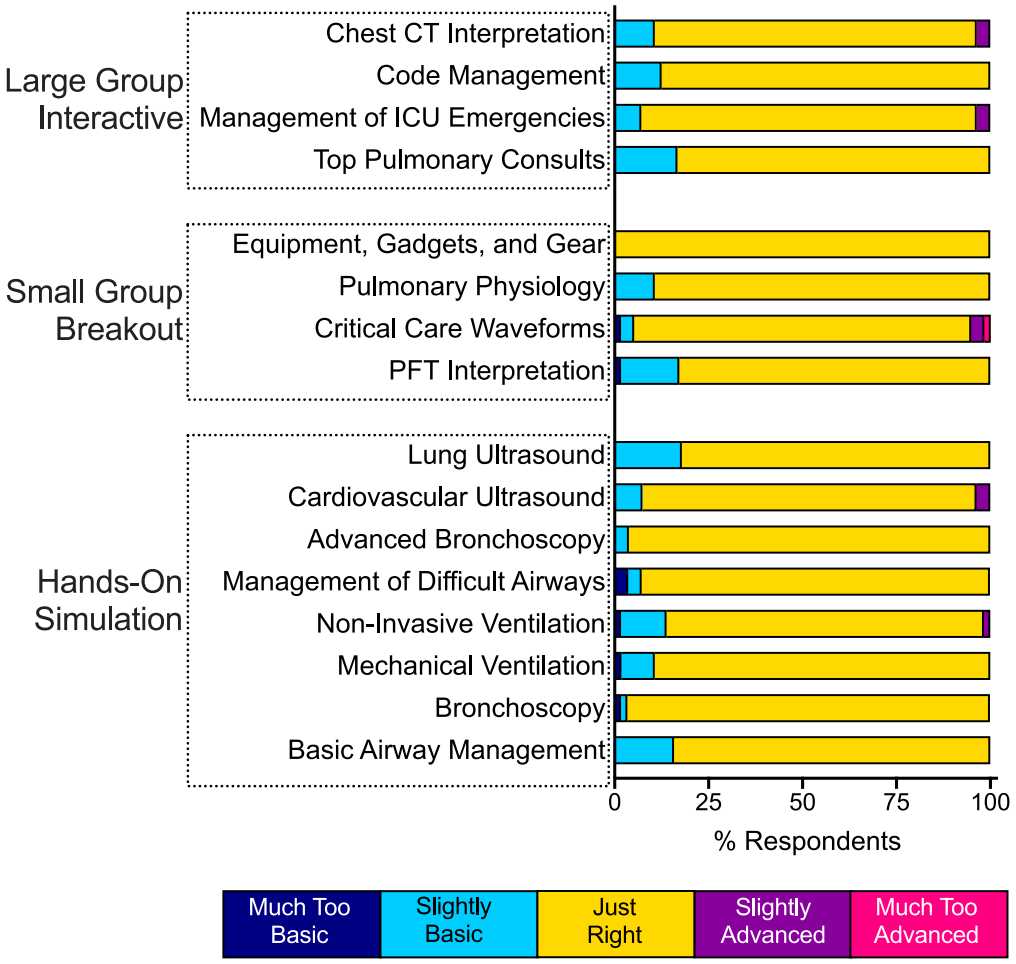

Figure 7. Learner evaluations of adult course content. Attendees of the adult resident course provided anonymous feedback on a five-point scale regarding the relevance of learning objectives to their level of training (1 = much too basic, 2 = slightly basic, 3 = right on target, 4 = slightly advanced, and 5 = much too advanced). All sessions were overwhelmingly rated as "just right." Responses are incorporated into an annual program evaluation that results in iterative changes to learning objectives and curricular topics (also *see* Figures E1 and E2). CT = computed tomography; ICU = intensive care unit; PFT = pulmonary function testing.

session was "much too basic," and only one respondent indicated a topic was "much too advanced."

Educational content scores, learner assessments, and educator feedback are reviewed by the Training Committee and RBC leadership annually. Lower scoring sessions are evaluated for content redesign, formatting change, or removal from the curriculum entirely. Final decisions regarding curriculum changes are made by the RBC leadership with input from all Training Committee members, resulting in iterative year-to-year changes in content and session format (Figures E1 and E2).

POTENTIAL BENEFITS FOR SPONSORING SOCIETIES AND COURSE INSTRUCTORS

Large-scale programs such as the RBC require considerable financial and organizational support. In this regard, the RBC is unique as the largest academic boot camp of its kind supported by a professional society (43). This support highlights the society's commitment to the interests of its members while also promoting society membership and attendance at its annual conference. In 2019, this translated into 58% of respondents indicating that they attended the international conference after the RBC. This is a clear first step toward engaging early career trainees in professional societies, which is essential for fostering and maintaining the pipeline of future talent.

For educators, involvement in curriculum design and delivery provides an ideal venue for professional networking and for exchanging educational best-practice methodology. For more than 100 clinician educators who took part in the 2019 RBC, they also had the opportunity to receive structured feedback from learners and from faculty observers on their teaching effectiveness. Specific assessments included whether an educator established a positive learning climate, managed an effective and focused session, and employed active learning strategies (Table E3).

For many trainees, the RBC experience is their first opportunity to develop their own professional network in PCCM. During fellowship training, connecting with colleagues from other institutions in person is a particularly rare opportunity. The RBC format empowers trainees to form relationships with future PCCM peers and with attending educators alike.

CHALLENGES AND SUSTAINABILITY

Obstacles facing the development and sustainability of academic boot camps are myriad, including finding and securing physical space, educators, equipment, funding, and time. This is particularly true for individual fellowship programs attempting to organize boot camps in July, when other training programs need similar resources. Broadly distributing RBC development across a leadership structure (Figure 3) reduces the cognitive burden and time costs associated with developing such a large program. Additional benefits of this leadership structure include the ability to leverage professional connections in host cities for local resources and educators and to ensure that a broad group of educators form the foundation of future RBC leaders.

Beyond personnel, financial support remains the greatest challenge to sustainability. A clear commitment from a supporting institution and/or professional society is an integral part to creating a long-lasting program worthy of attracting

educators and trainees. Reinforcing the value of such a program for attendees and for a sponsoring institution is a necessary practice, lest the impact of these programs gets overlooked during challenging budget cycles.

LIMITATIONS

Limitations of our curricular design and opportunities for improvement have been repeatedly assessed and have resulted in annual updates to content and session formats since the RBC's inception (Figures E1 and E2). As noted above, an overarching goal of the RBC is to reduce anxiety by familiarizing trainees with core PCCM-related skills. Thus, change in trainee confidence was measured across multiple domains before and after attending the RBC. However, confidence survey tools and knowledge pretests and posttests have not been independently validated. Reduced posttest response rates may limit the certainty from which we can draw conclusions from our data, and in the case of posttest knowledge assessments, outcomes may also be affected by recency bias because the tests were completed soon after RBC participation. Whether knowledge retention, procedural skill, and trainee confidence are improved over a longer time frame has not been evaluated. That said, trainee satisfaction is consistently high, and many attendees choose to participate in the society conference that follows the RBC, which are meaningful metrics for success in their own right.

CONCLUSIONS

Academic boot camps are effective platforms to rapidly advance trainee knowledge, skills, and confidence. As the 6-year development of the RBC demonstrates, creation of a large scale, immersive, rigorous academic boot camp is feasible with the sustained commitment from educators and a sponsoring medical society. The ATS RBC accomplishes this through a curriculum that uses active learning methods to maximizes adult learning. As a secondary benefit, involvement in the RBC provides ample professional development opportunities for learners and educators alike. Attendee satisfaction is consistently high. Furthermore, repeated refinements of the curriculum based on participant and educator feedback ensures that content remains highly relevant to the evolving landscape of fellowship training and continues to elevate trainee readiness for Day 1 of PCCM fellowship.

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