

Training Intensivists and Clinician-Scientists for the 21st Century: The Oregon Scholars Program

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Abstract

Background Innovation is important for the development and advancement of any medical specialty. Leaders in anesthesiology have emphasized the need for more training in critical care and additional research to advance our specialty.

Intervention To help address this need, Oregon Health & Science University (OHSU) developed an innovative training program that combines a critical care medicine (CCM) or research fellowship with traditional clinical anesthesia training. This article outlines the program structure, challenges, and successes of this innovative approach to training anesthesiology clinicians and scientists.

Findings Since the program began in 2006, we have filled all available positions and currently have 9 scholars in the anesthesiology/CCM track and 3 in the

anesthesiology/research track at the postgraduate year-2 to postgraduate year-5 levels. Our first class of scholars graduated in the summer of 2010. The Oregon Scholars Program (OSP) scholars and faculty have confronted challenges, including the transition from resident in the operating rooms to fellow in the critical care units. In 2007, our residents acknowledged the OSP/CCM scholars' expertise in CCM and have looked to them as teachers and advocates for their education during their CCM rotations. In July 2007, OHSU received a National Institutes of Health T32 training grant to support the research component of the OSP. OSP scholars' research productivity has resulted in 11 publications, 3 abstracts, 3 presentations, 3 research grants, and 1 resident research award. Several other anesthesiology programs have recently instituted similar programs to address the need for anesthesiologists trained as intensivists and clinician-scientists.

Background

Anesthesiology residency programs are at a critical crossroads. The future of any specialty depends on its practitioners evolving and adapting to new challenges and opportunities. The leaders of our specialty have emphasized that training in perioperative medicine and intensive care medicine and research in outcomes and safety are critical to the future of the specialty.^{1–3} In 2008, anesthesiology residency programs graduated 1473 residents from 131 approved programs.⁴ In that same year, only 61 anesthesiology graduates completed fellowship training in 47 approved anesthesiology programs in critical care medicine (CCM).⁴ This compares to 490 internal medicine graduates completing CCM training in 165 approved programs, and 115 general surgery graduates completing CCM training in 94 approved programs.⁴ The data for

anesthesiologists entering research are equally concerning. The National Institutes of Health (NIH) funds research in their K series and T series grants. The NIH Mentored Research Scientist Development Award (K01) program “provides support and protected time (3–5 years) for an intensive, supervised career development experience in the biomedical, behavioral, or clinical sciences leading to research independence.”⁵ In 2003–2005, anesthesiologists received 9 NIH K series career development grants, compared with 158 for internal medicine.² The T32 training grant program seeks to “prepare qualified individuals for careers that have a significant impact on the health-related research needs of the nation.”⁶ In 2003–2005, only 10 T32 grants were awarded in anesthesiology, representing <1% of all T series awards granted during that period.² In contrast, internal medicine subspecialties received 354 NIH T32 training grants representing 27.6% of T series award grants. One department of medicine alone received 21 T32 grants in 2003, more than twice the number awarded to all 131 anesthesiology programs.² The disparity is even more striking considering that anesthesiology represented 5.6% of total US residency positions compared with internal medicine subspecialties representing 8.7% of US residency positions from 2003–2005.² The Foundation for Anesthesia Education and Research (FAER) provides starter grants to promising researchers in anesthesiology. In 2008, fewer

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TABLE 1 OREGON SCHOLARS PROGRAM CRITICAL CARE MEDICINE (CCM) TRACK ^a		
Year	Months of Clinical Anesthesia Training	Months of CCM Training
CA1 (PGY-2)	12	2 (as resident)
CA2 (PGY-3)	12	2 (as resident)
CA3 (PGY-4)	9	3 (as CCM fellow)
CA4 (PGY-5)	6	6 (as CCM fellow)
Totals	39 (includes 3 months of electives as CCM fellow) ^b	9 (as CCM fellow)

Abbreviations: CA, clinical anesthesiology; PGY, postgraduate year.

^a Residents who do not have 2 months of critical care medicine in the clinical base year receive 1 to 2 additional months as needed to provide a total of 6 months of CCM experience as residents before the CA3 year.

^b The 3 months of critical care electives that are part of the CCM fellowship training are included in the months of clinical anesthesia training column and are distributed during the CA3 and CA4 years of the program.

than 10 FAER training grants were awarded compared with 28 in 1990.⁷ These statistics do not bode well for the continued development of clinical scientists or CCM subspecialists in our field.

The Accreditation Council for Graduate Medical Education (ACGME) encourages programs to design and implement innovative approaches to education, which can help anesthesiology residency programs develop the perioperative physicians of the future.⁸ In 2003, the Department of Anesthesiology and Perioperative Medicine at Oregon Health & Science University (OHSU) in Portland, Oregon, decided to invest in the development of a unique resident education program, the Oregon Scholars Program (OSP), to ensure that our specialty remains at the forefront of CCM and scientific research. The OSP was approved by the ACGME Residency Review Committee for Anesthesiology and the American Board of Anesthesiology. We enrolled the first scholars in July 2006.

The Oregon Scholars Program

The OSP is a focused, educational approach to develop researchers and intensivists in anesthesiology. The OSP is a single program that allows the scholar to choose 1 of 2 tracks: research or CCM. During the established recruiting season, our residency applicants can evaluate both the traditional and innovative programs. Residents selected for OSP positions are evaluated using the same academic criteria as for our core program. In addition, we look for evidence of commitment to fellowship training in research or CCM by reviewing their personal statements, letters of recommendation, personal interviews, and curriculum vitae. Applicants who match to 1 of the 3 OSP positions are in a distinct program in our department and are unable to transfer to the traditional program unless there is an unexpected opening. Similarly, residents in 1 of the 9 traditional program positions are unable to transfer to the OSP unless there is an unexpected opening. We believe that

this distinction provides clarity for our applicants, residents, and faculty throughout the training period.

By the beginning of postgraduate year-2/clinical anesthesia year 1 (PGY-2/CA1), applicants who match to the OSP must choose either the CCM or the research track. Our department has the resources to offer OSP residents a position in either track based on their career goals. Therefore, we can have any combination of OSP residents in these tracks at any given time. The scholars balance traditional residency experiences with fellowship experiences throughout the 48-month curriculum. This flexibility is 1 of the unique and key components of the OSP and allows our scholars to master skill sets in the core components of our specialty while adding subspecialty expertise in a graduated, humane approach.

Anesthesiology/CCM Track

The OSP scholars who select the CCM track complete the PGY-2/CA1 and PGY-3/CA2 years along with the anesthesiology residents in the traditional program. The only exception is that the OSP/CCM scholars complete 4 months of critical care units during this 2-year period as residents, compared with 2 critical care months in the traditional program. In the PGY-4/CA3 year, the OSP/CCM scholars complete 3 critical care rotations as junior fellows in addition to CA 3 rotations or elective experiences in CCM. In the PGY-5/CA4 year, the scholars complete 6 months of critical care rotations as senior fellows; and during the remainder of the year, they complete their remaining CA3 anesthesiology rotations and CCM electives (TABLE 1). Scholars in the CCM track have the option to spend up to 9 months of their training completing research. Our department also offers 2 traditional CCM fellowship positions. An example of a traditional CCM schedule is provided for comparison (TABLE 2).

The CCM rotations are interspersed with anesthesiology rotations or CCM electives to ensure balance and

TABLE 2 TRADITIONAL CRITICAL CARE MEDICINE FELLOWSHIP

Year	Months of Critical Care Training	Months of Elective Training
Critical care fellowship (PGY-5)	9	3

Abbreviation: PGY, postgraduate year.

maintenance of core specialty skills while acquiring subspecialty expertise. Ultimately, the anesthesiology OSP/CCM curriculum is identical to the curriculum completed by residents who choose a traditional anesthesiology track followed by a 1-year CCM fellowship. The OSP/CCM scholars complete all ACGME/American Board of Anesthesiology training requirements but benefit from integrating clinical experience in CCM with the anesthesiology core training. In addition, the flexible scheduling inherent in the OSP/CCM curriculum provides these scholars with time for reflection and skill consolidation between CCM experiences.

Upon completion of the program, the anesthesiology CCM scholars are eligible to take the examination for American Board of Anesthesiology core certification and for subspecialty certification in CCM.

Anesthesiology/Research Track

Scholars who choose the OSP research track complete 30 months of clinical anesthesiology training as well as 12 to 18 months of dedicated research experience. Scholars in the OSP research track complete their first year of training alongside anesthesiology residents in the traditional program. During that period, they meet with our Vice-Chair for Research, select a research mentor, and begin planning their research experiences. The research mentor's primary faculty appointment may be in anesthesiology, or the research mentor may be from another OHSU clinical or

TABLE 3 OREGON SCHOLARS PROGRAM RESEARCH TRACK

Year	Months of Clinical Anesthesiology Training	Months of Dedicated Research Training
CA1 (PGY-2)	12	0
CA2 (PGY-3)	4	8
CA3 (PGY-4)	8	4
CA4 (PGY-5)	6	6
Total	30	18

Abbreviations: CA, clinical anesthesiology; PGY, postgraduate year.

TABLE 4 ENTRY QUALIFICATIONS AND IN-TRAINING EXAM SCORES

Qualification/Exam	OSP Residents	Core Program Residents
USMLE step 1 score average	225	229.8
AOA membership	3/12	8/36
Research publications on program entry (average)	3	3
CA1 level in-training exam percentile	61	74

Abbreviations: AOA, alpha omega alpha; CA, clinical anesthesiology; OSP, Oregon Scholars Program; USMLE, United States Medical Licensing Examination.

basic science department. The research experiences can focus on bench or clinical investigations and are customized for each scholar. TABLE 3 provides an example of an OSP/research scholar's schedule. Residents in the research track of the OSP complete all requirements of the core residency in anesthesiology as well as 12 to 18 months of research in a balanced schedule for 4 years to ensure development and maintenance of clinical skills and proficiency in research to prepare them for a career as a clinician-scientist.

Findings

Since the OSP began in 2006, we have filled all available positions. We currently have 9 scholars in the anesthesiology/CCM track and 3 in the anesthesiology/research track at the PGY-2 to PGY-5 levels. Our PGY-1 scholars who entered in July of 2010 are deciding their track this year. Our first class of scholars graduated in the summer of 2010. The entry qualifications and in-training exam performance of our 12 PGY-2 to PGY-5 OSP residents, compared with their peers in our traditional program, are presented in TABLE 4.

The OSP scholars and faculty have confronted unique challenges as the program has developed. The scholars were faced with making the transition from resident roles in the operating rooms during 1 month to fellows in the CCM units in the next month. Our CCM faculty has developed specific competency-based curricula to guide our scholars in their transition from resident to junior fellow to senior fellow. This process is dynamic and has required close interaction between our scholars and faculty. We have not seen any resistance from our traditional residents to accepting the scholars as fellows in the critical care units. Our residents have acknowledged the OSP/CCM scholars' expertise in CCM and have looked to them as teachers and advocates for their education during their CCM rotations.

In July 2007, our department received an NIH T32 training grant to support the research component of the

OSP. This T32 grant is unique because it was awarded for training residents who have not yet completed the core requirements in their specialty. The scholars on the research track have been successful in pursuing research in their areas of interest. We have not detected any concerns with their clinical performance in direct comparisons with their peers in the traditional training program. Between program initiation in 2006 and July 2010, research productivity by these scholars has included 11 publications, 3 abstracts, 3 presentations, 3 research grants, and 1 resident research award.

Conclusions

At this point, the OSP has been a great success. We have had an average of >200 applicants from US medical schools per year for the 3 OSP positions. We have successfully matched applicants with outstanding academic records, and they have performed at an exemplary level. No scholars have left the program or moved to a traditional residency position. By the summer of 2010, several other anesthesiology programs in the United States began similar programs to address the need for anesthesiologists trained to be intensivists and clinician-scientists. We must make this investment now to train the next generation of anesthesiologists in a focused and novel approach to address the needs of our patients and to maintain our specialty's

leadership in patient safety, perioperative medicine, and medical research. However, the true success of the program will be measured years from now when we assess how our graduates have incorporated CCM, academic medicine, and research into their careers. Only then will we know if the OSP contributed to our vision of the anesthesiologist as a true 21st century perioperative physician.

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