



American Society of
Anesthesiologists™

A GUIDE TO ANESTHESIOLOGY FOR MEDICAL STUDENTS

Courtesy of the ASA Committee on Residents and Medical Students



EDITORS IN CHIEF

Emmett Whitaker, M.D.

Johns Hopkins Class of 2010
Former Resident Component President
Johns Hopkins University Medical Center

Ronald L. Harter, M.D.

Jay J. Jacoby Professor and Chair
Department of Anesthesiology
The Ohio State University Medical Center

Basem B. Abdelmalak, M.D.

Professor of Anesthesiology
Departments of General Anesthesiology and Outcomes Research
Director, Center for Sedation and Director, Anesthesia for Bronchoscopic Surgery
Cleveland Clinic Lerner College of Medicine

ASSOCIATE EDITORS

Rafi Avitsian, M.D.

Cleveland Clinic
Cleveland, Ohio

Jia Lin, M.D., Ph D.

Cleveland Clinic
Cleveland, Ohio

Thomas B. Bralliar, M.D.

Cleveland Clinic
Cleveland, Ohio

Mohammed Minhaj, M.D.

University of Chicago Medical Center
Chicago, Illinois

Sorin J. Brull, M.D.

Mayo Clinic Florida
Jacksonville, Florida

Kathy Schlecht, D.O.

South Oakland Anesthesia Associates
Troy, Michigan
Beaumont Hospital
Royal Oak, Michigan

Stephanie Jones, M.D.

Beth-Israel Deaconess Medical Center
Boston, Massachusetts

Brian Vaughan, M.D.

The Christ Hospital
Anesthesia Associates of Cincinnati
Cincinnati, Ohio

Stephen J. Kimatian, M.D.

Cleveland Clinic
Cleveland, Ohio

Created 12/2014, Revised 12/2018

INTRODUCTION

Welcome, and congratulations! By picking up this book, you are exposing yourself to one of the most exciting and rewarding specialties in medicine. I invite you to peruse these pages and experience what anesthesiology is all about.

Anesthesiology is a specialty that traverses many other fields. For an anesthesiologist, day-to-day practice doesn't just mean putting patients to sleep for surgery. A good anesthesiologist needs solid foundations in medicine, surgery, physiology, and pharmacology to deliver a safe and effective anesthetic. Further, our specialty is clearly thought-driven, but it also represents an opportunity for practitioners to utilize procedural skills on a daily basis.

We have developed this book as a guide for any medical student with interest in anesthesiology. In the following chapters, you will find information relating to the specialty as a whole, information relating to training as an anesthesiologist, introductions to the many subspecialties of anesthesiology, and finally a medical student's guide to the ASA. We hope that you will find this book helpful in choosing a specialty that is right for you. Best wishes for success in your career!

– Emmett Whitaker, M.D.
Johns Hopkins Anesthesiology Class of 2010

Disclaimer

This document has been developed by the ASA Committee on Residents and Medical Students but has not been reviewed or approved by the ASA House of Delegates. It shall not be construed to contain official ASA policy (except where otherwise indicated herein), nor is it intended to provide medical or legal advice. The content provided in this publication represents the opinions and interpretations of the authors of such content and not that of ASA.



CHAPTER 1

History of Anesthesiology

Viji Kurup, M.D.

Associate Professor
Department of Anesthesiology
Yale University School of Medicine

Paul Barash, M.D.

Professor
Department of Anesthesiology
Yale University School of Medicine

The discovery and application of anesthesia has been the single most important contribution of American medicine to mankind. All the major advances in surgery would not have been possible without the accompanying vision of the pioneers of anesthesiology. Anesthesiologists today are like no other physicians: we are experts at controlling the airway and at emergency resuscitation; we are real-time cardio-pulmonologists achieving hemodynamic and respiratory stability for the anesthetized patient; we are real-time pharmacologists and physiologists administering and titrating drug dosages to patient responses; we are internists evaluating patients perioperatively; we are actively engaged in pain management of patients on the labor floor and in pain clinics; we manage critically ill patients in the intensive care units; we are trained researchers looking for answers and delving into the mystery of the human body. Today, the boundaries of anesthesiology extend far beyond the operating room into the arena of critical care, pain, space medicine and underwater expeditions.

The story of the evolution of the specialty of anesthesia is a fascinating one, filled with visionary individuals who held on to their dreams in the face of adversity, tales of serendipity, intrigue, secrecy and controversies. The antiquated methods to control surgical pain, such as nerve compression, cold application, mesmerism and herbal remedies, paved the way for more scientific methods of pain relief. A few dentists were looking for new ways to relieve pain during dental procedures. Horace Wells, a dentist from Hartford, Connecticut, experimented with nitrous oxide and had some initial success; however, a public demonstration at the Bullfinch Amphitheatre of Massachusetts General Hospital in January 1845 failed, and this proved to be a setback for all those pursuing the goal of pain-free surgery. The first public demonstration of ether anesthesia was by William Thomas Green Morton on October 16, 1846, again at the Bullfinch Amphitheatre. This demonstration was a success, and the surgeon, Dr. John Warren, turned to the audience after the procedure and said “Gentlemen, this is no humbug.” This day is celebrated as “Ether Day” across the globe; it was a turning point in the attitudes of people towards

pain and spurred the development of anesthesia as a specialty. The inscription on Morton’s tombstone reads: “Inventor and Revealer of Inhalation Anesthesia: Before Whom, in All Time, Surgery was Agony; By Whom, Pain in Surgery was Averted and Annulled; Since Whom, Science has Control of Pain.” Although this was the first *public* demonstration, even before this date, Dr. Crawford Long from Georgia had been administering ether for surgical anesthesia since 1842, but he did not make this discovery public and remained silent until 1849. A long battle for the credit of discovery of anesthesia ensued, and has been termed “the ether controversy.” It remains unresolved even today. The other important early milestone in the history of anesthesia was the use of chloroform by James Simpson. As an obstetrician in Scotland in 1847, Simpson published his experience in the *Lancet*. Anesthesia during childbirth was a controversial issue in the 19th century due to religious ramifications of the subject. The religious debate quieted when Dr. John Snow was invited by Queen Victoria to administer chloroform for the birth of her child, a technique soon-to-be-known as “chloroform a la reine.” This was followed by the discovery of additional inhalational agents: ethyl chloride, ethylene and cyclopropane. Since the majority of anesthetics were “explosive,” the search for the ideal nonflammable anesthetic agent was on. In the 1960s the fluorinated anesthetic halothane was introduced into clinical practice. This was followed by other nonflammable inhalation anesthetics: enflurane, isoflurane, desflurane and sevoflurane. However, we have not yet discovered the “ideal anesthetic.” A number of agents are being studied, including xenon, a gas with many properties of the ideal anesthetic.

The development of regional anesthesia does not lag behind in sensationalism. The coca leaf had long been known for its anesthetic properties when applied to the mucous membranes. However, the clinical application of this anesthetic property was not appreciated until 1884, when Carl Koller, a surgical intern, recognized this. He was working in Vienna looking for a topical ophthalmic anesthetic. His friend Sigmund Freud was studying the cerebral-stimulating effects of cocaine and gave Koller a small sample in an envelope. A few grains of cocaine leaked and stuck to Koller’s finger and he absent-mindedly licked his finger. To his surprise, he found that his tongue felt numb. As Pasteur proclaimed, “Chance favors only the prepared mind.” The significance of this finding was not lost on Koller. He reported the finding in his article, which sparked a revolution in ophthalmic and other surgical disciplines. This discovery was soon followed by reports of sensory nerve blocks of the face and arm by two young American surgeons, Halsted and Hall. The self-experimentation of these surgeons led to one of the early reported cocaine addictions in the medical profession. The possibility of blocking individual nerves was attractive, and multiple nerve and plexus blocks were described. Neuraxial anesthesia was not far behind.

CHAPTER 2

Patient Safety and Outcomes

Lee A. Fleisher, M.D.

Robert D. Dripps Professor and Chair of Anesthesiology and Critical Care

Professor of Medicine

University of Pennsylvania School of Medicine

In 1885, Corning described epidural anesthesia, while August Bier introduced intrathecal (spinal) anesthesia. The introduction of various types of local anesthetic drugs with different durations of action and better spinal and epidural needles led to the development of regional anesthesia as a specialty.

Anesthesiology began evolving as a specialty among physicians in the early part of the 20th century and led to the formation of professional societies. The first organization in America was the Long Island Society of Anesthetists, formed in 1905. This organization later became the New York Society of Anesthetists and subsequently became the American Society of Anesthesiologists (ASA). Francis Hoeffler McMechan founded the International Anesthesia Research Society (IARS), which together with the ASA are the premier American organizations in anesthesiology today. After World War II, specialties within anesthesia began to thrive, and pediatric, obstetric, pain, critical care, vascular, cardiac, thoracic and other distinct fields continue to evolve.

The story about the development of the field of anesthesiology is incomplete without mentioning the immense work of former ASA President Ellison “Jeep” Pierce and the ASA leadership (1984) in championing the cause of patient safety. The mortality attributed to anesthesia has seen a dramatic decrease from 1:2,680 in the 1950s to 1:200,000 in the 1990s. Evidence is accumulating that anesthesiologists are experiencing the greatest decline in the incidence of medical liability claims of any specialty, according to the Anesthesia Patient Safety Foundation.

The art and science of anesthesiology continues to grow and evolve. We are continually challenged with advances in technology, by our own drive to make anesthesia safer than ever, and to make the perioperative experience better for our patients. Anesthesiologists today are involved in diverse areas such as molecular biology, tissue engineering, novel drug delivery techniques, nanotechnology and functional imaging research. We are pioneers in incorporating simulators as a tool for education and fostering safe practices. We are also in the forefront in studying and integrating complementary and alternative medical practices into the mainstream of medicine.

We have come a long way, but we still have a long road ahead in our quest to make the perioperative experience a safe and pleasant one for our patients. We have some answers, but there are still a lot of questions that need to be answered by painstaking research. This is an exciting and challenging phase in the growth of this specialty and all associated with it!

References:

1. Smith HM, Bacon DR. The History of Anesthesia, Clinical Anesthesia. Edited by Barash PG, Cullen BF, Stoelting RK. Philadelphia, LWW; 2006:3-26.
2. Stoelting RK. A historical review of the origin and contributions of the Anesthesia Patient Safety Foundation. *ASA Newsletter*. 2005:25-27.
3. Wetchler BV. Ellison C. Pierce, Jr., M.D., to receive ASA's highest honor. *ASA Newsletter*. 1997;61(10):21.

The specialty of anesthesiology has been lauded as one in which safety has always been of paramount importance. In the landmark Institute of Medicine report, *To Err is Human*, anesthesiology was cited as the specialty to emulate with respect to improving safety. The first study of anesthetic safety (and risk) occurred shortly after the first report of the delivery of anesthesia for an operative procedure in 1846. Subsequently, Ruth et al. helped to establish the first anesthesia study commission to analyze perioperative deaths in 1935.¹ They relied on voluntary submission of cases and determined the cause of death by majority vote. This was followed by a report by Beecher and Todd of anesthetic death in 10 institutions, published in 1954.² The cause of mortality was determined at the local institution by a consensus reached between a surgeon and the chief anesthesiologist. Overall, the chance of mortality was 1:75 cases. They reported that anesthesia was the primary cause of mortality in 1:2,680 cases, and was either the primary or contributory cause of mortality in 1:1,560 cases. Surgical error in diagnosis, judgement or technique was the primary cause of death in 1:420 cases, while patient disease was the primary cause in 1:95 cases. Over the past five decades, most anesthesiologists believe that anesthetic risk has decreased.

The importance of perioperative mortality in England led to the development of the Confidential Enquiry into Perioperative Deaths (CEPOD), which assessed nearly a million cases of anesthesia during a one-year period in 1982.^{3,4} Deaths within 30 days of surgery were included in the study. There were 4,034 deaths in an estimated 485,850 operations, resulting in a crude mortality rate of 0.7 to 0.8 percent. Surgery had contributed totally or partially in 30 percent of all patients. Progression of the presenting disease had contributed to death in 67.5 percent of all patients, with progress of an intercurrent disease being relevant in 44.3 percent of patients. Anesthesia was considered the sole cause of death in only three individuals, for a rate of 1:185,000 cases, and anesthesia was contributory in 410 deaths, for a rate of 7:10,000.

The accumulating data clearly demonstrate that risk directly attributable to anesthesia has declined over time. The etiology for this reduction in mortality is unclear. Numerous factors have been implicated in the improved outcome, including new monitoring modalities, new anesthetic drugs and the changes in the anesthesia workforce. However, it is difficult to document reduced risk related to any one factor. Interestingly, although newer monitoring

modalities, particularly pulse oximetry, would be expected to lead to improved outcomes, no randomized trial has been able to document such a conclusion.⁵

Studies similar to the CEPOD study have not been performed in the United States, most likely because of the legal system. Therefore, information related to perioperative mortality had to be obtained from other sources. This basic concept led to the formation of the American Society of Anesthesiologists Closed Claim Study. The Committee on Professional Liability of the American Society of Anesthesiologists conducted a nationwide survey of closed insurance claims for major anesthetic mishaps. Both fatal and nonfatal outcomes were reviewed and a series of landmark papers discussing both the potential etiology and treatment of morbidity and mortality were also studied. For example, cases involving unexpected cardiac arrest during spinal anesthesia were observed in 14 healthy patients from the initial 900 claims.⁶ Two patterns were identified: oversedation leading to respiratory insufficiency and inappropriate resuscitation of high spinal sympathetic blockade which led to general recommendations for perioperative care.

Improving Anesthesia Safety

Over the past several decades there have been numerous major initiatives to improve the safety of anesthesia. In 1984, Cooper, Kitz and Ellison hosted the first International Symposium on Preventable Anesthesia Mortality and Morbidity (ISPAMM) in Boston. Approximately 50 anesthesiologists attended the meeting from around the world and, after much debate, established a series of definitions of outcome, morbidity, and mortality. Such meetings have been held every two years since the first symposium.

The Anesthesia Patient Safety Foundation (APSF) was established as a result of the Boston meeting. The society has been active in publishing widely-circulated newsletters and awarding annual grants. Similar societies have now been established in countries outside the United States, and a National Patient Safety Foundation has also been created based on the APSF model.

Starting with the American Society of Anesthesiologists Closed Claims Study, there has been a great deal of interest in establishing guidelines for best and safest practice. Practice policies or guidelines are the summation by clinicians of the available evidence about the benefits and risks of a treatment plan. Guidelines are a method of codifying recommendations regarding the use of a given technology. There are several types of recommendations that fall into the general category of a practice parameter. A standard implies that a therapy or practice should be performed on patients with a particular condition. Standards are only approved if an assessment of the probabilities and utilities of the group indicates that the decision to choose the treatment or a strategy would be virtually unanimous. If a particular therapy or strategy is considered standard, it is cost-effective for those to whom it is being recommended. Standards are intended to



Reprinted with permission, The Cleveland Clinic Center for Medical Art & Photography © 2015. All Rights Reserved.

be applied rigidly. The American Society of Anesthesiologists has established Standards for Intraoperative Monitoring, which was developed from safety guidelines adopted at the Harvard hospital system. Guidelines are intended to be more flexible than standards, but should be followed in most cases. Depending on the patient, setting, and other factors, guidelines can and should be tailored to fit individual needs. Like standards, guidelines should be cost-effective. There have been a number of guidelines adopted by the American Society of Anesthesiologists for diverse issues such as the difficult airway, use of pulmonary artery catheter, and use of blood components. The goal is to define the evidence upon which optimal practice can be based.

Finally, there is a great deal of interest in the use of anesthesia simulators to train and test individuals and their ability to react to simulated crises. Standardized scenarios have been developed upon which comparisons between individuals can be made. Current research is ongoing to determine how best to utilize this technology in anesthesia training and potentially in recertification.

References:

1. Ruth HS. Anesthesia study commissions. *JAMA*. 1945;127:514.
2. Beecher HK, Todd DP. A study of deaths associated with anesthesia and surgery. *Ann Surg*. 1954;140:2-34.
3. Lunn JN, Devlin HB. Lessons from the confidential enquiry into perioperative deaths in three NHS regions. *Lancet*. 1987;2:1384-6.
4. Buck N, Devlin HB, Lunn JL. Report of a confidential enquiry into perioperative deaths. London: The King's Fund Publishing House; 1987.
5. Moller JT, Svendsen I, Johannessen NW, Jensen PF, Espersen K, Gravenstein JS, Cooper JB, Djernes M, Johansen SH. Perioperative monitoring with pulse oximetry and late postoperative cognitive dysfunction. *Br J Anaesth*. 1993;71:340-7.
6. Caplan RA, Ward RJ, Posner K, Cheney FW. Unexpected cardiac arrest during spinal anesthesia: a closed claims analysis of predisposing factors. *Anesthesiology*. 1988;68:5-11.

CHAPTER 3**Choosing a Career in Anesthesiology****Saundra Curry, M.D.**

Clinical Professor of Anesthesiology
 Director, Medical Student Education
 Department of Anesthesiology
 Columbia University Medical Center

You're interested in becoming an anesthesiologist. If you are seriously considering this field then you probably have a number of questions. What is anesthesia? What traits do anesthesiologists share? What do anesthesiologists do after training? What kinds of skills should I have to become a good anesthesiologist? What are the challenges of the specialty? How should I plan my fourth year with an eye towards residency?

Anesthesia was an early, important American contribution to medicine. In 1846, surgery and medicine were primitive at best. Patients preparing for surgery were expected to drink alcohol to reduce insensitivity to pain, bite a bullet to keep from screaming or be tied down to keep from moving. When dentist William Thomas Green Morton performed a public demonstration of the use of ether to render a patient insensible to pain for an operation at Massachusetts General Hospital, surgeons instantly realized that they had a new, important tool with which to care for their patients. Within two years surgery was being regularly performed under anesthesia. Anesthesiology and surgery have been inextricably intertwined ever since. As surgeons have brought increasingly unwell patients to the operating rooms, anesthesiologists have met the challenge with drugs, monitoring and the firm conviction that patient safety is paramount. As a

result, we have been the pioneers in perioperative medicine, intensive care, pain management, resuscitation and patient safety.

What traits do anesthesiologists share? Typically these individuals enjoy crisis management as well as watching physiology and pharmacology in action. They also like instant gratification and don't mind short-term contact with patients. Since the operating rooms are the centers of activity, liking surgery and surgeons are critical. Anesthesiologists also handle stress well. What skills are required to make a great anesthesiologist? There are no personality profiles in literature describing the "ideal" anesthesiologist. However, based on the daily work required, the best anesthesiologists are smart, willing to work hard and have "good hands." Outsiders often see anesthesia as a specialty of procedures, and certainly there are plenty of those, but anesthesia is far more than that. Multitasking is a critical part of the specialty. There are multiple alarms and monitors that need to be supervised regularly and simultaneously. The needs of the surgical staff and the needs of the patient must be regularly assessed, balanced and addressed. People who can only focus on one thing at a time tend to have difficulty handling the multiple tasks of anesthesia. The operating room is often stressful due to multiple personalities and the life-or-death situation of the patient. Prior to surgery, patients are oftentimes frightened, sometimes in pain and fearful of the unknown physician who is asking them to trust their lives to him or her. An anesthesiologist must be able to communicate well to establish trust quickly and effectively with these patients. They also must be able to communicate well with other physicians and health care professionals in the operating rooms and hospital to best care for patients.

What do anesthesiologists do after training? Most end up working in private practice, administering anesthesia to patients in operating rooms. "Operating rooms" these days include the traditional operating room but also include endoscopy suites, invasive cardiology and radiology suites, doctors' offices, virtually wherever a procedure can be performed. Others who train in our field work in intensive care units or pain clinics. Doctors who choose an academic career perform bench or clinical research and participate in the training of residents and medical students. During training and in practice, anesthesiologists interact with physicians from all specialties and deal with patient safety issues, critical incidents and rapidly-changing situations on a regular basis. This is perfect training for hospital administration, and anesthesiologists often find themselves running clinics, preoperative areas, hospitals and becoming deans of medical schools.

What are the challenges of anesthesia? Anesthesiologists do not tend to be independent practitioners today. Call responsibilities preclude that so we work in groups. If you want to be independent, this is a problem. Call can be burdensome and tiring, offset only by the fact that patients need our services.



Reprinted with permission, The Cleveland Clinic Center for Medical Art & Photography © 2015. All Rights Reserved.



Reprinted with permission, The Cleveland Clinic Center for Medical Art & Photography © 2015. All Rights Reserved.

We are a service specialty, so we don't admit patients to hospitals. The patients "belong" to other practitioners, although we maintain an important responsibility to them while in our care.

Anesthesiology is an extremely rewarding career path. As with all careers in medicine, there are stresses to deal with, some of which are beyond our control. But the rewards of caring for patients and making them pain- and stress-free as they undergo operative procedures far outweigh the stresses. Medicine as a whole is changing, and anesthesiologists are at the forefront of these changes. We are leading the way in patient safety, operating room efficiency, surgical homes and cost management. We are also heavily involved in the science of medicine, researching how drugs work, the pathophysiology of diseases and outcome studies. If you want to become involved in these exciting areas, anesthesia is the field for you.

How should you prepare for training in anesthesia? Do your best to excel throughout your years of medical school. Though AOA is not a prerequisite to getting into a good residency program, doing well keeps your options open. Students usually feel they need to learn how to intubate in order to go into anesthesia. In truth, you'll learn how to do that during residency. It's best to concentrate on taking elective courses that interest you, such as cardiology, pulmonary, renal and critical care. Fourth year is an opportunity to take all the courses you'll never get to take again, and you should take advantage of it. If you are still unsure about anesthesia, the time to take an elective to confirm your choice is early in fourth year.

CHAPTER 4

Practicing in the Anesthesia Care Team (ACT)

Ronald L. Harter, M.D.

Professor of Anesthesiology and Chair
Ohio State University Medical Center

Anesthesiologists can deliver anesthesia care primarily in two modes of practice. The first mode is **Personal Performance**, in which the anesthesiologist personally administers all facets of a patient's perioperative care. This chapter will address the other primary mode – the **Anesthesia Care Team (ACT)**.

When providing perioperative anesthetic management in the ACT mode, the anesthesiologist may interact with three different types of providers:

- Anesthesiology residents
- Nurse anesthetists
- Anesthesiologist assistants

The interaction between the anesthesiologist and the other provider in the ACT is known as **Medical Direction**. Medical direction requires performance and corresponding documentation of participation by the directing anesthesiologist at specific points throughout the perioperative anesthetic management of the patient. Those points include:

1. Preanesthetic evaluation of the patient.
2. Prescription of the anesthesia plan.
3. Personal participation in the most demanding procedures in this plan, especially those of induction and emergence, if applicable.
4. Following the course of anesthesia administration at frequent intervals.
5. Remaining physically available for the immediate diagnosis and treatment of emergencies.
6. Providing indicated postanesthesia care (www.asahq.org/publicationsAndServices/standards/16.html).

Thus, the anesthesiologist in the ACT must remain closely involved in the preoperative, intraoperative and postoperative management of each patient for who medical direction is provided.

An anesthesiologist may medically direct up to two residents at one time, according to current guidelines for anesthesiology resident supervision from the Residency Review Committee for Anesthesiology (RRC) (www.acgme.org). When the anesthesiologist medically directs nurse anesthetists or anesthesiologist assistants, up to four cases may be medically directed at one time. Obviously, the number of concurrent sites

that an anesthesiologist medically directs depends upon a number of factors, including the available personnel and resources, the severity of illness of the patient, and the complexity of the surgical procedures to be performed.

A nurse anesthetist, also referred to as a Certified Registered Nurse Anesthetist (CRNA), is a registered nurse who has satisfactorily completed an approved nurse anesthesia training program. An anesthesiologist assistant (CAA) is a physician's assistant who has completed an approved anesthesiologist's assistant training program. CAA programs, which operate in the medical school model, have been in existence since 1969 and are presently fewer in number than nurse anesthetist (NA) training programs. The curriculum and prerequisites for entry into an CAA program are comparable to those for NA programs, but typically require pre-med course completion. The pathway into each program requires completion of a bachelor's degree prior to admission. At present, many states do not yet provide licensure for CAAs, although the number of states that formally recognize CAAs has increased in the past few years. Those anesthesiologists who practice in states which allow practice by both CAAs and NAs generally note that CAAs and NAs perform similar roles within the ACT (<http://www.anesthetist.org/content/view/14/38/>). CAAs are generally permitted statutorily to practice only under the medical direction of an anesthesiologist, whereas NAs may be supervised not only by anesthesiologists, but also by other physicians, as well as by nonphysician health care providers such as dentists and podiatrists, depending on the laws within one's state.

When nonanesthesiologists supervise nurse anesthetists, perioperative mortality rates are higher than when an anesthesiologist is performing the anesthetic or is providing the supervision. In a study of nearly 200,000 Pennsylvania Medicare patients from 1991–1994, there were 2.5 more deaths within 30 days of hospital admission per 1,000 surgical patients when no anesthesiologist was involved with the provision of the anesthetic care. When patients experienced complications during the perioperative period, there were an additional 6.9 deaths within 30 days of admission per 1,000 patients when no anesthesiologist was involved, compared to when an anesthesiologist was either performing or directing the anesthesia care.¹

In summary, anesthesiologists frequently practice in the Anesthesia Care Team mode. The close interaction between the directing anesthesiologist and the anesthesiology resident or nonphysician anesthesia extender (CAA or NA) results in the extremely safe delivery of anesthesia care for patients in a variety of surgical settings.

Reference:

1. Silber JH, Kennedy SK, Even-Shoshan O, et al. Anesthesiologist direction and patient outcomes. *Anesthesiology*. July;93(1):152-163.

CHAPTER 5

A Career in Academic Anesthesiology

Berend Mets, M.B., Ph.D., FRCA

Eric A. Walker Professor and Chair of Anesthesiology
Penn State Milton S. Hershey Medical Center

A career as an academic anesthesiologist is a riot. This career affords an opportunity for continuous personal growth while developing the specialty through educating residents, contributing to the literature by scholarship and research, and in this way building upon and further developing the history of anesthesiology.

While most of the academic anesthesiologists practice in 1 of the 125 academic anesthesiology departments in the United States and have built their career after completing residency training, there are colleagues who return to academia later in life while others work outside these centers and so contribute significantly to the development of our chosen specialty. Nevertheless, most successful academic anesthesiologists have chosen this career early on. The skills needed are hard won and the expertise developed takes many years to attain. As an academic colleague of mine states, "Private practice anesthesia is a job, while academic anesthesia is a career."



Reprinted with permission, The Cleveland Clinic Center for Medical Art & Photography © 2015. All Rights Reserved.

ASA GUIDE TO ANESTHESIOLOGY FOR MEDICAL STUDENTS

More usually, a resident-in-training will develop an interest in pursuing an academic career and then progress from there. While many decry the high salaries that are now prevalent in private practice, I believe that this is an opportunity. Academic salaries – while not as high – are substantial. One can have a very fruitful academic career (under current conditions) without fear of becoming impecunious (and pay off student loans fairly rapidly).



Reprinted with permission, The Cleveland Clinic Center for Medical Art & Photography © 2015. All Rights Reserved.

Career Path

After residency, the usual route is to do a fellowship in one's area of interest. This can be a clinical fellowship or a research fellowship. American College of Graduate Medical Education (ACGME)-accredited fellowships are now available in pediatric and cardiac anesthesia as well as pain medicine and critical care. An ACGME-approved obstetric anesthesia fellowship is likely in the future. Some institutions provide fellowships in regional anesthesia and neuroanesthesia. The importance of a fellowship is that it builds an area of clinical subspecialty expertise upon which you can build your career. A research fellowship is an outstanding opportunity, as this allows one to really develop the necessary expertise for a research career in the future, which includes learning to write manuscripts and apply for grants. During the time of your fellowship, you will also prepare for the oral board examinations. A further benefit of a fellowship in an academic department is that you will continue in an academic environment during the period of preparation for these examinations. Instead of the fellowship, some institutions will have a 2-year clinical rotating instructor position, allowing you to gain expertise as a consultant while preparing for the boards.

Once this fellowship or clinical instructorship has been completed and board certification has been achieved, the individual will be appointed as an assistant professor of anesthesiology.

Promotion and Tenure

The promotion and tenure process may be different in many institutions. Suffice to say that most clinical anesthesiologists are not promoted on the tenure track and that most institutions (and departments of anesthesiology) have well-defined promotion guidelines upon which the promotion to associate professor and subsequently (full) professor are based. The promotion to associate and then full professor usually takes at least six years for each step. With this promotion, in most departments there is an incremental increase in base salary scales, although nationally there is a trend for narrowing the gap between base salaries of assistant and full professors.



Reprinted with permission, The Cleveland Clinic Center for Medical Art & Photography © 2015. All Rights Reserved.

Tracks

While there are no well-defined steps on building an academic career one can review the careers of previous academic anesthesiologists and characterize these loosely into tracks. The key is the development of unique expertise, upon which scholarship and possible research can be based.

Although research is not essential to an academic career, believe scholarship, the collation of (new) knowledge and wide dissemination of this through peer-reviewed mechanisms, is absolutely essential.

In the past, academic anesthesiologists were expected to be "Triple Threats," i.e., clinicians, researchers and educators.

This requirement is unrealistic today; however, the successful academician is often a “Double Threat,” both experts in a subspecialty clinical area and in education, administration or research.

Clinical Subspecialty

This “track” could be developed as follows: the assistant professor, having done a fellowship in cardiac anesthesiology, decides to develop clinical expertise in echocardiography, with a special interest, for example, in intraoperative evaluation of mitral valve disease. The assistant professor will start by building his or her knowledge of echocardiography, lecture to the residents and Fellows, and design a research project around this subject area of interest. He or she will give a Grand Rounds lecture in his or her institution on the subject and progress to lecture locally and then nationally on the subject of interest. The research project will be written first as an abstract for presentation at a national meeting and then as a full manuscript of the completed research project. Additionally, a case report and/or a review article on the subject could be written and published. Hence, the assistant professor evolves into an expert on the subject, and soon will be invited to speak nationally, and possibly internationally, on the subject.

Education/Teaching

This “track” would develop as follows: the assistant professor has decided that education is the area of his or her interest. Education is clearly not just teaching but all that goes with providing an environment in which medical students and residents may develop and learn. This includes developing and implementing the structure, curriculum and evaluation of the education process. The assistant professor would start by developing expertise in education. Joining the Society for Education in Anesthesia, www.seahq.org, would be a good start in support of this endeavor. The assistant professor would serve on medical student and/or resident education committees with the goal of eventually heading a clinical competency committee, medical student rotation or residency program in the department. Along the way, the individual would become particularly interested in a certain area, such as resident evaluation systems, and study and develop these, and so become a regional and, possibly national, expert on this subject. From this would flow scholarship which could be presented and published.

Simulation/Education

Another track would be developing expertise in education through simulation in its many forms. Well-known examples are the full-body simulation systems, but any model used to allow practice independent of patient care can be used in simulation to achieve this.



Reprinted with permission, The Cleveland Clinic Center for Medical Art & Photography © 2015. All Rights Reserved.

Research

This “track” is often preceded by a research fellowship, but the latter is not a prerequisite.

This can take the form of clinical, education or basic science research. Substantial additional training is often required and it is essential to have appropriate mentorship within the department and/or the institution to assure that the assistant professor does not become frustrated and give up on a promising career.

Operating Room Management and Administration

With the increasing complexity of perioperative care as well as the administrative processes within the departments of anesthesiology, there is an increasing trend for academic anesthesiologists to build a career around scholarship in these areas.

Skills and Expertise

There is a great deal that needs to be developed in an academic anesthesiology career beyond the obvious need to be a knowledgeable and consummate clinical anesthesiologist. Below is a brief summary by way of illustration.

Teaching

Teaching can take many forms. All require special expertise and knowledge. By way of example, one will need to develop different expertise whether one is teaching in the operating room, a small group, conducting a problem-based learning discussion or giving a lecture in an auditorium filled with 200 to 300 people.

Presentation

The development of presentation skills is crucial to an academic career. Think only of how differently you would approach preparing a poster at an academic meeting, illustrating the presentation of an anatomy lesson for medical students, putting together an instructive talk on your area of expertise, or presenting options for analgesia to expectant mothers planning to visit the obstetric unit. Oscar Wilde has said, when talking of a presentation, “I would have made it shorter but I did not have enough time.”

Writing

The skill of writing for publication will be one that requires support and practice to develop. A way that you can learn this is through a good mentor who supports you in writing, from your first case report to manuscripts and grant submissions. While this may seem trivial, the writing of a case report teaches one to be singularly focused on teasing out the key issues and writing this down in an instructive, readable, yet parsimonious fashion.

Leadership and Management and Communication

As you grow in your area of expertise, you will be asked to become a director of a division, chair of a department of hospital committee, chief of a clinical service, a residency or fellowship program director, or perhaps even a departmental chairman. Clearly you will need to develop skills in administration and leadership to help create an environment that brings out the best in your colleagues.

Conclusion

I hope that I have been able to encapsulate what a career in academic anesthesiology may look like. As in life, there is no set path. Half the fun is the journey. If you want to make a difference to your chosen specialty and help build its history, academic anesthesia beckons. Will you take the challenge?

CHAPTER 6

Anesthesia in the Armed Forces

Jamison Elder, M.D., Major, USAF, MC

Board Certified Anesthesiologist, WHMC, LAFB, TX
Wichita Falls, Texas

Introduction

A former chairman once said to me, “I wish I could hire a department full of former military anesthesiologists. Their expertise, maturity, work ethic, sense of duty and ability to adapt are simply amazing, which are qualities that would solve many of the problems that I face as a chairman in anesthesiology.” He asked me, “How is it that the military generates such exceptional providers?” Although I acknowledged many influences that shape these providers, our discussion highlighted several ideas that uniquely describe anesthesiology in the military.

Military Unique Activities

The fundamental distinction of military anesthesiologists is in their military unique activities. A casual inspection of military anesthesiology reveals a work environment similar to any American civilian institution with its equipment, supplies and anesthetic approaches common to most anesthesiologists. However, a closer inspection discovers the military anesthesiologist removed from comfort zones to face tasks and circumstances that demand his or her deepest reserves of expertise, endurance and emotional resolve. Some find themselves in the tensions of war, the extremes of natural disasters or the medical hunger of third-world countries.

Following a mass casualty experience, an anesthesiologist stationed in the Middle East stated that “while six anesthesia providers ran six operating rooms in three 15-foot-by-15-foot tent rooms, we completed over 80 trauma cases in the first 24 hours, which included 40 percent craniotomies and some of the most complex multi-trauma injuries I have ever seen. We had no complaints or perioperative complications. We just had 80 excellent resuscitations and anesthetics.”

Another provider described the destruction of Hurricane Katrina as absolute chaos. He found the city of New Orleans submerged to its roof tops without food, power, communication or transportation. Helicopters served as ambulances and a collection of tents on an airport runway served as the only medical system for the tens of thousands of patients and evacuees. While one military anesthesiologist was performing an emergency cesarean section by flashlight, another initiated on a chalkboard the plans for a medical triage and evacuation system, which spanned across multiple services, technologies and aircraft. Military anesthesiologists can find themselves on humanitarian missions

providing relief for underserved countries across the world equipped with limited space, finances and supplies. These providers design, prepare, transport and deliver the entire anesthetic for these remote areas. All providers report of their service with fondness and are eager to return to the deeply grateful patients and the adventure of rural medicine with its dramatic pathology and the simplicity of their preparations. It is this combination of extreme circumstances and tasks that forge new perspectives and increase their abilities to adapt and overcome, despite a surplus of crisis, chaos and critically ill patients.

Clinical Duties

The military anesthesiologist's scope of clinical practice spans across multiple specialties, such as intensive care medicine, emergency medicine, trauma medicine, internal medicine and others. In addition, they negotiate extremes in climate, contribute to the manual labor to sustain the military compound, and create diversity within the constraints of compound life.

They function in portable surgical suites, such as metal containers or tents. Their routine duties are interrupted with marked mass casualties that exceed most modern American Level-1 trauma centers. Patients are stabilized and transported across escalating levels of care, which span across continents, all forms of transportation and various providers from all uniformed services.

For example, the Air Force employs some anesthesiologists as the intensivists for its Critical Care Air Transport Team (CCATT), which moves critically ill patients from remote areas, such as the theater of war, to tertiary care centers. These missions require the anesthesiologist to plan, prepare, pack and employ all the needed equipment and supplies to resuscitate and sustain critically ill patients for many hours and thousands of miles in the dark and deafening noise on a military cargo plane.

Some military anesthesiologists are sent as part of forward surgical teams with surgeons, emergency physicians and registered nurses to provide emergent triage and surgery out of backpacks in forward combat positions, natural disasters, humanitarian relief and terrorist-related scenarios. These providers plan, prepare and deploy their care from five backpacks.

Similarly, natural disasters frequently involve military anesthesiologists as the initial providers during the resuscitation and transportation of critically ill patients to tertiary facilities. Hurricanes, tornados, volcanoes, forest fires, tidal waves, earthquakes, explosions and riots have all required these providers to adapt to unpredictable injuries and unimaginable conditions with limited resources and support.

Following Hurricane Katrina, Air Force anesthesiologists assisted in the transport of hundreds of critically ill patients from the flooded city of New Orleans to neighboring states. The Army created a tent hospital center, which served as the only hospital

and Level-1 trauma emergency center for a city that once enjoyed several giant and sophisticated medical centers. Their success followed careful planning, preparation, teamwork, expertise and relentless efforts to adapt and overcome the many unimaginable obstacles.

Emotional

Most providers agree that military anesthesia deployments can test their character and emotions. While some find humor amid the boredom of maintaining a quiet installation of past conflicts, some describe dodging the heat and sand of the desert. Others speak of wrestling with the noise, temperature and turbulence of military aircraft. Several have told of filing into the local bunker as a siren alerts to possible mortar attacks.

Remarkably, many agree that their initial fears melt into common place when engaged in the selfless act of patient care. Others recall their most cherished moment while emergently caring for a wounded American troop as they enter the operating room still dressed in dirt, camouflage and bullet proof vests. It is learning their names and of their loved ones at home, while imparting hope through a smile and an encouraging word as they drift to sleep. Despite their personal peril, it is common to hear American troops ask, "Doc, how long until I can return to fighting? My friends are still fighting and they need me!" Several of my peers have confided that deployment life is a personal hardship. But, caring for wounded American troops has been one of the most meaningful things they have ever done in their life.

Training

Providers enter military training in anesthesiology for many reasons, which commonly include finances, intrigue and patriotism. Despite their motives, military training programs are postured toward these military requirements. The stated goal of the SAUSHEC anesthesiology residency program is to turn out the very best-trained anesthesiology consultants, who can excel in the military environment.

As a result, military residencies in anesthesiology attempt to equip trainees for deployment anesthesiology. Their training has an added emphasis in trauma surgery, regional anesthesia and burn medicine. Their training is mingled with annual workshops in difficult airway management, transesophageal echocardiography and advanced regional anesthesia. The Navy, Army and Air Force have ACGME-accredited residency programs across the nation. Wilford Hall Medical Center (WHMC) in San Antonio, Texas, has served as the flagship of Air Force medicine for decades, which offers nearly every aspect of tertiary medical care and the bulk of its medical training programs. Brook Army Medical Center (BAMC) in San Antonio, Texas, is the Army's newest and most technically advanced hospital, which functions as a Level-1 trauma center and the home of the Institute of Surgical Research

and Extremity Trauma (ISR), a state of the art burn care center and research depot. The anesthesiologists at BAMC maintain the Research Center of Excellence for Total Intravenous Anesthesia (TIVA) as the home of the Triservice Anesthesia Research Group Initiative on TIVA (TARGIT) to explore its military applications. The National Naval Medical Center (NNMC) and Walter Reed Medical Center (WRMC) are similar institutions on the east coast, which are associated with the nation's primary medical research center, the National Institutes of Health (NIH).

Historically, military graduates have been outstanding, with near perfect passing rates of the written and oral board exams. Military anesthesiology alumni have contributed to respiratory care through the advent of intermittent mandatory ventilation (IMV) and high positive end-expiratory pressure (PEEP) ventilation. As alumni, they have gone on to be departmental chairmen, leaders in academic residencies, authors of anesthesia textbooks and numerous medical and public publications. Some have become editors of major journals and served as a president of the American Society of Anesthesiologists (ASA). Indeed, military anesthesiologists become inclined to serve as leaders, educators and innovators that have dotted the map and history with their contributions.

Summary

My former chairman recognized a pattern of “expertise, maturity, work ethic, duty and ability to adapt,” which were forged by early responsibility and heroic challenges. These providers learned firsthand the critical value of teamwork, determination and adaptability. They succeeded at doing more with less, traveled many extra miles and improvised when many would yield. I believe it was these ideas that caused my chairman to suggest that a department full of military-trained anesthesiologists “would solve many of the problems that I face as a chairman in anesthesiology.” In many ways, the military houses one of the last frontiers of anesthesiology where technology and sophistication must give way to simple tools and basic medical principles. Their solutions are won through innovation, determination and adaptation. Like all pioneers, these providers emerge with war stories and battle wounds of the soul and body. But, they emerge stronger, undeterred and more able than before. More importantly, most report that the care they rendered during their military missions was the most meaningful of their career. One provider commented that he thought he enjoyed delivering anesthesia, but he added with tears in his eyes that “helping our soldiers in their dire need was the best experience of my career and possibly my life.”

Some would argue that greatness is not what we become but rather what we do. A military anesthesiologist is not a life of wealth, privilege and prestige. However, the life of a military anesthesiologist will involve thousands of military members that volunteer to stand in harm's way for America and its allies' sake.

Compared to its civilian counterpart, military anesthesiology is a selfless, industrious and relentlessly demanding profession without commensurate praise, comfort or financial gain. Nonetheless, a military anesthesiologist finds meaningful reward in raising the fallen soldier, in the grateful tears of his or her family, and the consolation that their expertise may have aborted the misfortune of those serving who dare to give everything.

NOTE: *The content of this publication is the exclusive opinion and interpretation of the author and not that of the Department of Defense or one of its uniformed services.*

CHAPTER 7

What Makes a Competitive Anesthesiology Candidate?

Stacey Watt, M.D.

Clinical Instructor of Anesthesiology
Jacobs School of Medicine and Biomedical Sciences
University at Buffalo, SUNY

Mark Lema, M.D., Ph.D.

SUNY Distinguished Professor and Chair
Department of Anesthesiology
Jacobs School of Medicine and Biomedical Sciences
University at Buffalo, SUNY

Anesthesiology is a very demanding field. It requires skill, speed, knowledge, judgement and vigilance. These traits have not only brought you success in medical school but are your main highlights in gaining acceptance into the anesthesiology residency of your choice. Use the tools that have brought you to this point. Highlight your strengths and brush up on some tips about interview skills. Use this chapter as a guide to prepare yourself for the application process. Good luck.

What are Residency Programs Looking For?

Residency programs are not only looking for the best and the brightest, they desire an applicant who will be a “good fit” into their program. As an interviewer, I remember my first interview session when I was told to look at the applicants not only as the future of anesthesiology but as future partners.

Applicants must be able to function compatibly within the program, having similar goals and educational styles. For example, a student who learns only from lectures and tutorials will not do as well in a program noted for clinical excellence and independent study. Both the applicant and programs are searching for a successful partnership.



Reprinted with permission, The Cleveland Clinic Center for Medical Art & Photography © 2015. All Rights Reserved.

What Sets You Apart?

You want to be the best, and that is a natural desire, but so does everyone else! Being competitive in an anesthesiology application requires certain basic skills as well as those elements that set you apart from the rest.

- **Basic Requirements**

Many programs have basic requirements that they use as a filtering device for applicants. These requirements are very good medical school grades (mostly high pass to honors), solid USMLE I scores and strong letters of recommendation. Top programs will have more stringent guidelines. Residency programs will sort through applicants based on the student's ability to meet their pre-set requirements.

If you meet these basic requirements, you can be relatively assured of a second look and usually an interview. Now let's break down the basic requirements and examine each component of a winning combination.

- **Medical School Grades**

Residency programs are not looking for only passing grades but some high passes to honors. If you come from a program that is mainly pass and fail, your class ranking may be a way of evaluating you against your peers. Anesthesiology programs look for candidates who are strong students, especially in the fields of pharmacology and physiology.

If you have incompletes or failing grades you may be excluded early in the process. If you have a good explanation for a blemish on your record, explain it in your personal statement, or find a way to get this information to the anesthesiology department to which you are applying. They may overlook a failed grade if it is inconsistent with an outstanding record and a good explanation furnished.

- **USMLE Scores**

The USMLE Step I examination is taken in the summer of the second year and is usually basic science oriented. Step II of this examination process is taken at any time during your fourth year of training.

Anesthesiology programs are looking for a decisive passing grade on Step I. If you are debating whether you should take Step II before applying you must look at your test taking skill and confidence that you will score well. If you had a weak Step I score, a strong Step II performance may make you more competitive. Conversely, a poor Step II exam may put a strong Step I score into question. If you take the exam and pass it solidly it will definitely enhance your desirability to your program. Many program directors believe that high USMLE scores correlate with good to high scores on anesthesiology in-training exams and ultimately to success in passing the written certification exam. Thus, high USMLE scores generally result in an invitation to interview.

- **Letters of Recommendation**

Having strong letters of recommendation often will tip the odds in your favor when it comes to being granted an interview. As a candidate you should seek out letters of recommendation from people who can write powerful letters of support and who know you well. You want someone who can emphasize your strengths as an applicant. Remember that when you are applying that you are marketing yourself. When deciding who should write these letters, it is a good idea to have at least one of your letters be written by an anesthesiologist. The most highly ranked letters are typically those written by academic heads of their departments.

When asking for a letter of recommendation it is a good idea to provide that person with a copy of your curriculum vitae and personal statement. It is also advisable that you spend some time with your recommender honestly discussing your strengths and weaknesses so that emphasis can be placed in the appropriate areas.



Reprinted with permission, The Cleveland Clinic Center for Medical Art & Photography © 2015. All Rights Reserved.

Setting Yourself Apart

You have all of the basic requirements and now you are looking at how you can get ahead of the other candidates. Start with your personal statement. Other components of a competitive application include anesthesia electives or work experiences and research. Remember that anesthesiology is more than a technical skill or applied pharmacology. The anesthesiologist is the leader of the health care team and program directors are looking for leaders. Avoid filling your application with “fluffy” one- or two-day volunteer positions and focus on projects that have required drive, initiative and leadership.

- **Personal Statement**

Programs often use this part of your application after you are granted an interview to find out more about you before your personal meeting. Interviewers often use this essay as a question generator during the interview session. Remember that your personal statement will be the first impression your interviewer is given. Make it a good one. You want to mention

why you want to be an anesthesiologist and what attributes would help you in achieving that goal, as well as how you tested your interest in anesthesiology (rotations, shadowing, etc.). Other ways to approach this component of your application is to tell the story of your life and how it has steered you to anesthesia as a specialty. Draw your audience in and give them a glowing first impression. Having said this try to avoid the cliché statements like “I want to be an anesthesiologist because I like physiology and pharmacology.” Virtually everyone applying for anesthesia likes these things as well. Also, when discussing your personal attributes avoid definitive statement such as “I have exceptional IV and intubating skills.” Short of an applicant who was a nurse anesthetist before going to medical school, an overly confident statement such as this only tells the program director how little insight you have as to how much there is to learn. Lastly, just before you submit your personal statement have someone you trust proofread it! Minor grammar, spelling and word use error might not seem all that important, but anesthesiology mandates attention to detail, and a sloppy personal statement says all the wrong things.

- **Anesthesia Electives**

Having added exposure to anesthesiology shows the interview committee your dedication and knowledge of the field. It relays to them you know what you’re getting into and you really want a career behind the “ether screen.” If possible, make sure at least one rotation is at a tertiary care center. If all your rotations are at small community hospitals or surgery centers it may raise the question of whether you really understand the implications of caring for critically ill patients in the operating room.

- **Work Experience**

Some applicants have further polished their applications with extra exposure to the field of anesthesia. This usually takes the form of summer internships or work-internships over the summer or during breaks. It places an exclamation point after your stated dedication to the field of anesthesiology. If you have the time and opportunity, we highly recommend gaining further exposure.

- **Research**

As interviewers, we give a nod of approval to those applicants who have research experience. Having done many projects ourselves, we know the extra time and work required to participate. We offer this with a word of caution. If you have participated in a research project make sure that you know what role you played in the project and the project’s goal. We see many applicants that spent a few days in the lab and really made no strong contribution to the study. Moreover, they had no idea what the goal of the study was other than reciting the title. Please do not be one of these applicants!

It will take your application down a few notches and perhaps cost you a residency position.

We encourage you to get into the lab and participate. Find a mentor and be relentless that you want to do some type of research project and follow through. You will be rewarded for your efforts when you get accepted into an anesthesiology program.

Some Helpful Hints

Congratulations on deciding to join the field of anesthesiology. You made an excellent decision. Remember to get the basic requirements aligned and then work toward adding extra elements to your resume that will make you an extremely competitive candidate.

To prepare for a successful interview have a trusted professor or mentor give you a mock interview. Gain feedback on your appearance, speech and behavior. You don't want to appear coached, but the last thing you need on interview day is to represent yourself poorly. On the day of your interview dress professionally. You want the interview committee to look at you as a future partner. Smile and act confident. You are an excellent candidate. Listed below is a checklist of items/tasks to be completed prior to the interview in order to look, act and talk like a successful applicant.

Considerations for Presenting a Positive Image When Interviewing

Walk the Walk

1. Subdued mannerisms (no wild hand motions)
2. Manners ("Yes, doctor" and "No, thank you")
3. Firmness of handshake (no limp fish, no weight lifter's grips)
4. Maintain eye contact (don't stare!)
5. Posture (no slouching, small of back against chair)
6. Speaking (not too loud, not too loquacious)
7. Tone of voice (vary pitch, use pauses to keep interest)

Talk the Talk

1. Be honest, tactful, respectful
2. Know your personal topics well (research, anesthesia interest)
3. Learn about the program via website, literature, and ask follow-up questions based on that reading

Look the Look

1. Appropriate appearance (remove facial piercings or unnatural hair color)
2. Appropriate dress (look professional)
3. Being overdressed may be as bad as sloppily dressed (could look too "slick")
4. Remember your appearance is a nonverbal form of communication

CHAPTER 8

Choosing a Residency

Stephen J. Kimatian, M.D., FAAP

Chair, Department of Pediatric Anesthesiology
Vice Chair for Education, Anesthesiology Institute
The Cleveland Clinic

Having made the decision to pursue a career in anesthesia, the next decision to be made is where to go for residency. The National Resident Matching Program (NRMP) match process can be intimidating; however, a systematic approach that assesses your goals as well as your strengths and weaknesses as a learner will help guide you to the correct decision.

Self-Assessment

The first fact that needs to be established is that not every person learns best in the same environment, and as such there is no single "best" program. While many people ask "What is the best program," the question should be "What is the best program for ME?" This is an important distinction because it implies that before you can start to examine programs, you must first examine yourself. Looking back over your education to date, where have you had the most success? Where have you encountered difficulty? Do you function best in a small, more intimate setting or in a large group? Are you a very self-directed person or do you function better when you have mentorship and direction? Would you rather be in an urban or a rural environment? These are but a few of the many questions you must ask yourself before you get started. This type of personal introspection is difficult at times, but it is important to be honest and critical if you want to find the best fit. The reality is that you have already accomplished a great deal and passed a number of competitive selections to get to this point. You have developed a set of strategies for learning that have served you well and set you among some of the most educated people in the country. The only thing standing between you and your future career is post-graduate training, and selecting a program that matches well with your personality and learning strategies will be the key to future success. It is often helpful to get an outside perspective from a trusted friend or mentor when considering these issues, but the end result should be a personal list of criteria to use when assessing programs.

Identifying Programs

Once your self-assessment is complete, the next step is determining your list of programs to send applications. The simplest way to start this process is to sort programs based on your list of personal criteria. If location is important, then an initial sort by geographic location would be important. If the potential for research or a future academic career is important, you may want

to sort by institutional reputation. Most residency programs have excellent websites that will help you identify important aspects of the program. Keep in mind, however, that these are their websites and are meant to paint the program in a positive light. Statistics from NRMP are helpful in determining the number of programs to visit and are available from their website (<http://www.nrmp.org/>) in the section on data and reports. NRMP data from 2007 suggests that senior United States medical students interested in anesthesiology who ranked eight programs or more had a very high rate of matching in anesthesiology compared to those who ranked a lesser number of programs. If we assume that not every program we visit is one we would rank, then you probably need to interview at more programs than you intend to rank. Depending on your academic statistics and USMLE scores you may have to anticipate sending out even more applications to ensure an adequate number of interviews. Once you have a “wish list” of programs, it is important to sit down with a faculty member or mentor from your home institution who can help you sort them out. As of 2007, there were 131 anesthesiology programs accredited by the ACGME, so it is likely that the faculty at your institution have firsthand knowledge of a large portion of these programs.



Reprinted with permission, *The Cleveland Clinic Center for Medical Art & Photography* © 2015. All Rights Reserved.

The Application

The application through the NRMP match process is fairly standard and straightforward, but based on my experience as a program director, I will offer you the following advice about the application process:

1. Make sure your application is as complete as possible on the day the ERAS application process opens (typically on or around Sept. 1). As anesthesia has become more competitive, programs have been offering interviews earlier and earlier and the best application in the world will not get interviews if it is not available relatively early.

2. Have a faculty member, advisor or mentor review your CV and personal statement for content before you submit. I advise my medical students to have a personal statement that gives me insight into who they are (and not why they like anesthesia). In addition, I advise people only to list research and activities where they have made a substantial contribution. Go for quality, not quantity.
3. Have a trusted family member or friend review your CV and personal statement for grammar and spelling. Anesthesia is all about attention to detail and your application is the first impression we have of you.

The Interview

Once you submit the paperwork the real fun begins. Remember that the interview process is as much for you to evaluate the program as it is for the program to see you. Preparation for your interview starts before you arrive. Start by going to the ACGME website (<http://www.acgme.org/acWebsite/home/home.asp>), click on “Review Committees > Anesthesiology,” and download and review the Common Program Requirements. These requirements are the minimum standard that a program must meet to maintain accreditation. While there are a few specific requirements, such as the requirement for “Forty anesthetics for vaginal delivery” (Section IV Patient care A 5 a (1) (a)), there are others that are vague, and it is in these vague requirements that you can find a measure of a program’s commitment to education. Take for example the requirement 2 D (1), “There must be adequate space and equipment for the educational program ...” How is space allocated for education? Are there sufficient areas to study? Are there resources for education readily available (i.e., library, journals, texts, computers)?

Accreditation

Periodically, programs are reviewed by the ACGME Resident Review Committee (RRC) for Anesthesiology and reaccredited based on the criteria set forth in the program requirements. At the time this article was written, program accreditation can be from 1 to 5 years, with most programs receiving 4- or 5-year cycles. In addition to an accreditation cycle, programs often receive citations that describe areas where the RRC felt the program was deficient. The citations are accompanied by a recommendation that these issues receive special emphasis prior to the next accreditation cycle. One indication of how a program has progressed and what they have done to improve education is to ask what their accreditation cycle is and how they have addressed any citations they have received.



Reprinted with permission, The Cleveland Clinic Center for Medical Art & Photography © 2015. All Rights Reserved.

Outside of the O.R.

Beyond the obvious areas of clinic teaching there are several areas where a program can show its commitment to education. Can faculty be promoted in an education or clinical educator track? Are there funds available (endowments, grants, scholarships) for resident research and presentation at meetings? Are the residents engaged in political advocacy (state and ASA resident components)? Do residents sit on departmental or institutional committees? Have they developed any novel or unique rotations for residents outside of the O.R.?

Personal Fit

Perhaps most importantly is the question of personal fit. When all is said and done, any accredited residency program should be able to help you become a competent anesthesiologist, but not every program will be a fit for your personality. In his book, “The Five Dysfunctions of a Team,” Patrick Lencioni discusses the fundamental aspects of cohesive team function. The foundation is Trust; trust that the team shares the same goals and objectives. In this case, these goals and objectives should focus around concepts of excellence in patient care and excellence in education. Lack of trust results in **Fear of Conflict** and the inability of the team to openly discuss issues of concern. Without effective and open communication there is a **Lack of Commitment**. If your concerns have not been heard, why would you be expected to commit to the plan? Without commitment there can be no **Accountability**, and as a result no one takes responsibility for the education process. Without accountability there can be no **Results**. In this case the results are safe and effective patient care and your education. **Trust, Communication, Commitment, Accountability, and Results**. As you consider each program, ask yourself how the program lives up to these values as they relate to your future as an anesthesiologist.

Did you see these values in their residents, their faculty, their leadership, their curriculum? Did you get the impression that the residents you met would be colleagues you could rely on, or new best friends? Was the program open to critique, willing to make change and responsive to its residents? Was the executive leadership accessible to the residents and open for discussion? Is the department willing and able to make the same commitment to you that you are prepared to make to them? If the answer to these questions is “yes” then you may have just found your new home.

Good luck!

CHAPTER 9

Categorical Versus Advanced Programs

John E. Tetzlaff, M.D.

Professor of Anesthesiology
Cleveland Clinic Lerner College of Medicine of
Case Western Reserve University
Anesthesiology Institute
Cleveland Clinic

The educational pathway for anesthesiology residency is 48 months and can be accomplished by two distinct approaches. One option is to match into a program that offers 48 months at one site (categorical). The other option is to match at the PGY-2 level (advanced) and choose a PGY-1 year at another site. Each of these choices has advantages and disadvantages that should be considered by each student as an individual.

Many students choose the categorical option for practical reasons. Being at one institution for the entire residency means only having to move once. It also means that at the start of clinical anesthesia (PGY-2), the resident has the familiarity with the hospital that originates from being an intern (PGY-1) in that hospital. Other students choose an advanced program for equally practical reasons. Some students want one more year in the same city as the medical school for personal reasons (e.g., family, significant other). Other students have formed satisfying professional relationships with faculty who also participate in PGY-1 programs, and they prefer to continue these relationships during the legendary “intern” year. Some osteopathic students choose a traditional rotating osteopathic internship to facilitate working in the small number of states that require D.O. physicians to complete an internship approved by the Osteopathic Society.



Reprinted with permission, The Cleveland Clinic Center for Medical Art & Photography © 2015. All Rights Reserved.

Many students are completely undecided and want information to help in the choice. In the 2006 NRMP match, 1,040 traditional seniors matched with anesthesiology programs (of a total of 1,311 who matched into anesthesiology), and 451 were categorical and 589 were advanced positions.¹ Overall, there is no evidence that there is a difference in outcome between the categorical and the advanced path (completion rate, training scores, board pass rate). This may be a chance phenomenon or related to the high degree of variability between categorical PGY-1 years, ranging from preliminary positions in medicine, surgery or pediatrics, transitional years, or the growing minority of programs that sponsor an anesthesiology-controlled Clinical Base Year (CBY).

There is evidence for the movement toward the 48-month curriculum. In 1996, there were 234 PGY-1 positions which expanded to 552 available in 2006. Although they backed away from a mandatory, integrated 48-month curriculum, the RRC for anesthesiology published new rules² this year requiring greatly increased control of the CBY curriculum, allowing some of the curricular elements to occur during the CBY. The wisdom of an anesthesiology-controlled CBY has been debated extensively within the ASA reference committee system, at the SAAC/AAPD meeting (several), and informally throughout the specialty. The argument against anesthesiology control of the CBY is resource- and logistically-based. At sites where there is no current CBY, there are issues about funding new positions and a reluctance to give up PGY-2-4 slots to create PGY-1 positions, undoubtedly related to the ability of anesthesiology chairs/program directors to demonstrate value-added benefits to the hospital by creating these positions. With the 80-hour rule, there has been a redistribution of work and some sites have been able to fill teaching services with new CBY residents.

For the programs that aggressively market anesthesiology-controlled CBY positions, the motives are related to recruitment and faculty perceptions. Having a CBY is a plus to a candidate who wants a 4-year experience. The faculty at these sites are pleased with the familiarity with hospital function that the CBY brings to the CA-1 year in the beginning when orientation to clinical anesthesia starts.

For those programs that offer both options and offer an anesthesiology-controlled CBY, there may be a shift toward the 4-year option. Those who have followed this path are often its strongest advocates. The reasons cited included becoming a part of the anesthesiology family from the start, rotations in pain, critical care and perioperative medicine, as well as the academic/social advantage of having the opportunity to participate in anesthesiology teaching activities. Since current resident satisfaction is a well-known feature for recruitment of future residents,³ this is an important element.

So what should you do if you are a senior in the match process interested in anesthesiology? Since either option (advanced or categorical) will prepare you well for a career in anesthesiology, you should interview at sites that offer both options and consider this element of anesthesiology residency along with the dozens of other issues presented by the match. Solicit opinions on this issue from as many different residents, faculty and program directors as you can and decide what is best for you.

References:

1. Grogono AW. National Residency Matching Program results for 2006: recruitment shifts to the PG-1 Year. *ASA Newsletter*. 2006;70(5):23-7.
2. www.acgme.org
3. Wass CT, Long TR, Randle DW, Rose SH, Faust RJ, Decher PA. Recruitment of House Staff into Anesthesiology: a reevaluation of factors responsible for house staff selection anesthesiology as a career and individual training program. *J Clin Anesth*. 2003;15(4):289-94.

CHAPTER 10**Transitional/Preliminary Year****Gerard Costello, M.D.**Program Director, Transitional Year Residency
Ball Memorial Hospital

The following is based on information provided in the Graduate Medical Education Directory 2005–2006 published by the American Medical Association.

The ultimate goal of a graduating medical student entering a program in graduate medical education in anesthesiology is (or should ultimately be) board certification by the American Board of Anesthesiology. A review of documents by the American Board of Anesthesiology includes the following statement from its Booklet of Information: “It is crucial that the resident know the requirements described in this document, since the resident ultimately bears responsibility for compliance with the requirements and bears the consequences if one or more aspects of training prove unacceptable.” Further in the document it describes an entrance requirement into the certification process being “fulfilling all the requirements of the continuum of education in anesthesiology.” The continuum of education in anesthesiology consists of a clinical base year (CBY). It is described as follows: “During the CBY, the physician must be enrolled and training as a resident in a transitional year or primary specialty training program in the United States or its territories, that is accredited by the ACGME or approved by the American Osteopathic Association, or outside the United States and its territories in institutions affiliated with medical schools approved by the Liaison Committee on Medical Education. Acceptable clinical base experiences include training in internal

or emergency medicine, pediatrics, surgery or any of the surgical specialties, obstetrics and gynecology, neurology, family practice, critical care medicine, or any combination of these as approved for the individual resident by the director of his or her training program in anesthesiology. The CBY must include at least 10 months of clinical rotations during which the resident has responsibility for the diagnosis and treatment of patients with a variety of medical and surgical problems, of which at most 1 month may involve the administration of anesthesia. At most, 2 months of the CBY may involve training in specialties or subspecialties that do not meet the aforementioned criteria.”

The Program Requirements for Graduate Medical Education in Anesthesiology as put forth by the ACGME describes the CBY as follows: one year of the total training must be the CBY, which should provide the resident with 12 months of broad education in medical disciplines relevant to the practice of anesthesiology. It repeats the board requirement that the CBY must include at least 10 months of clinical rotations of which at most one month may involve training in anesthesiology.

From a practical standpoint, the graduate medical student is given two choices: 1) To enter into a CBY affiliated with an anesthesiology residency program, or 2) To enter an independent CBY program.

In the 2006 NRMP match, 77 anesthesiology programs offered 552 CBY spots affiliated with their programs. Of these spots, 539, or 97.6 percent, were filled in the match. There were 759 spots available at the PGY-2 level in the match in anesthesiology residencies.

The second option is to match in an independent first year program. If a student chooses this option they have two choices. The first is to enter a transitional year residency program. The other is to complete one year of a residency in another acceptable specialty. Most commonly these are referred to as preliminary medicine, preliminary surgery, or one year of a family practice, obstetrics and gynecology, or pediatrics residency.

Of these two choices, the Transitional Year Residency is the only independently accredited program by the ACGME. The purpose of the Transitional Year is to provide a well-balanced program of graduate medical education to a number of medical students. Most commonly these students have chosen a career specialty that requires one year of fundamental clinical skill education and which may also contain certain specific experiences or the development of desired skills. Students entering Transitional Year programs have most commonly chosen a career specialty in anesthesiology, radiology, ophthalmology, physical medicine and rehabilitation, or are planning to serve in active duty in the military as a general medical officer or flight surgeon.



Reprinted with permission, The Cleveland Clinic Center for Medical Art & Photography © 2015. All Rights Reserved.

The content of the Transitional Year program is specifically stipulated by the ACGME in the program requirements for the Transitional Year. During the 12 months of the program, at least 24 weeks of the curriculum must be in disciplines that offer fundamental clinical skills, that is, emergency medicine, family practice, internal medicine, obstetrics and gynecology, pediatrics or surgery. Fundamental clinical skills are further defined as developing competencies in obtaining a complete medical history, performing a complete physical examination, the ability to define a patient's problems, the ability to develop a rational plan for diagnosis, and the implementation of therapy based on the etiology, pathogenesis and clinical manifestations of various diseases.

In addition, Transitional Year programs are required to provide no fewer than eight weeks of electives. Transitional Year programs must also have at least a 4-week rotation in emergency medicine and a 4-week experience in ambulatory care.

As stated previously, Transitional Year residency programs are independently accredited by the ACGME. This is of some importance to the resident in that any program so accredited will have to meet minimum standards in order to maintain accreditation.

The other option, completion of one year of a residency in another acceptable specialty residency, is not independently accredited by an external organization, and consequently provides a more variable experience. The quality of these experiences can be and in many cases is exceptional. The quality, however, is more dependent on the underlying quality of the parent program and the integrity of the institution where the parent program is located. For example, there is no defined curriculum for one year of an internal medicine program. While this could include a variety of experiences, even including electives in such rotations as surgery and pediatrics, it is equally possible that it could include only ward medicine and intensive care unit opportunities.

The decision to enter a particular CBY program is frequently predicated on a number of issues. Geography is frequently important, as residents wish to minimize their potential number of moving experiences, or wish to remain close to a significant other, spouse, or family. Frequently, residents will also choose to match a first-year program close to their ultimate categorical program choice. For those residents who are not confined by these constraints, there are a number of good choices available. In the 2006 NRMP match the following positions were available. The 2006 NRMP match offered designated positions in transitional year, preliminary surgery, and preliminary medicine. It is unknown how many students opted for a single year in other programs. Ninety-four Transitional Year programs offered 759 positions, with 748 or 98.6 percent filling. Two hundred seventy-nine preliminary surgery programs offered 1,234 positions with 748 or 60.6 percent filling. Two hundred eighty-five preliminary medicine programs offered 1,943 positions with 1,749 or

90 percent filling. As you can clearly see there are a variety of available choices.

Numerous sources are available on the web to assist the student in making his/her choice. An incomplete but useful list follows:

1. <http://www.ahme.org/councils/ctypd.html>
2. Search Google for "preliminary medicine" and "preliminary surgery"
3. <http://www.ama-assn.org/ama/pub/category/2997.html>
4. www.scutwork.com

CHAPTER 11

ERAS: The Application Process

Rita M. Patel, M.D.

Professor and Vice Chair for Education
University of Pittsburgh Medical Center

The Electronic Residency Application Service (ERAS), provided by the American Association of American Medical Colleges (AAMC), allows applicants, Deans' offices, and other credentialing organizations to submit materials electronically to residency programs and program directors. It allows for electronic transmission of medical school records, letters of reference and other credentials, such as USMLE/COMLEX scores, for application to fellowship, osteopathic internship and residency programs. Anesthesiology residency programs began using ERAS in 2001. Use of ERAS is not mandatory and is independent of the National Residency Matching Program ("match") process. However, it is the preferred method of application by most programs. Few programs in the country still accept "paper" applications.

Prior to using the ERAS system, students can research programs and contact them for information regarding requirements and processes. It is important to note that ERAS does not set program application deadlines. These are set by the individual residency programs.

Fees for applications are based on the number of programs selected per specialty. The fee schedule can be found on the ERAS website. The system can automatically calculate fees. Payments may be made online.

There are four components of ERAS:

- *The MyERAS Website* – This is where the candidate completes the application and personal statement, selects programs and assigns documents to be received by those programs.
- *The Dean’s Office Workstation (DWS)* – This is where the Designated Dean’s office uses software to create ERAS tokens that candidates use to access MyERAS; also to add supporting documents to the application, e.g., transcripts, photos, Dean’s letters and letters of recommendation.
- *Program Director’s Workstation (PDWS)* – This software is used by program staff to receive, evaluate and rank applications.
- *The ERAS PostOffice* – This is a central bank of computers that transfer applications. The candidate can track his or her file on the ERAS PostOffice through the Applicant Data Tracking System (ADTS).

The first action is to contact the Dean’s office. Each office follows its own procedure for applications, including the schedule for distributing materials, downloading applicant files, scanning transcripts, attaching documents, processing letters of recommendation and sending files to programs. RESPECT DEADLINES. Do not assume they can transmit files at the last minute.

The usual process for applications through ERAS is listed below (*approximate dates/exact information can be found on the ERAS website*):

The ERAS Post Office closes on May 31 every year to prepare for the next application season. Records are NOT maintained from year to year, i.e., all servers are purged of all applications and supporting documents.

Applicants work mainly with the MyERAS website, which has the following areas:

1. **Account** – Gateway to the entire application service; candidates can review checklist for progress on application; update profile with new contact information; check messages from programs.
2. **Application** – Contains the majority of information about the candidate; includes educational and work experience, honors, published papers, etc.; can be completed in multiple sessions, but once certified and submitted, cannot be altered. Twelve pages.
3. **Documents** – Candidates create their personal statement; identify individuals for letters of recommendation; release COMLEX or USMLE transcripts.
4. **Programs** – Search for and select programs to receive application materials; assign USLME/COMLEX transcript, personal statement and letters of recommendation to individual programs.

The ERAS website (<http://www.aamc.org/students/eras/start.htm>) contains detailed information as does the Dean’s office. Good luck!

| Date | ERAS | Candidate/Applicant |
|--------------|--|--|
| Late June | Applicant manuals available for download on ERAS website | Obtain MyERAS tokens from Dean’s office |
| July 1 | MyERAS website opens | Begin working on applications |
| July 15 | Osteopathic internship programs contact ERAS PostOffice to download applications | Apply to osteopathic internship programs |
| September 1 | ACGME programs contact ERAS PostOffice to download applications | Apply to ACGME-accredited programs |
| November 1 | Dean’s letters are released | |
| December | Military match | Military match |
| January | Urology match | Urology match |
| Late January | Osteopathic match | Osteopathic match |
| March | NRMP match results | NRMP match |
| May 31 | ERAS closes until next year | |

CHAPTER 12

Interviewing for Anesthesiology Program

Peter S.A. Glass, M.B., Ch.B., FFA (SA)
Emeritus Chair
Department of Anesthesiology
State University of New York at Stony Brook

Jaya Bahl
Medical Student
Stony Brook Medical School

General Info

The goal of the interview is for you to find the program that fits you best and for the programs to find the best candidates for them. It is thus a two-way street. It is important for you to show who you truly are during the interview process. You must be your own advocate, as no one will do that for you.

Scheduling

Most programs begin to send out invitations in October while others wait until your school sends out its Dean's letters on November 1. Your contact information should be easily available and accurate. Be sure to check your email after sending out the ERAS application as programs may invite you for an interview right away.

You should submit your application by early October and reference letters by the middle of October, but no later than after the Dean's letter is received. The interview season generally begins in November and ends in early February. Departments may interview four to 20 candidates at a time, any day of the week (except around the holidays), and perhaps one Saturday per month. Sometimes arrangements outside of these guidelines can also be made under certain circumstances.

Don't visit your most desirable program first or even second, as there is a learning curve to the interview process. Try, however, to make it somewhere between the second and fifth interview. This way you will be able to compare it against other programs you visit later. It is hard to maintain enthusiasm through a long interview season. Avoid scheduling more than one interview per day or on a day when you will be post-call.

How many interviews are enough? Clearly, this depends on many factors. For anesthesiology, we suggest most applicants will not need to go to more than 10 interviews. The specialty has gone through several cycles. However, the current popularity of anesthesiology seems to be on the rise, so increasing numbers of interviews may be prudent in coming years.

Preparation

Preparation for your interview starts as early as preparing your personal statement, as it is a key feature of the application and serves as an introduction to you. It should be an interesting piece of reading with personal stories and should address why you are a good match for that particular residency. Don't focus the entire essay on why you want to become an anesthesiologist, but rather what qualities and qualifications you possess that will make you a good one. You may want to look back at evaluations from previous rotations and try to pick out three to four consistent qualities that you can put in the essay as positive character traits. Also, make sure to include any research experience in the essay. Be prepared to answer questions about your personal statement and the information within it. Be prepared to discuss hobbies and extracurricular interests as well. You may want to review your personal statement and CV the night before an interview to have what you wrote fresh in your thoughts.

Another important preparatory step is to do extensive research on each program before you interview. The program's website is a good starting point. Look to see if the faculty are of national or international recognition, and look at the educational programs offered.

Prepare a set of questions before the interview. This will allow you to make comparisons between and within programs. Do not put off asking these questions even if you feel they were answered in the initial introductory talk at the department. Also, do not be afraid to ask the same questions of several people in the program to get a true reflection of what the program offers. Be prepared to answer questions about yourself as well as questions about the field.

Arrive on time. Dress professionally and, more importantly, behave professionally. Remember to be courteous. If the program has provided accommodations or dinner, thank the program director and chairperson as soon as you walk in and greet them.

The Interview Day

A sample day may resemble the following: Interview session begins at 9 a.m. A faculty member interviews candidates for approximately 30 minutes. There are usually three to four interviews. Group interviews are also common. A catered lunch for the candidates, faculty and current residents is often provided, followed by a tour of the institution conducted by the current chief resident or an available senior resident. Pay attention during the tour so that you can ask pertinent questions later. On the interview trail, talk to other students and ask them what they think about the programs where you are interviewing.

Allow the interviewer to make an opening statement. During the interview, take notes. This creates a good impression and allows you to recall facts later when you fill out your final

match list. It is critical that you make eye contact. Smile, be cheerful, and don't let the conversation drag. That's also why it is good to have prepared questions. Expect the first few minutes to be "chitter-chatter," but if this continues for too long, feel free to break that. Know what the chair and the program director do clinically. For example, if the program director is the head of OB-GYN anesthesia, make note of this so that you can make a better connection with him or her. Being familiar with the chairperson's, programs director's, and interviewer's major publications and research interests also scores points for you. This information is usually accessible on the department website or by doing a simple search on the Internet. Asking a question specific to your interviewer shows that you are willing to put in a little extra work and generally gives the message that you are really interested in the program. This also helps you to stand out in the interviewer's mind when the candidates are discussed. They will likely become your advocate to have you ranked as highly as possible on the departmental match list. When the conversation is appropriate, feel free to slip in some of your major accomplishments. Make sure you do not dominate the interview with questions; they also want to ask you questions. The balance should be 50/50.

The interview is the most heavily weighted portion of the application. The interviewer will judge whether or not you are compatible with the program. They will be assessing whether you are a hard worker, committed to the field, professional, compassionate and whether you get along well with other people. You may be asked strange questions! This is to assess whether you can think on your feet and deal with awkward situations. This is very important in anesthesiology as the operating room is a very fluid and challenging environment and things may rapidly become "life or death." A good anesthesiologist will remain calm and know how to think on his or her feet. Thus do not be put off by such questions. Often the answer is not critical, but showing you are able to think and formulate an answer is essential.

Questions to Ask

Important questions to ask include those that gain information regarding the department's educational philosophy and objectives, didactic programs, clinical exposure, and research opportunities for residents.

Where have previous graduates gone? Are they enjoying the kinds of careers (or continuing their education) in a way that you hope to enjoy yours? How do residents perform on the board examinations? What are the weaknesses of the program? What are the strengths? What changes are you expecting to see in the field? What changes are you expecting to see in your department in general, as well as in response to these changes? If you want answers to questions such as how many hours a day/week/month will I have to work, how many sick days can I take, etc., ask for a copy of the

department's policies, or save them for a more informal setting, such as during lunch with residents. Questions you do not want to ask include: How many hours can I moonlight, questions regarding rank order (it is also forbidden for the program to ask you about rank order), or questions that may appear to be condescending.

If you want to ask about information stated in the program brochure/catalogue or detailed during the interview day information session you can state it as such, "I know it is in here or that it was mentioned earlier, but what is your opinion on x, y and z?" As mentioned above, such questions are encouraged, as they will demonstrate consistency of the response.

If you have the chance to speak candidly to residents only, ask questions you really want to know. How is the learning environment? Do you see enough cases of this or that? How do the residents do on the in-training exam and on the American Board of Anesthesiologists' certification exam? Do you feel the chairperson really cares about you as a resident? Is there mentorship and support for your ideas? Could I stay on as faculty? Do the residents really get along this well all the time? Questions about call schedule, vacation time and financial compensation should be asked casually. Probe to see how happy the residents are. Is the department aware of how the residents feel? If the department is aware of an issue that the residents are having and is up front about it, this would be optimal as it shows the faculty are in-touch with their residents.

When you meet the residents, ask yourself if these are people you would feel comfortable with as friends.

Finishing the Interview

At the end of the interview day, it may be helpful to ask yourself what you thought about the overall organization of the day. This may be a good indication of how well organized and receptive the department and program are to their residents, medical students, etc.

Before you leave, make sure you have the names of people you have spoken to, particularly those who interviewed you, the program director, coordinator, and one or two of the residents. Get addresses and telephone numbers when possible, in case you want to follow up with a letter or a telephone call. The easiest way of doing this is by asking people for their business cards. It is always polite to send a thank you letter within a week. In late January, send an email to the program director asking them a question or two. This demonstrates interest and reminds them of who you are.

Written notes will be of immense help three months from now when you compile your rank order list. When you get home, review your notes. Make more notes. Keep a running rank order list as you interview in various places. If additional questions come up, call back a faculty member or resident. This will give you additional information and serve to communicate your interest.

A return visit is nice for programs you are very interested in. Although you cannot ask directly about your ranking, many programs will send letters showing interest in late January. For example, some programs send out letters to the top 30 to 40 applicants on their rank list. Don't forget to continue to interact with your advisor at your home institution.

References:

1. <http://anes.anesthes.sunysb.edu/Residency/Education.html>
2. www.emra.org; Med Student Survival Guide, Chapter 13
3. <http://www.ama-assn.org/ama/pub/category/7475.html#Anesthesiology>
4. <http://www.umassmed.edu/anes/residency/interview.cfm>
5. First Aid for the Match; Le, Bhushan



Reprinted with permission, The Cleveland Clinic Center for Medical Art & Photography © 2015. All Rights Reserved.

CHAPTER 13

Osteopathic Student Guide to Applying to Anesthesiology Residency

Christopher Ryan Cook, D.O., PLLC

2008 ASA Resident Component President
Oklahoma City, OK

Patrick W. Hogan, D.O.

Staff Anesthesiologist
Valley Anesthesia Consultants
Phoenix, AZ

Basem Abdelmalak, M.D.

Professor of Anesthesiology,
Director Center for Sedation,
Anesthesiology Institute, Cleveland Clinic

Osteopathic students are in a unique situation as they apply for anesthesiology residency. Important considerations must be made before beginning the process. One of the issues of prime importance is deciding between osteopathic or allopathic anesthesiology residencies. This is a difficult decision and is based on multiple factors including geographic location, size of residency desired, career plans, separate residency match programs, board certification, approval of allopathic internship and residency, licensing exams, and relating with separate professional organizations. All of which can be daunting but well worth the effort.

Geographic location is an important decision based on family, cost of living, or metropolitan versus rural location. There are 11 osteopathic anesthesiology programs located in seven states, including California, Florida, Missouri, Michigan, Ohio, Oklahoma and Pennsylvania.¹ As there are 23 osteopathic schools (soon to be 29) with approximately 3,000 graduates per year, this leaves relatively few osteopathic anesthesiology residencies to

meet the demand by osteopathic students.^{1,2} It is a challenging dilemma for osteopathic students when looking for an osteopathic anesthesiology residency because of the limited geographic locations and the limited number of positions at each site. Due to the small number of osteopathic anesthesiology slots, it is likely that an interested applicant seeking an osteopathic anesthesiology residency may not be granted the opportunity nor be willing to relocate for such an opportunity. There are 129 allopathic anesthesiology programs that exist throughout the United States today, in every state but Hawaii, Alaska, Idaho, Rhode Island, Wyoming, Delaware, Montana and South Dakota.³

Size of anesthesiology residency is important to many osteopathic student applicants. The benefits of small and large programs must be weighed. The largest osteopathic anesthesiology programs have a total of 12 residents compared to allopathic programs that can carry over 100 anesthesiology residents.^{1,3} Possible benefits of training at a smaller osteopathic or allopathic program include greater personal attention by instructors, greater investment in each resident as a reflection of the program, greater emphasis on private practice anesthesiology, and the programs are usually community hospital-based. Potential benefits of larger allopathic programs include larger number of faculty, a greater emphasis on didactics, exposure in training to a vast diversity of pathology accompanied by a higher complexity of clinical cases, more research opportunities, and less need to move to affiliated hospitals to gain subspecialty training.

The data to support what the typical D.O. does after osteopathic anesthesiology residency versus allopathic anesthesiology residency is difficult to gather (academic versus private practice). In general, it is assumed he or she would follow the trend of M.D. residents and enter into private practice at a greater rate. It is important for the osteopathic student to know in general for an osteopathic physician to become a program director or director of medical education at an osteopathic

institution, he or she must have completed an osteopathic anesthesiology residency.¹ It is also important for osteopathic anesthesiology students to know that they are not eligible for dual board certification (ABA/AOBA) unless they complete both residencies. In addition, there are no dually accredited (AOA/ACGME) anesthesiology residency programs like those that exist in primary care specialties.

The American Board of Anesthesiology (ABA) is the certification organization for physicians, both M.D. and D.O., who have completed ACGME-approved anesthesiology residency training. ABA certification requires passing both a written and oral examination. The ABA written examination is administered in July, after graduation from residency. The oral examination requires passing the written exam, and is administered in April or October of the year subsequent to graduation from residency.

The primary certification organization for osteopathic physicians who have completed an AOA-approved anesthesiology residency is the American Osteopathic Board of Anesthesiology (AOBA). The certification process requires completion of a written, oral and clinical examination. The clinical examination requires submission of case totals and medical record numbers for a specific period of time, and involves a board-certified osteopathic anesthesiologist reviewing selected patient charts, and observing one or two anesthetics during a visit to the applicant's clinical practice.

If one matches into an allopathic anesthesiology residency, it is advisable to either complete an AOA internship, or ensure that the AOA will recognize and credit training completed at the intended ACGME internship. Start by contacting the AOA and informing them of the intended institution and the internship rotations it provides. The reason to go through this process is osteopathic physicians are required to have completed an AOA-approved internship in order to receive a medical license in the states of Florida, Michigan, Oklahoma, Pennsylvania and West Virginia. Sometimes there are ways around this stipulation, i.e., practicing at a Veterans Affairs Hospital. An AOA-approved internship is required for application to an AOA-approved anesthesiology residency, and for entrance into the AOBA board eligibility and certification process. AOBA board certification is required to become a director of medical education (DME) or a program director in AOA-approved postdoctoral programs. Since the passage of AOA Resolution 42, a total of 1,241 osteopathic physicians petitioned the AOA for approval of their first year of ACGME postgraduate training. Seven hundred and seventy-four (62 percent) of these applications have been approved and 455 (37 percent) approved pending completion of residency training requirements and 12 (<1 percent) were denied between July 2001 and October 2006.² Finally, there are a few dually accredited internship programs (AOA/ACGME) that allow flexibility for entrance into both allopathic and osteopathic pathways.

Another consideration for internship is the restructuring of the traditional osteopathic internship. Starting July 1, 2008, all osteopathic anesthesiology residencies will be four-year residency positions similar to categorical ACGME programs. This means osteopathic students will match directly into their residency programs.²

The ACGME is also moving towards integrating internship into the anesthesiology residency continuum. Although this will be gradual, it will force change to the AOA internship requirements or mean more DO anesthesiologists may not have AOA approval and they will face geographic practice restraints as previously mentioned.⁴

Currently, there are separate matches for osteopathic and allopathic anesthesiology residencies. According to the D.O.-online website, it is important for osteopathic students to know if they are matched through the AOA match and have also registered to participate in the allopathic match program in the same year they will be withdrawn from the allopathic match program for concurrent programs.²

Osteopathic medical students applying for ACGME-approved residencies may want to consider taking the USMLE Step 1 (United States Medical Licensing Exam). Taking the USMLE is not required; however, osteopathic medical students are essentially prepared for the USMLE when they have studied for COMLEX. Thus, adding USMLE scores to your application only requires an extra day of testing and an exam fee. If you perform well on standardized exams, taking the USMLE may well serve to your advantage. Remember that you are an osteopathic medical student applying for a position in the allopathic training world. Allopathic program directors may be largely unfamiliar with the reputation of each specific osteopathic medical school; therefore, the USMLE provides them with a consistent measure to compare their osteopathic and allopathic student applicants.

Finally, if the osteopathic applicant elects to take only the COMLEX, it would be prudent to send each program director a letter explaining what your COMLEX score represents. Further, please note that in the past, the National Board of Osteopathic Medical Examiners has only released to programs the 3-digit COMLEX score. If you have a strong 2-digit percentile score, it may be beneficial to send it with the aforementioned letter that highlights this information.

The above article is not meant to be a comprehensive guide to making the decision on whether to choose an osteopathic or allopathic anesthesiology residency, but rather a tool to bring up some of the issues that each applicant should consider. To make a final decision on your anesthesiology path please talk with your college advisors, the AOA, and AOCA to find out the current rules and regulations. If you are considering an allopathic residency, speak to the anesthesiology program directors at the specific training programs you are interested in to find out how

they accommodate their osteopathic residents. Be sure to talk with D.O.s in the states in which you would consider practicing who have completed training at an allopathic or osteopathic anesthesiology residency and discuss any issues they have faced. Helpful articles and websites have been referenced for you. I hope I have helped you in your decision-making process and invite you to become involved with the American Society of Anesthesiologists. Even as a student there are opportunities to help lead and shape the future of our specialty.

References:

1. AOA Residency Programs: <http://opportunities.osteopathic.org/index.htm>
2. Obradovic JL, Winslow-Falbo P. Osteopathic graduate medical education. *J Am Osteopath Assoc.* 2007; 107(2):57-66.
3. AMA residency programs: www.ama-assn.org/ama/pub/category/2997.html
4. Mychaskiw G. Will the Last DO Turn Off the Lights? *J Am Osteopath Assoc.* 2006;106(5):252-3, 302; discussion 302-3.
5. DO-Online: www.do-online.org [American Osteopathic Association website].
6. AOA match: www.natmatch.com/aoairp
7. NRMP: www.nrmp.org
8. American Society of Anesthesiologists: www.asahq.org
9. ASA Resident Component: www.asahq.org/asarc
10. Medical Student Delegation: www.asahq.org/msd 2006 May 5;252-302.
11. American Osteopathic College of Anesthesiologists: www.aocoonline.org/



Reprinted with permission, *The Cleveland Clinic Center for Medical Art & Photography* © 2015. All Rights Reserved.

I am carrying the cardiac arrest airway equipment bag, they make room for me to get to the head of the bed. After obtaining a brief history, I'll set up to secure the airway. Once the airway is secured, and I write my note, I head back to the O.R. to help expedite the completion of the ongoing cases and start other emergencies. By 7 or 8 p.m., most of the elective cases are wrapping up, leaving emergencies for the rest of the night.. Perhaps we can sit down for some dinner; this is the best part of the evening because not only is the food good (compliments of the attending-on-call), but this gives us a chance to socialize. Over the course of the evening, as everything winds down, I may even get some shut-eye. The arrest beeper will probably go off again but before I know it, it will be 7 a.m. and time to sign-out to the day staff. I'll head home having survived the night as team captain but knowing that I have begun to master what it is like to be a leader of a health care team.

For Henry, however, his alarm has gone off at 5 a.m. He'll leave his apartment and have changed into his scrubs by 6:30 a.m. It still takes him 25 to 30 minutes to set up his room, but he'll get faster with time. He's a first-year anesthesiology resident. He'll go to conference before seeing his first patient. He should already know quite a bit about the patient since laboratory results and history can be obtained from the hospital information system the evening before. He already has an idea about what type of anesthesia he'll recommend since he discussed this with his attending the evening prior as well. His job this morning is to confirm and collect additional data about the patient, discuss the options for anesthesia, explain the risks, benefits and alternatives of these options, calm the patient, and inspire confidence in his ability; all in a short period of time. Despite the patient's multiple comorbid diseases, the anesthesia preparation time (two IVs and an arterial line), induction, maintenance and emergence from anesthesia go without a hitch. During the case, his attending has discussed the anesthetic concerns of a patient with COPD and has given him a morning break. After extubating the patient, he will take him to the

CHAPTER 14

A Day in the Life of an Anesthesiology Resident

Leila Mei Pang, M.D.

Department of Anesthesiology & Pediatrics
Columbia Presbyterian Medical Center
College of Physicians & Surgeons of Columbia University

Hello. I'm Helen, and I'm a third-year anesthesiology resident. I'm the team captain tonight, which means I'll be coordinating the anesthesia service in our hospital. I can sleep as late as I want this morning because my day won't begin until 4 p.m. Nights can be busy, which is why I'm going to need the extra rest. When I arrive at the hospital, my first tasks are to report to the attending-in-charge, review the board that summarizes all the operating rooms still running and their estimated times for finishing, and to pick up the arrest beeper. There's always an attending available to help or ask for advice and guidance, but as team captain, I'm in charge. After reviewing the board, I will make rounds in the PACU to receive sign-out from the PACU resident. Inevitably, the arrest pager will let out its typical adrenaline-provoking beep. I run to the nursing floor and find that a patient has arrested. Others have started basic life support, but since they recognize that

post-anesthesia care unit, give a report to the nurse taking care of him, then go off to set up for and see his next patient. The day will fly by but before he can head home, he will need to check the schedule for the next day and prepare.

Meanwhile, Julie, who is a second-year anesthesiology resident, didn't get out of bed until 5:30 a.m., because she lives in the neighborhood and walks to work. She's rotating in the cardiothoracic ICU this month. She's already had a rotation in the surgical-anesthesia ICU and one in the cardiothoracic rooms. She arrived in the unit at 6:30 a.m., completed her sign-out rounds, looked up lab values, had a chance to go to conference and even had a cup of coffee before rounds with the ICU anesthesiology attending at 8:30 a.m. Our units are "closed," so that the ICU attending has the final word on all decisions. There is a lot of teaching during rounds. As each patient is discussed, the residents try to work as a team: while someone writes the orders, someone else is making phone calls for tests while the resident taking primary care of the patient is making sure that the treatment plan is understood. After rounds, there will still be some time to complete tasks not completed during rounds before the first wave of patients are admitted. There also will be time between patients to grab a bite to eat because they work until 6:30 or 7 p.m. Being in the CTICU is a 12-hour workday with call being about every five days. It's hard work, but residents will learn a lot from their very ill patients and great attendings!

challenging, but he also gets to provide anesthesia for the bread-and-butter cases as well. The surgeons, nurses and anesthesia staff have a great working relationship so that there's a sense of cooperation and teamwork. Bill will be relieved at 3:45 p.m. by either another resident or his attending so he can get to his curriculum lecture session on time. He'll return to his case when the session is over. There is a separate call team for pediatrics, but there are more anesthetizing locations than there are call residents. Bill eventually gets out but he doesn't mind working late because there are excellent teaching opportunities both in and out of the O.R., and there are useful handouts and articles for his and his cohorts' education.

Regardless of where you do your residency, you will see a lot of cases and become skilled at taking care of patients with coexisting medical problems when you work hard. It is important to remain vigilant, be adaptable, anticipate problems, study and ask questions. At the end of your three years of residency, you will be trained to practice competently and independently.

CHAPTER 15

Research Careers in Anesthesiology

Paul Knight, M.D., Ph.D.

Professor

Departments of Anesthesiology and Microbiology
University at Buffalo, SUNY

The term anesthesia comes from the Greek ἀναισθησι'α meaning "insensible" and is defined in the 1771 copy of the Encyclopedia Britannica as "a privation of the senses." For the modern use of the words anesthesia and anesthetics, we are indebted to Oliver Wendell Holmes. Surgical anesthesia is the United States' unique gift to medicine and is primarily responsible for the development of the surgical specialties. At a demonstration of diethyl ether in London for an amputation, the renowned British surgeon, Robert Liston, remarked in December 1846, "This Yankee dodge, gentlemen, beats mesmerism hollow!"

Academic activities performed by anesthesiologists are primarily based within university departments. The scope is quite broad and residents and medical students have always been encouraged to participate. These investigative endeavors range from molecular biology to observational patient studies and clinical trials. Traditionally, physician scientists in our specialty have focused on the pharmacology of drugs used in the perioperative period, as well as management and assessment of pathogenic mechanisms involved in acute pulmonary pathophysiology. For example, a number of anesthesiologists have been the driving force



Reprinted with permission, The Cleveland Clinic Center for Medical Art & Photography © 2015. All Rights Reserved.

Bill is a CA-3 resident rotating through pediatric anesthesia. By 6:45 a.m., he's changed into his scrubs and is already setting up his room. Today is Thursday, so there is a departmental Grand Rounds/QA Morbidity and Mortality conference. All of the O.R.s start one hour later today. After conference, Bill will go see his first patient. His challenge is to handle a newborn for one case and a 19-year-old for another case, not to mention their parents, all in one day. Many of the cases are very complex and

behind the development of cardiopulmonary resuscitation (CPR) paradigms, as our specialty has always been the “gold standard” for airway management and judging the adequacy of ventilation, the “A” and the “B” of basic CPR. There is also major translational research in a large number of areas including the pathogenesis of chronic pain syndromes, as well as brain and cardiac protection in the perioperative period and ICU, to name a few. Probably because of the key role of anesthesiology in the development of modern medicine, many academic departments have faculty interested in the history of medicine and there are many opportunities for students to participate in such studies.



Reprinted with permission, The Cleveland Clinic Center for Medical Art & Photography © 2015. All Rights Reserved.

Of all the medical specialties, the practices and principles of anesthesiology are the most related to the classical basic sciences taught in medical schools, particularly pharmacology and physiology. Thus, it is not surprising that a number of the first academic physicians recruited into the specialty during its formative years came from these basic science departments and much of our translational research has been focused in these disciplines. Anesthesiologists practice acute care medicine, where drugs with a very low therapeutic index are administered by titration. For example, except in the management of chronic pain states, the anesthesiologist usually does not hand the patient a prescription and have them come back in two weeks to assess the efficacy of the treatment. Instead, the anesthesiologist personally administers the drug, immediately (i.e., within five minutes) assesses the response to the therapy, and without delay adjusts the treatment to obtain the desired physiologic response. Research into pharmacokinetics and pharmacodynamics of these potent, fast-acting drugs, performed both in patients and experimental animal models, has long been an area of research performed by many physician scientists in anesthesiology.

As a practice of medicine, anesthesiology focuses primarily on two major areas. The first is the management and alleviation of pain states, be it surgically-induced trauma, or acute or chronic pain syndromes. The second emphasis is on the maintenance of physiologic homeostasis in the presence of severe pathophysiology. Therefore, not surprisingly besides providing perioperative care, the anesthesiologist may also subspecialize in pain medicine or critical care medicine. Anesthesiologists often function as the patient’s advocate during the perioperative period. They will see patients in preoperative clinics in order to ensure that they are optimally medically prepared prior to surgery. As a result of this focus, research opportunities in clinical outcome studies exist in many departments of anesthesiology.

Currently, there is a relative shortage of anesthesiologists in most places around the country. In the past, anesthesiologists have been almost exclusively hospital-based physicians; however, while this is primarily the case, the practice of pain management has allowed members of our specialty to expand outside the hospital as part of multidisciplinary practices. Additionally, anesthesiologists often manage freestanding ambulatory surgical centers and in some instances provide anesthesia for minor surgical procedures in an office setting. These practices have had the effect of broadening the traditional research endeavors of our specialty to encompass pharmacologic epidemiology as well as expand the scope of the previously more narrowly-focused neuroscience investigations.

In summary, anesthesiology is a diverse practice of acute care medicine that originally developed out of a need to alleviate patient suffering from the severe pain and to correct the perturbation of physiologic homeostasis that occurs secondary to the trauma of surgery. The research performed in most academic centers reflects these interests. Anesthesiology is particularly well suited for those who like some excitement in medical practice, and like to see the results of their interventions more rapidly than traditional medical practice allows. In many ways the O.R. is a “laboratory” that allows the anesthesiologist to study traumatic perturbations in human physiology and their pharmacologic remedy. In addition to pain medicine and critical care medicine, recognized perioperative subspecialties include pediatric, cardiac, regional, neurosurgical, ambulatory and obstetrical anesthesia. Both patient-oriented and translational bench-top research opportunities exist that are directly germane to these subspecialties. Opportunities to practice clinical anesthesiology in conjunction with research currently exist in many locations. Our specialty is ideally structured to allow the physician to practice a very high level of quality patient care while being able to adapt his/her schedule to a scenario that best suits his/her individual needs and objectives, which might include a career as a physician-scientist. For those who are interested in developing an academic career in which research is a major focus, the earlier you become involved in scientific investigations, the better.

CHAPTER 16

Research as a Medical Student

Mark A. Hoeft, M.D.

University of Vermont College of Medicine
and Massachusetts General Hospital
Boston, MA

Introduction

Research as a medical student can be an exciting and rewarding opportunity to focus on a specific area of interest and give you a break from the long, scheduled hours of the clinic. Anesthesiology provides a unique specialty to be involved in research. We are probably one of the only specialties where the mechanism of action of our mainstay, the inhaled anesthetics, is not fully understood. Anesthesia is also unique in the collaborative approach to research. Any project can span the spectrum of all surgical and medicine specialties, allowing you to network with other physicians outside of the anesthesiology specialty.

Why Research?

Research as a medical student has many potential benefits. First, you have the opportunity to become an expert in a specific subject. I have found attendings in multiple other specialties to be very interested in my past projects and have asked me to present them in rounds or in clinic. Becoming an expert can set you apart from others in your class. Second, when applying for residency programs, a research background can generally give you an inside edge on academic programs and provides a topic of discussion during interviews. It also lends the opportunity to work one-on-one with a mentor who can become your biggest advocate and friend during your medical school career. In contrast to clerkship where you are often in an observational role with minimal responsibility, research provides a period of independence where you are ultimately the only person responsible for patient enrollment and completion of your project. An additional benefit can include a stipend for your work provided by your school, anesthesiology department or an outside source. Finally, some of the most exciting aspects of research are the opportunities to travel and present your project at national meetings and publication of the final manuscript. These are often the most difficult portions of research as you are questioned by national and worldwide experts in your field of investigation. This truly challenges your conceptual understanding of both the basic and clinical science behind your investigation.

Choosing a Research Project

A good research project can best be accomplished during the summer between the first and second years of medical school. This break provides the most natural point to complete a project, as students generally have two continuous free months off from

school. Other opportunities exist as fourth-year elective months, while other students choose to take a year off from medical school to complete more extensive investigations.

Before beginning a research project, you must choose which route you want to take (basic or clinical research) and find a mentor. Clinical research incorporates patient-oriented investigations of human pathology, therapeutic treatments, epidemiologic and behavioral studies, and patient outcomes, all of which can be performed under an M.D. Basic research often involves determining the basic mechanism of a specific phenomenon with much of this occurring through cell and/or animal research or drug development in a Ph.D. laboratory setting. Basic versus clinical research will influence your selection of a mentor as many M.D.s do not participate in basic science research.

When deciding upon a mentor, you must also settle on a specific area of interest in anesthesia (neuroanesthesia, cardiac, pediatrics, pain medicine, etc.). A physician or resident within the anesthesia department or other medical students are often good resources to guide you in the direction of a good mentor. A Medline or PubMed search under potential mentors' names will often provide a quick idea of the types of research they have performed. When meeting with a mentor for the first time, your potential work relationship should never be overlooked. Advantageous qualities in this person include active involvement in research, prior medical student involvement in research protocols, teaching ability, availability to meet and discuss questions (at least weekly), and most importantly, someone who you can see yourself working alongside.

Once meeting with your mentor, you should have a good idea of potential projects that you can further pursue. An important decision to make is if you would like to construct your own research protocol or join a preexisting protocol of your mentor. Joining a preexisting protocol is ideal for those interested in learning about the scientific method and a specific area of interest but who want no strings attached once their research month is over. Designing your own protocol is time consuming and requires much more dedication and initiative prior to and after your actual designated research month, but it is very rewarding in the end when you are the first author on a publication.

Designing a Protocol

Timing is the most important aspect of research as a medical student. While a student might anticipate only spending his or her scheduled one to two months performing research, he or she must have insight and diligence during the time building up to and after the actual data collection portion of the research. It may take up to six months to prepare and obtain institutional review board (IRB) approval for a protocol, analyze data; writing a manuscript and completing edits can also be a very lengthy process. Thus, the medical student must take much initiative in starting and completing his or her project.

When designing your own protocol, it is impractical for a medical student to think he or she will complete a clinically altering, randomized, double-blinded placebo controlled trial in a month or two of research. This does not mean one cannot perform a clinically relevant investigation that can add substantially to existing knowledge. A good medical student-initiated research project often consists of a retrospective chart or radiographic review of normal anatomic and/or pathologic conditions, and/or case reports. Running prospective trials is often cumbersome as patient enrollment is very sporadic, especially when dealing with a limited amount of time.

When designing your own protocol, a general outline is as follows:

1. Find a motivating mentor and choose a project.
2. Perform a literature search and read articles to familiarize you with prior research on your research topic. Finding past publications usually first starts with a literature search on Medline or PubMed, but do not forget to search the references of articles or anesthesia textbooks you read. These are often filled with publications you may have missed through Medline or PubMed.
3. Develop a general hypothesis and write your protocol. If your mentor has written prior protocols, ask to review one so you have a template. Find similar publications to the protocol you are writing and base your methods on this protocol.
4. Discuss the project with a statistician to determine adequate power and sample size. When designing the protocol or analyzing the data, a good, basic knowledge of statistical analysis will usually suffice (mean, standard deviation, confidence intervals, p values, etc.); however, if more advanced statistics are needed, do not hesitate to use a statistician.
5. Submit the protocol for IRB approval. This can take anywhere between two to three months or longer as the IRB will often have questions and ask for revisions.
6. Collect data/enroll patients.
7. Analyze data, write manuscript and submit for publication.

Funding

Many sources are available to fund your project and provide you with a stipend for your work. These can include your medical school, your local anesthesiology department, the Foundation on Anesthesia Education and Research (FAER) (<http://faer.org/medicalstudents.php>), or the National Institutes of Health (NIH). The Medical Student Anesthesia Research Fellowship (MSARF) through FAER is a relatively new opportunity for research in anesthesiology. The application is typically due in January of the year for which you are applying. There are host institutions across the nation, requires an

eight to 12 week commitment, includes 15 percent of your time to be devoted to clinic exposure to anesthesiology, and includes a travel stipend for you to present your work at the annual American Society of Anesthesiologists meeting. For those interested in anesthesiology, this is a great opportunity!

Closing Thoughts

Including a research project at some point in your medical career will expand your understanding of the scientific method, and hopefully, give you a greater ability to scrutinize the many new good and bad research publications that drive change in current medical practice. Performing a successful research project requires much initiative on your part. Start the process early, especially if you decide to write your own protocol. Know your topic thoroughly as it will aid you immensely in writing your manuscript and answering questions, especially when you can quote past publications. Most of all learn a lot and have fun with the project!

CHAPTER 17

Cardiac Anesthesiology

Jeremy D. Kukafka, M.D.

Associate Professor of Clinical Anesthesiology and Critical Care
Perelman School of Medicine
University of Pennsylvania, Philadelphia

Bonnie L. Milas, M.D.

Professor of Anesthesiology and Critical Care
Department of Anesthesiology and Critical Care
University of Pennsylvania School of Medicine

Cardiac Anesthesiology

The unique characteristics of the cardiac surgical patient led to the development of the subspecialty of cardiac anesthesia. Cardiac anesthesiologists are perioperative physicians who specialize in the anesthetic management of patients undergoing cardiac surgery, including valve replacement and repair; coronary artery bypass grafting; thoracic aortic surgery; repair of congenital heart defects; heart transplantation; and the implantation of mechanical assist devices. Cardiac anesthesiologists also have expertise in anesthesia for thoracic (e.g., lung surgery and transplantation) and vascular surgery. In addition some cardiac anesthesiologists serve as attending physicians in the cardiothoracic intensive care unit (CTICU).

Cardiac anesthesia requires expertise in a number of areas in order to care for the cardiac surgical patient. In-depth knowledge of cardiovascular physiology and pathology is paramount, as is the ability to manage cardiac physiology with an arsenal of vasoactive and cardiotropic medications. The introduction of cardiopulmonary bypass in 1953 revolutionized cardiac surgery and cardiac anesthesiologists must understand its operation, effects on physiology, and risks. Finally, they must be proficient at acquiring vascular access for invasive monitors (e.g., arterial and central venous catheters) and interpreting the data obtained from them.



© 2016 American Society of Anesthesiologists. All Rights Reserved.

In recent years, transesophageal echocardiography (TEE) has developed into an important tool for both cardiac and noncardiac anesthesia. Intraoperatively, TEE has many applications, including the evaluation of valvular and aortic pathology, atrial and ventricular filling and function, regional wall motion abnormalities indicative of coronary artery disease, and congenital heart defects. During cardiac surgery, the TEE examination helps to guide both the anesthetic and surgical management and allows for the immediate evaluation of cardiac repairs. During noncardiac surgery, TEE has become an important tool in determining the etiology and guiding the treatment of hemodynamic instability. Cardiac anesthesiologists were integral in the development of standards for perioperative TEE and continue to develop future applications to improve the safety and efficacy of cardiac surgery.

Prior to beginning subspecialty training in cardiac anesthesia, one must first complete a residency in anesthesiology. Residency training consists of broad training during a clinical base year followed by three years of dedicated training in anesthesiology, pain management and critical care medicine. During residency, those who wish to pursue a career in cardiac anesthesia may apply to fellowship programs, most of which are one year in

duration. Currently, there is no match program for cardiothoracic anesthesia fellowships. Cardiothoracic anesthesia fellowships have been in place for many years and were approved for accreditation by the Accreditation Council for Graduate Medical Education (ACGME) in February 2006.

The ACGME requirements for fellowship education in adult cardiothoracic anesthesiology provide for comprehensive training in the perioperative care of cardiac and thoracic surgical patients. Fellows obtain experience in preoperative evaluation and interpretation of diagnostic studies, such as coronary catheterization. Intraoperatively, Fellows learn the anesthetic management of patients undergoing various types of cardiac, pulmonary, and aortic surgery. Experience is obtained managing patients with various mechanical support devices, such as the intra-aortic balloon pump (IABP), ventricular support devices and extracorporeal membrane oxygenation (ECMO). Cardiothoracic anesthesia fellowship also includes training in perioperative TEE. Upon completion of fellowship training, board certification in perioperative TEE is available from the National Board of Echocardiography (NBE). Finally, Fellows gain experience in postoperative care through rotations in the CTICU.

Obtaining training in pediatric cardiac anesthesia can be done through two pathways. After completing a residency in anesthesiology, one may enroll in an adult cardiothoracic fellowship program and elect to concentrate in pediatric cardiac anesthesia. This provides the ability to care for both adult and pediatric cardiac surgical patients. Alternatively, after completing an anesthesiology residency, one may enroll in a pediatric anesthesia fellowship and concentrate on pediatric cardiac anesthesia. This option provides training in both pediatric cardiac anesthesia and anesthesia for complex pediatric surgery. However, a fellowship in pediatric anesthesia does not provide training in adult cardiac anesthesia. Similar to cardiothoracic anesthesia fellowship programs, pediatric anesthesia fellowships are accredited by the ACGME.

Additional information on cardiac anesthesiology can be found on the Society of Cardiovascular Anesthesiologists website (www.scahq.org). Specific fellowship information can be found on the Accreditation Council for Graduate Medical Education website (www.acgme.org).

Reference:

1. Practice Guidelines for Perioperative Transesophageal Echocardiography. A report by the American Society of Anesthesiologists and the Society of Cardiovascular Anesthesiologists Task Force on Transesophageal Echo-cardiography. *Anesthesiology*. 1996;84(4):986-1006.

CHAPTER 18

Neuroanesthesia

Richard A. Jaffe, M.D., Ph.D.

Professor of Anesthesiology and Neurosurgery
Department of Anesthesia
Stanford University School of Medicine

Neuroanesthesiologists, indeed all anesthesiologists, owe a debt of gratitude to a medical student named Harvey William Cushing. In 1894, Cushing, a student at Massachusetts General Hospital, challenged fellow student Ernest Amory Codman to see who could achieve the best control over the administration of ether during surgery.¹ The most significant outcome of this competition was the development of the anesthesia record as an important tool in the management of the anesthetized patient.

It is possible that Cushing was motivated to improve the practice of anesthesia by his first experience administering ether as a medical student. Unfortunately, during the induction of anesthesia his patient died. Years later, Cushing (by then a distinguished neurosurgeon) admitted that he had never forgotten that experience in spite of being assured that such events were common and certainly not the fault of the anesthetist.



Reprinted with permission, The Cleveland Clinic Center for Medical Art & Photography © 2015. All Rights Reserved.

As a neurosurgeon, Cushing was quick to emphasize the importance of the anesthetist, stating, “Anesthetization by an expert is absolutely essential. There are trials enough for the surgeon in these cases without the added anxiety in regard to narcosis.”² To that end he employed Dr. S. Griffith Davis as his full-time neuroanesthetist, later stating, “It is entirely due to [Davis’] skill that in over three hundred cranial operations there has been a complete absence of the calamities usually assigned to anesthesia.”² While much of the practice of neurosurgery would still be familiar to Cushing today, he would recognize little of the modern practice of neuroanesthesia, except the anesthesia record.

The current practice of anesthesia for neurosurgical procedures continues to evolve as it benefits from advances in our understanding of neurophysiology, pharmacology and the pathophysiologic (molecular) processes that underlie the nervous system’s response to injury and ischemia. With continuing advances in neuroprotective and neuromonitoring techniques we are increasingly able to target anesthetic-related interventions to specific patient needs. Indeed, much of the “art” of neuroanesthesia has been replaced by evidence-based practice guidance. As Michael Todd said in his Forward in the 4th edition of *Anesthesia and Neurosurgery*, “A large part of what we do in neurosurgical anesthesia isn’t particularly difficult. The young resident ... can quickly be taught a few basic rules about how to anesthetize a patient with a brain tumor, an intracranial aneurysm or a cervical spine injury. Unfortunately, while this may result in the safe care of most patients, it qualifies the individual only as a minimally skilled technician. The rest of neuroanesthesia is ‘the hard part’ and is what distinguishes the technician from the physician and consultant.”³

The interdependence of surgeon and anesthesiologist is nowhere more evident than it is in the operative management of the neurosurgical patient. The perceptive neurosurgeon realizes that the successful outcome of complex neurosurgical procedures is a true team effort. While the perceptive neuroanesthesiologist understands that, although necessary, it is not sufficient to be technically proficient. It is the “rest of neuroanesthesia” that is both the challenge and the reward.

It is ironic that the brain, the most important organ system and principle target of anesthetic action, is still the least understood and most difficult to monitor. In that irony lays opportunity. As a student contemplating a career in neuroanesthesia you can anticipate clinical challenges and practice or research opportunities limited only by your own enthusiasm and desire to learn.

References:

1. Bingham, WF. The early history of neurosurgical anesthesia. *J Neurosurg.* 1973;39(5):568-84.
2. Cushing, H. Some principles of cerebral surgery. *JAMA.*1909;LII(3):184-195.
3. Todd, MM, Cottrell JE, Smith DS, ed. *Anesthesia and Neurosurgery*, 4th ed. St. Louis, MO: Mosby; 2001: Forward.

CHAPTER 19**Obstetric Anesthesiology****Paloma Toledo, M.D.**

Instructor in Anesthesiology

Northwestern University Medical Center

Obstetric anesthesiology is the body of anesthesiology knowledge and practice that relates to the anesthetic care of women during pregnancy. Obstetric anesthesiologists are specialized anesthesiologists who have expertise in maternal and neonatal physiology, as well as in regional anesthesia. These anesthesiologists are involved in the care of parturients during the entire duration of their pregnancy. Obstetric anesthesiologists are involved with in vitro fertilization, anesthesia for cerclage placements, nonobstetric surgery for the pregnant patient, fetal surgery, postpartum procedures, and of course, anesthesia for labor and cesarean deliveries.

Obstetric anesthesia is one of the newer subspecialties of anesthesiology. Anesthesia for deliveries has only recently become a well-accepted practice of medicine. In the mid-1800s, it was commonly believed among Western practitioners that uterine pain was inseparable from contractions; therefore, any medication that removed pain would interfere with contractions and the progress of labor. This belief originated from the Bible when God punished Eve for her disobedience in the Garden of Eden. Pain was seen as a punishment for sins; therefore, people believed that it was wrong to avoid the “divine punishment” of labor pain.¹

This belief was ultimately challenged by James Simpson, the inventor of the Simpson forceps, who used diethyl ether to anesthetize a woman with a deformed pelvis for delivery. This sparked a huge controversy in the medical field, and for years physicians debated the use of anesthesia for delivery. It was ultimately public demand for labor analgesia, and the development of safe techniques, that led to acceptance of pain relief for labor.² Obstetric anesthesia primarily relied on inhalation agents and narcotics until the 1950s when regional anesthesia began being used in obstetric settings. Over the last 50 years, anesthesiologists have engaged in research that not only refined the techniques of regional anesthesia, but have also made the delivery of anesthetics safer for both the mother and her baby. General anesthesia is associated with a seven times greater incidence of a failed intubation in pregnant patients when compared to nonpregnant patients due to increased swelling in the maternal airway and difficulty in properly positioning these patients.³ Advances in regional anesthesia have led to a decline in the need for general anesthesia in obstetrics. Accordingly, the number of deaths associated with anesthesia in pregnant patients has decreased.⁴

The increasing use of anesthesia for obstetric purposes, combined with advances in the understanding of the physiologic and pharmacologic differences between pregnant and nonpregnant patients, led to the development of the subspecialty of obstetric anesthesia.

Our obstetric colleagues have recognized the benefits of epidural analgesia. An American College of Obstetrics and Gynecology (ACOG) statement says, “Of the various pharmacological methods used for pain relief during labor and delivery, the lumbar epidural block is the most effective and least depressant, allowing for an alert, participating mother.” An additional benefit of advances in epidural analgesia has been that labor has become more of a “family” event. In the past, fathers were not allowed in delivery rooms, particularly during cesarean deliveries, and instead were forced to pace the halls until their spouse or partner gave birth. Improvements in epidural and spinal anesthesia have permitted the expectant father to enter the labor and delivery suite and become a true partner in the birthing process. Labor epidural catheter placement and anesthesia for cesarean deliveries are the two most common procedures performed by the obstetric anesthesiologist; however, even these common procedures are not without challenges. Medical management of patients with diseases such as preeclampsia, complex cardiac lesions, or neurological processes require not only knowledge of the disease state, but also of the physiologic changes that we cause with our anesthetics.

Training to become an obstetric anesthesiologist generally involves a 1- to 2-year fellowship after completion of an anesthesia residency program. Obstetric anesthesia Fellows learn the skills and techniques necessary to manage high-risk as well as low-risk pregnancies preoperatively, intraoperatively, and postoperatively, as well as the skills necessary to teach and conduct research in the field of obstetric anesthesiology.

There are many exciting developments on the horizon for obstetric anesthesia. New techniques such as ultrasound for epidural placement, new medications, and better understanding of the relationship between our anesthetics and the effect on the parturient, hold promise for greater research opportunities and ultimately advancements in the quality of care for our patients.

References:

1. Canton D. The History of Obstetric Anesthesia. In Chestnut DH, ed. *Obstetric Anesthesia*, 3rd ed. Philadelphia, PA: Elsevier Mosby. 2004:3-11.
2. Eltzschig HK, Lieberman ES, Camman WR. *Regional Anesthesia and Analgesia for Labor and Delivery*. NEJM. 2003;348(4):319-332.
3. Lyons G. Failed intubation: Six years' experience in a teaching maternity unit. *Anaesthesia*. 1985;40(8):759-62.
4. Hawkins JL. Anesthesia related maternal mortality. *Clin Obstet Gynecol*. 2003;46(3):679-87.

CHAPTER 20

Pain Medicine

James P. Rathmell, M.D.

Professor of Anesthesiology

University of Vermont College of Medicine

Director, Center for Pain Medicine

Pain medicine is the subspecialty of anesthesiology that focuses on the diagnosis and management of patients with acute, chronic and cancer-related pain. The specialty grew from the application of regional anesthetic techniques to help control pain. This subspecialty differs dramatically from the practice of anesthesiology in the operating room; much of what the pain specialist does is carried out in the outpatient clinic and involves the long-term care of patients with chronic illness. For those who enjoy the technical aspects of anesthesiology, particularly regional anesthesia, but long for a bit more of the patient-physician relationship that comes with long-term care and the challenges of diagnostic evaluation, this is just the subspecialty for you.



Reprinted with permission, The Cleveland Clinic Center for Medical Art & Photography © 2015. All Rights Reserved.

How Did the Subspecialty of Pain Medicine Evolve From Anesthesiology?

Much has been written about the origins of pain medicine as a distinct discipline,¹ and anesthesiologists have played a primary role since the start. It began with the introduction of effective general anesthetics in the mid-19th century, when surgical pain could be separated from operation. Almost 100 years later, the late John Bonica, an anesthesiologist at the University of Washington and recognized father of the specialty we now call pain medicine, developed his career promoting multidisciplinary pain care and formal training of specialists. Dr. Bonica recognized the usefulness of regional anesthesia and other types of neural

blockade in treating pain, but he also recognized the complexity of chronic pain. From his life's work we now have extensive ongoing efforts to recognize and treat pain effectively, to train subspecialists, and to conduct basic and clinical research to further our understanding of pain and its treatment.

At the time of this writing, subspecialty certification in pain medicine requires completion of a core residency program in anesthesiology (one year of general medicine and three years of anesthesiology) followed by a one year "fellowship" in pain medicine. The first pain medicine programs recognized by the ACGME were accredited in 1992. The American Board of Anesthesiology, working in parallel with the ACGME, developed a subspecialty certification examination in pain medicine now titled, "Subspecialty Certification in Pain Medicine." The first exam was given in 1993. The number of candidates sitting for the examination has steadily grown since that time. To see a detailed list of the training that takes place during pain fellowship, see the ACGME's program requirements.²

Pain and its consequences draw on resources from all medical disciplines. Dr. Bonica's experiences during World War II suggested that each medical specialist had unique expertise to bring to patients suffering in pain; hence, his consistent and effective promotion of a multidisciplinary process for pain care. Also, thanks largely to Dr. Bonica, anesthesiology has led the development of formal training programs. Indeed, all currently accredited programs reside within academic anesthesiology departments and the majority of program directors are anesthesiologists. Specialists from other disciplines have also focused their clinical and research efforts on pain. The most obvious example is neurology where the majority of clinical treatment and research about headache has arisen. Physical medicine and rehabilitation (PM&R) has also long had a focus and expertise in functional restoration, and many chronic pain rehabilitation programs are led by physiatrists. And, of course, psychiatrists have been closely involved where pain, depression, and substance abuse overlap. During the last decade, specialists from these other disciplines have been seeking subspecialty training in pain medicine with increasing regularity.

What Does a Pain Medicine Specialist Do?

The range of practitioners declaring themselves as pain medicine specialists is extraordinary – from clinics that provide largely or solely cognitive-behavioral approaches to chronic pain (psychiatrists and psychologists) through functional restoration programs (physiatrists) all the way to the type of clinic that offers nothing more than injections of various sorts. The common thread is that all pain physicians care for patients with acute, chronic or cancer-related pain. Due to preference, expertise or the particular patient mix at their own institution, some practitioners have chosen to spend most or all of their time caring for one of these very different types of patient.

Acute pain specialists are often anesthesiologists who have expertise and ability in performing regional anesthesia and have chosen to extend these techniques into the postoperative settings. Anesthesiologists who staff acute pain services often spend part of their day in the operating room providing intraoperative anesthesia care and another part of the day visiting patients on the postoperative ward to manage their pain in the hours and days following surgery. The most common techniques they employ include continuous epidural analgesia and single-shot and continuous nerve block techniques. While some pain specialists care for both acute pain and chronic pain, the focus during fellowship training has turned toward teaching how to care for those with chronic and cancer-related pain. The skills and knowledge needed to establish and run an acute pain service are well covered in the core residency training program.

The majority of pain medicine fellowships spend most of the training year teaching the skills and knowledge needed to care for patients with chronic and cancer-related pain. Most training programs are centered in an outpatient clinic where patients are seen for evaluation and treatment on an elective basis. Comprehensive diagnostic evaluation, medication management, and applying neural blockade to the patient with pain are among the skills needed of the pain specialist. Many pain specialists have also gained the minor surgical skills needed to independently perform implantation of devices used to control chronic pain, including spinal cord stimulators and spinal drug delivery systems.

“Interventional Pain Medicine” is a term that has been coined for those techniques that involve minimally invasive treatments and minor surgery as part of their application, including neural blockade and implantable analgesic devices. There is no single practice pattern that any pain specialist can point towards as the correct way to treat patients with chronic pain. The best pain medicine practitioners strike a reasonable balance between interventional and non-interventional management. This practice pattern is sustainable and those adopting a balanced style of practice will be able to adapt to evolving scientific evidence that appears in support of pain treatment, regardless of the type of treatment. A balance between treatment modalities also allows practitioners to switch from one mode to another or incorporate multiple treatment approaches simultaneously.

Can I Practice Both Pain Medicine and Anesthesiology?

The answer is yes, but the specialized training and skills required for work as an anesthesiologist in the operating room are very different from those required of the pain physician in the outpatient clinic. In recent years many practitioners have found keeping both skill sets up-to-date too difficult and have chosen to practice pain medicine full time.³ In an insightful editorial in the *ASA Newsletter*, Mark Lema wrote knowingly of the everyday tensions that often arise between pain medicine practitioners and their anesthesiology

colleagues practicing exclusively in the operating room setting.⁴ With specialization comes a conscious effort to focus practice so as to become intricately familiar with a more limited realm. The obvious result is a loss of the skills and knowledge needed to practice in the broader parent specialty. My belief is that the specialized knowledge and skills needed to practice pain medicine will make it difficult to practice both anesthesiology in the operating room and pain medicine within the span of my own career. For now the road from anesthesiology to pain medicine provides a focus on neural blockade and core training in pharmacology and physiology that is a solid grounding for treating patients with pain. I would not have chosen any other route.

References:

1. Rathmell JP, Brown DL. The evolution of training in pain medicine in the United States. *ASRA News*. August 2003.
2. ACGME program requirements for training programs in pain medicine. [Internet]. ACGME; c2000-2005 [cited 2005 Dec 29]. Available from: http://www.acgme.org/acWeb site/RRC_040/040_prIndex.asp
3. Rathmell JP, Deer TR. Pain medicine and anesthesiology: oil and water? Do they mix? [Pro-Con] *ASA Newsletter*. 2004;68:7-9.
4. Lema MJ. Ventilations. Algology – the next medical specialty? *ASA Newsletter*. 2001;65(6):1,33-34.



© 2016 American Society of Anesthesiologists. All Rights Reserved.

CHAPTER 21

Pediatric Anesthesiology

Deborah A. Schwengel, M.D.

Johns Hopkins University School of Medicine
Assistant Professor of Anesthesiology,
Critical Care Medicine and Pediatrics,
Division of Pediatric Anesthesiology
Residency Program Director

What Do Pediatric Anesthesiologists Do, and How is the Field Different Than Other Specialties of Medicine?

Pediatric anesthesiology is the practice of anesthesiology that focuses on the care of children and sometimes young adults. Compared with the practice of pediatrics, pediatric anesthesiology is a procedure-based specialty with a lot of knowledge of general medicine and pediatrics. Anesthesiologists have a great fund of knowledge of all body systems and do not focus on just the function of the heart, lungs and airway, although we are experts in management of the airway. Medical students sometime choose anesthesiology as a career when they learn that they can work with their hands, be in the operating room, and still manage medical conditions like heart disease, kidney disease, hematologic disorders, etc. Anesthesiologists have also been pioneers on the topics of safety and efficiency and must be good team leaders. To be a good anesthesiologist you must be very good at multitasking, troubleshooting, working with your hands, working under stress, and working well with teams of surgeons and nurses. And if you are a compassionate doctor, you can really find satisfaction in your ability to allay fears, treat pain and keep patients safe in the operating room. Anesthesiology is truly an exciting career choice; the work hours are better than many other medical professions, the burnout rate is low, the pay scale is favorable and the job market is excellent.

Children are not just small adults, which is why the subspecialty of pediatric anesthesiology is necessary. The art and science of medicine is blended well in the specialty of pediatric anesthesiology. Although children can be cared for by anesthesiologists with general training, children (especially infants) have differences in anatomy, physiology, pharmacodynamics and behavioral development that can make them challenging candidates for anesthesia. Most general-trained anesthesiologists do not have the comfort level required to care for newborns. Precision in medication dosing is required, and infants desaturate quickly. It is important for the anesthesiologist who is taking care of infants to be comfortable with the fact that systems designed for adults sometimes don't work for babies, and once the surgeon has prepped and draped the patient, there is almost no access to the patient.

Young children are also not capable of understanding the plan or environment, or they need to be NPO. Unfortunately, their coping mechanisms do not lead to cooperation, so techniques of anesthesia care that focus on the developmental capabilities of the patient are needed. A great pediatric anesthesiologist can make all the difference to children and their parents, and research has shown that sensitive preoperative discussions and play techniques on induction can reduce the need for preoperative sedatives; however, sometimes sedatives are a wise choice for extremely anxious patients. The transition from the prep area to the operating room is not only challenging but it can be fun too. This is when the anesthesiologist gets to play with the child, allay anxiety and sometimes act a little like a child. I have anesthetized children on parents' laps, on scooters, in strollers, in wagons and standing, sitting or lying down. There are many options; it is the anesthesiologist's job to pick a technique both safe and best for the psychology of the situation.

Another reason that pediatric anesthesiologists are needed is that children with severe illnesses, chronic illnesses or congenital disorders are more challenging to care for than patients born with perfect bodies. Only pediatric providers really understand how to care for patients with challenging congenital heart defects, metabolic disorders or other birth defects. Some of the care for patients with congenital disorders is so specialized that in many institutions, the pediatric anesthesiologists care for the adult patients with certain congenital disorders. Parents of patients with congenital disorders seem to understand the value of



© 2016 American Society of Anesthesiologists. All Rights Reserved.

specially-trained pediatric anesthesiologists. Parents of healthy children don't have the same hospital experience and thus have a more naive perspective. Just think about your child; if you are the parent, wouldn't you want your child cared for by someone who cares for children every day?

Training Options

Pediatric anesthesiology is an exciting blend of both pediatrics and anesthesiology. Some people decide that they wish to combine the practices of pediatric anesthesiology and pediatric critical care medicine. If that is the chosen path, two residencies are currently required, followed by fellowship training.

The training options include the following:

1. Traditional internship, anesthesiology residency followed by fellowship in pediatric anesthesiology – 5 years
2. Pediatric internship, anesthesiology residency followed by fellowship in pediatric anesthesiology – 5 years
3. Pediatric residency, anesthesiology residency followed by fellowship in pediatric anesthesiology – 7 years
4. Pediatric residency, anesthesiology residency followed by both pediatric critical care and pediatric anesthesiology fellowships – 8 to 9 years

If I Choose to Train as a Pediatric Anesthesiologist, What Are My Career Options?

1. Clinical pediatric anesthesiologist
 - a. Pediatric hospital – 100 percent pediatric cases
 - b. Combined adult and pediatric hospital – depending on the hospital, you might do a mixture of adult and pediatric cases
2. Academic pediatric anesthesiologist
 - a. Clinical specialist
 - b. Educator
 - c. Research track
3. Combined pediatric anesthesiologist and pediatric intensivist
 - a. Clinical specialist
 - b. Educator
 - c. Research track

How Do I Investigate My Interest in Pediatric Anesthesiology as a Career Choice?

Do electives in anesthesiology, pediatric critical care medicine and possibly the neonatal intensive care unit. Talk to the pediatric anesthesiologists in your institution, and pick their brains about what they like and what they dislike about what they do. Ask them how they would train and talk about different career options in the field of pediatric anesthesiology.

CHAPTER 22 Geriatrics and Anesthesia: Everything You Wanted to Know About Anesthesia But Were Too Afraid to Ask

Michael C. Lewis, M.D.

Professor and Chair of Anesthesiology
University of Florida, College of Medicine
Jacksonville, FL

An aging population carries huge consequences for the practice of anesthesiology. Aging issues affect most aspects of anesthesiology. This chapter aims to describe the demographic and physiological changes of aging. I hope after reading this you will join me in being driven to solve some of the challenges that this ever-enlarging patient group offers.

An Ever-Increasing Elderly Population

The roots of this change lay in advances in medicine and progressive social policy. After World War II, fertility rates increased. There was a “baby boom” from 1947 to 1964, and now this generation is growing old. Since Americans are now living longer, the age of the oldest segment of the population has also steadily increased over the last century. The “oldest – oldest” is the fastest growing segment of the elderly population. The number of people over 65 years old has tripled in the last 100 years and is anticipated to further double in size by the year 2040. Such improved life expectancy continues to enlarge that fraction of the surgical patient population that is considered elderly.



Reprinted with permission, The Cleveland Clinic Center for Medical Art & Photography © 2015. All Rights Reserved.

What is Different About These Patients?

Organ function with aging is usually well-maintained under basal conditions. When an organism can maintain a steady state in the face of increased physiological demand, it is said to demonstrate a good functional reserve. Aging manifests as an inability to enhance function in the face of increased demand.

What Physiological Changes are Associated With Aging?

■ Cardiovascular System (CVS)

- Progressive replacement of supple cardiac and vascular tissue by stiff, fibrotic material. The left ventricle (LV) must work harder to eject blood into a rigid aorta. Left ventricular hypertrophy (LVH) develops. This hypertrophy impairs filling because of increased ventricular wall stiffness in early diastole. Loss of the sinus rhythm, a common event during anesthesia, may depress cardiac output and arterial pressure more markedly in the elderly.
- Aging is associated with a decrease in parasympathetic outflow while overall sympathetic neural activity increases. The administration of β -adrenergic agonists elicit reduced responses in the elderly while β -blocking drugs retain their effectiveness.
- The maintenance of hemodynamic homeostasis largely depends upon the baroreflex. Arterial stiffening may reduce the ability of the baroreceptors to transduce changes in pressure.

■ Respiratory System

There are four “core” characteristics of pulmonary aging:

- Reduction in muscle mass and power
- Changes in compliance
- Reduction in diffusion capacity
- Decline in control of breathing

■ Renal System

- Aging results in both structural and functional changes in the kidney that affect drug metabolism and kinetics as well as predisposing the patient to fluid and electrolyte abnormalities.
- Renal mass is lost between ages 40 and 80, mostly from the cortex. Microscopically there is a reduction in the number of functional glomeruli, but the size and capacity of the remaining nephrons increase to partially compensate for this loss.
- Over 30 years of age, renal blood flow (RBF) declines progressively. A majority of this reduction in RBF occurs in the cortex.

- Glomerular filtration rate (GFR) decreases by approximately 1 mL/min/year beginning by age 40. This decline in GFR is accompanied by a gradual loss of muscle mass and is rarely associated with an increase in serum creatinine. Serum creatinine is therefore a poor indicator of GFR in these patients.
- Under normal circumstances, age has no effect on electrolyte concentrations or the ability of the individual to maintain normal extracellular fluid volume. However, the adaptive mechanisms responsible for regulating fluid balance are impaired in the elderly and the aging kidney has a decreased ability to dilute and concentrate urine.

■ Metabolism Temperature Regulation

- The mitochondria provide the power for all the metabolic functions. The energy required to maintain basic cellular functions is termed basal metabolic rate (BMR) and this falls with advancing age. Decreased BMR is associated with decreased β -receptor sensitivity. This blunting of the β -response has been used to explain predisposition to obesity in the elderly.
- The changes in body composition with aging are due to an increase in the percentage of body fat, loss of protein and intracellular dehydration.
- Body mass index (BMI) is a standardized measure of body habitus. It is defined as the weight of an individual divided by the height squared (kg/m^2). Obesity is defined as a BMI greater than 30, and morbid obesity is defined as a BMI of greater than 40. Visceral, intra-abdominal and intra-muscular fat increases with age.
- Body temperature regulation is impaired in the elderly, making them prone to hypothermia. Anesthesia impairs thermoregulatory responses in all patients but produces even greater impairment in the geriatric population. Perioperative hypothermia lasts longer in geriatric patients. Elderly patients are at greater risk than younger patients from the adverse effects of hypothermia.

■ Neurological

- Postoperative delirium, a transient mental dysfunction, can result in increased morbidity, delayed functional recovery and prolonged hospital stay in the elderly.
- Possibly related to the occurrence of postoperative delirium is the incidence of postoperative cognitive decline. These two concepts are not the same. Those who suffer cognitive loss are generally fully alert and oriented.

■ Follow Basic Rules of Geriatric Anesthesia

- Use smaller doses of medications, as they will have a more profound effect.
- Use shorter acting drugs (i.e., remifentanyl).
- Don't rush! Drugs take longer to work.
- Decreased organ function may increase risk of complications; therefore, choose drugs with fewer side effects.
- Use drugs with less accumulation (i.e., propofol).

Summary

America is experiencing a great challenge, facing the effects of the graying of the population and its impact on our health care system. The preoperative evaluation of the elderly patient is usually more complex. This complexity with increasing age is possibly due to the greater number and severity of coexisting illnesses. The functional status can be difficult to predict, making it a challenge to sufficiently evaluate the patient's ability to respond to the stresses associated with surgery.

CHAPTER 23
Regional Anesthesia

Joseph M. Neal, M.D.
Anesthesiology Faculty
Virginia Mason Medical Center
Clinical Professor of Anesthesiology
University of Washington

Regional anesthesia is the subspecialty of anesthesiology that focuses on the local anesthetic blockade of peripheral nerves and the neuraxis. This is a subspecialty that overlaps acute and chronic pain medicine, in addition to pediatric, obstetric and ambulatory anesthesia. Moreover, regional anesthesia is an essential component of surgical anesthesia, where its applications range from simple plexus blocks for ambulatory hand surgery, to femoral nerve block for analgesia following total knee replacement, to the placement of a thoracic epidural as a key contribution to the multimodal management of colon surgery.

Why Regional Anesthesia?

The regional anesthesia practice of many anesthesiologists is limited to placing lumbar epidurals for labor analgesia. They are missing all the fun! Performing spinal and epidural anesthesia, placing continuous perineural catheters, or anesthetizing the brachial plexus with a single injection is technically challenging and, yes, fun. It breaks the tedium of managing each and every patient with general anesthesia. However, professionalism dictates we have better reasons for choosing an anesthetic technique than our own entertainment. Indeed, regional anesthesia has a number of advantages as either an isolated technique or an adjunct to general anesthesia. Compared to fast-track general anesthetic techniques, upper extremity regional techniques promote faster hospital discharge, fewer opioid-related side effects, and better analgesia during the first 24 hours after surgery. A spinal or epidural anesthetic for knee arthroscopy allows the patient to watch the surgeon repair his or her knee, while epidural anesthesia allows a mother to be awake during the cesarean delivery of her child. As a component of multimodal analgesia, thoracic epidurals play a critical role in perioperative management by promoting faster return of bowel function and fewer pulmonary complications following major abdominal or chest surgery. In short, regional anesthesia is a valuable, enjoyable and ever-broadening facet of anesthesiology practice.

So Why is Regional Anesthesia Not a Part of Everyone's Practice?

Despite its advantages, the actual practice of regional anesthesia can be challenging. The most important impediment to its widespread acceptance is the lack of quality training of residents by well-qualified faculty. This situation is improving. In 1980, most residents' exposure to regional anesthesia was limited to obstetrics. Training in the subspecialty varied widely, ranging from hundreds of spinal anesthetics in some programs, to only three spinal anesthetics in other programs.¹ By the year 2000, the vast majority of residents exceeded the Anesthesiology Residency Review Committee's minimal caseload experience for spinal and epidural anesthesia (50 each), and their experience included not only obstetrical indications but also pain medicine and surgical anesthesia uses. Inter-program variation in regional anesthesia training had narrowed. Despite these gains, 40 percent of residents still failed to attain minimal experience in performing peripheral nerve blocks (n=40).² As would be expected, the more training residents receive in regional anesthesia, the more likely they are to actually perform blocks in practice.³ Indeed, a survey of regional anesthesia fellowship graduates found that regional anesthesia remains a significant part of their caseload, whether in academic or private practice.⁴



Reprinted with permission, The Cleveland Clinic Center for Medical Art & Photography © 2015. All Rights Reserved.

There are other self-imposed barriers to regional anesthesia practice. Many anesthesiologists are concerned about what they perceive as increased liability associated with regional anesthesia; the American Society of Anesthesiologists' Closed Claims database suggests that nerve injury claims have increased as major respiratory claims have decreased over the past two decades.⁵ Yet overall, regional anesthesia remains an extraordinarily safe practice that is linked only rarely to major morbidity. Another challenge that regional anesthesia enthusiasts often face is bringing their techniques to a practice where performing the blocks is perceived to "slow things down." However, after experiencing the advantages afforded by regional anesthesia, surgeons typically become strong advocates of these techniques.

Who Practices Regional Anesthesia?

Regional anesthesiologists are in some ways just a bit different from those who deliver only sedative hypnotic drugs and volatile gases. Regional anesthesiologists tend to be good with their hands, they like handling needles, and they enjoy the challenge of finding the epidural space in a 450-pound patient. They are committed to the belief that their extra efforts, at the very least, provide their patients with superior analgesia as compared with traditional opioid-based modalities.⁶ Regionalists generally have great communication skills and enjoy chatting with an awake patient during arthroscopic knee surgery. Finally, because regional anesthesia carries the risk of not being as effective as expected, it presents a challenge. The job of the regional anesthesiologist is to make the imperfect perfect, and then to research ways to make it even better.

What is the Future of Regional Anesthesia?

In the last decade, the practice of regional anesthesia has experienced advances not witnessed since the introduction of local anesthetics at the end of the 19th century. Regional anesthesia and acute pain medicine research is vibrant, particularly in the area of peripheral nerve blockade. Outcome studies have further defined the benefits of regional anesthesia in selected subgroups of patients, both those undergoing relatively minor ambulatory procedures and those having more complicated operations. Improvements in the technology of peripheral nerve stimulation and ultrasonography have the potential to revolutionize how we localize nerves destined for blockade. Technical and material improvements in perineural catheters have opened new doors for postoperative analgesia that were previously closed by concerns regarding neuraxial anesthesia during concomitant anticoagulation. Contemporary anesthesiologists believe that regional anesthesia will become an increasingly important part of their future practice,⁷ surgical and postoperative analgesia indications are growing, and residents and Fellows are becoming better trained.⁸ The future of regional anesthesia is bright. No matter what subspecialty of anesthesiology you eventually choose, regional anesthesia will likely be a much larger part of your daily practice than it was for the generation before you.

References:

1. Bridenbaugh LD. Are anesthesia resident programs failing regional anesthesia? *Reg Anesth*. 1982;7:26-28.
2. Kopacz DJ, Neal JM. Regional anesthesia and pain medicine: Residency training—the year 2000. *Reg Anesth Pain Med*. 2002;27(1):9-14.
3. Smith MP, Sprung J, Zura A, Mascha E, Tetzlaff JE. A survey of exposure to regional anesthesia techniques in American anesthesia residency training programs. *Reg Anesth Pain Med*. 1999;24(1):11-16.
4. Neal JM, Kopacz DJ, Liguori GA, Beckman JD, Hargett MJ. The training and careers of regional anesthesia fellows-1983-2002. *Reg Anesth Pain Med*. 2005;30(3):226-232.
5. Lee LA, L PK, Domino KB, Caplan RA, Cheney FW. Injuries associated with regional anesthesia in the 1980s and 1990s. *Anesthesiology*. 2004;101(1):143-152.
6. Block MB, Liu SS, Rowlingson AJ, Cowan JA, Wu CL. Efficacy of postoperative epidural analgesia: A meta analysis. *JAMA*. 2003;290(18):2455-2463.
7. Hadzic A, Vloka JD, Kuroda MM, Koorn R, Birnbach DJ. The practice of peripheral nerve blocks in the United States: A national survey. *Reg Anesth Pain Med*. 1998;23(3):241-246.
8. Hargett MJ, Beckman JD, Liguori GA, Neal JM. Guidelines for regional anesthesia fellowship training. *Reg Anesth Pain Med*. 2005;30(3):218-225.

CHAPTER 24**Critical Care Anesthesiologists****Antonio Hernandez, M.D., FCCM**

Associate Professor of Clinical Anesthesiology
 Director, Cardiovascular Intensive Care Unit
 Division of Critical Care Medicine &
 Cardiothoracic Anesthesiology
 Vanderbilt University Medical Center
 Nashville, TN

Elizabeth Cordes Behringer, M.D.

Professor of Anesthesiology & Critical Care Medicine
 Department of Anesthesiology
 Cedars Sinai Medical Center
 Los Angeles, CA

The Field of Anesthesiology and the Critical Care Anesthesiologist

Anesthesiology provides many challenges in daily practice as well as a variety of exciting opportunities in subspecialty training. The claim by uninformed clinicians that the practice of anesthesia involves “95 percent boredom and 5 percent terror” could not be further from the truth!

The anesthesiologist, utilizing a diverse array of anesthetic techniques, is the perioperative physician for surgical patients undergoing a wide variety of surgical procedures. Today’s practicing anesthesiologist is involved with the preoperative evaluation and preparation, intraoperative management, and postoperative care of surgical patients. Additionally, anesthesiologists undergoing subspecialty training in critical care medicine are leaders in postoperative care in the Surgical Intensive Care Unit.



Reprinted with permission. The Cleveland Clinic Center for Medical Art & Photography © 2015. All Rights Reserved.

There are a variety of subspecialties within the field of anesthesiology. An individual may pursue further training following successful completion of a residency in anesthesiology. The available subspecialties include pain management and regional anesthesia, obstetric anesthesia, pediatric anesthesia, transplant anesthesia, neuro-anesthesia, cardiothoracic anesthesia and critical care medicine, just to name a few. Anesthesiologists also excel in research, whether it’s clinical or lab-based. A research fellowship may also be pursued following completion of residency in anesthesiology.

Once a physician completes residency in anesthesiology, there are a myriad of practice opportunities available. Anesthesiologists can pursue careers in private practice, industry or academia. The goals of academic anesthesia practice remain excellence in teaching, clinical care and research. Further information about a career as an anesthesiologist can be found at the American Society of Anesthesiologists website (www.asahq.org).

Role of the Critical Care Anesthesiologist – Clinician/Perioperative Physician

Intensivists, or critical care physicians, comprise a diverse group of clinicians. Pulmonary specialists, trauma surgeons, pediatricians, as well as anesthesiologists, all may receive specialized training in the art and science of critical care medicine. Currently, certification in critical care medicine may be achieved through several different credentialing entities (e.g., American College of Surgeons for Trauma Surgeons or the American Board of Anesthesiology for Anesthesiologist-Intensivists). Physicians who have successfully completed residency in anesthesiology are eligible for additional training in the anesthesiology subspecialty of critical care medicine.

Like other critical care physicians, critical care anesthesiologists assess and develop a plan of care for the individual patient. Critical care anesthesiologists generally care for pre- and post-surgical patients. Skills unique, but not exclusive to critical care anesthesiologists, include airway and ventilator management, as anesthesiologists are considered to be “airway experts.”

Fellowship in critical care anesthesiology is diverse. The minimum time commitment for a critical care fellowship in anesthesiology is one year. Training may include a wide variety of skills including organization and daily running of an Intensive Care Unit, invasive monitoring, ventilator management, transesophageal echocardiography as well as subspecialty rotations in nutrition, infectious disease, or general radiology. Critical care Fellows may rotate through a wide array of critical care settings. These include trauma ICU, neurosurgical ICU, cardiothoracic ICU, transplant ICU, burn ICU and surgical ICU.



Reprinted with permission, The Cleveland Clinic Center for Medical Art & Photography © 2015. All Rights Reserved.

Many critical care anesthesiology teams function as a consulting service. They directly participate and coordinate patient care as part of a multidisciplinary team approach. Like other intensivists, they take a multidisciplinary approach to the individual patient and direct his or her care with the participation of the primary admitting service (surgeon). Other essential team members include respiratory therapists (RRTs), registered dietician, pharmacists Ph.D. (Pharm.D.), occupational and physical therapists, social worker, chaplain, and of course the critical care nursing staff. In academic practices, the critical care team includes a variety of residents (surgery and/or anesthesiology) as well as medical students. As a team, they manage the care of the individual patient and coordinate the surgical intensive care unit operation from infection control, quality control and improvement practices through the collection of data. This information is used to provide excellent health care as well as the conservation of limited and expensive resources. Collection and analysis of data become a vital role for the intensivist in order to improve quality of care, patient outcome and risk assessment, as well as cost reduction strategies. Further information on the field of critical care anesthesiology can be found at the Society of Critical Care Anesthesiologists (SOCCA) formerly ASCCA website (www.socca.org).

For more information on the field of critical care medicine, please see the Society of Critical Care Medicine website (www.sccm.org).

Role of the Critical Care Anesthesiologist – Investigator

Standardized practice in the ICU setting has resulted in a marked reduction in the morbidity and mortality of critically ill patients. Initiation of conservative ventilation practices, conservative blood transfusion, and aggressive glycemic control are a few strategies that have recently demonstrated improved outcome. The intensivist frequently has the opportunity to enroll patients in clinical research trials in an effort to improve

patient outcome. Some clinicians dedicate a large amount of their time conducting clinical and/or basic science research. This practice is not specific to critical care anesthesiologists, but mentioned for those interested in becoming a clinician-investigator.

Conclusion

The field of anesthesiology is one that provides the opportunity to participate in the care of essentially all patient populations. The anesthesiologist intensivist has the opportunity to implement many of the techniques unique to anesthesiology training in order to provide exceptional care of critically ill surgical patients. Such techniques vary as follows: one patient may require transesophageal echocardiography for evaluation of hemodynamic instability while another may require regional anesthesia to alleviate pain or improve vascular compromise by creating a selective sympathectomy.

Critical care anesthesiologists can tailor their practice from critical care medicine to a combination of both critical care and anesthesiology. Medical students with an interest and aptitude for the surgical specialties, a lifelong love of learning and “cutting edge” medicine should strongly consider a career in anesthesiology as well as subspecialty training in critical care medicine.

CHAPTER 25

Political Activism and The American Society of Anesthesiologists Political Action Committee

Anne T. Lunney, M.D.

Department of Anesthesiology
Geisinger Medical Center
Danville, PA

The American Society of Anesthesiologists Political Action Committee (ASAPAC) was formed in October 1991 by a vote of the American Society of Anesthesiologists (ASA) House of Delegates. The goal of the ASAPAC is to allow ASA membership to participate fully in the United States political process. The ASAPAC’s mission statement is: “To advance the goals of the medical specialty of anesthesiology through the bipartisan support of candidates who demonstrate commitment to patient safety and quality of care.”

Since its inception, ASAPAC has provided a unified and empowered voice to ASA and its individual members. ASA is the largest physician PAC and consistently in the top 50 of the over 3,000 association and corporate PACs. ASAPAC consistently raises over \$3 million in an election cycle.

CHAPTER 26

**The Key to Your Future:
The ASA and the AMA**

John B. Neeld Jr., M.D.

Chairman, Northside Anesthesiology Consultants
CEO, Sentinel Healthcare Services
Atlanta, GA

This chapter outlines the overriding importance of organized medicine, such as the American Society of Anesthesiologists (ASA) and the American Medical Association (AMA), to your future.

Let's begin at what turned out to be my earliest statement about organized medicine: "I have no interest in medical politics. I simply want to be a good doctor." These words were in response to a question posed by my soon-to-be wife in 1974, and I sincerely meant every word.



I believe today's students would champion a similar idealistic view such as that from Benjamin D. Unger, M.D., 2006 President of the ASA Resident Council Governing Council, "I like to consider myself of the generation of doctors whose practice is evidence-based and data driven."¹ His views are similar to mine but couched in the language of today's medicine.

I soon learned, however, as you will, that being a good physician is necessary but not sufficient to fulfill our duty to protect and improve the health of our patients and to advance medical knowledge.

The PAC provides a legal channel for political contribution of ASA members to collectively support election campaigns. The committee is registered with the Federal Election Commission (FEC) and is held to the standards of the 1975 Federal Election Campaign Act. All campaign contributions are openly monitored and follow the FEC guide for corporations and labor organizations. The ASAPAC is a Separate Segregate Fund PAC, as opposed to a non-connected PAC, which enables the PAC to solicit contributions only from individual dues paying members within the ASA.

The ASAPAC provides political support for ASA's advocacy efforts related to anesthesiology-related regulations and legislation, e.g., legislation which influences Centers for Medicare & Medicaid (CMS) reimbursement, patient safety, medical liability reform, physician supervision and pain management. In 2008, the ASAPAC was instrumental in helping House Resolution 6331 not only pass in Congress, but also override President Bush's veto of the bill. This bill helped reverse previous legislation that had singled out anesthesia teaching programs for unfair reimbursement practices (a.k.a. "The Teaching Rule") and blocked cuts in Medicare payments to physicians.

Since 1991, the ASAPAC has directly supported political candidates and ASAPAC members have participated in fundraising for countless political campaigns.

The political activities of ASAPAC allow anesthesiologists to participate directly and tangibly in the political process. With ASA membership support, the ASAPAC has the ability to positively influence the future of anesthesiology practice.



Reprinted with permission, The Cleveland Clinic Center for Medical Art & Photography © 2015. All Rights Reserved.

While physicians deal very effectively with the needs of their individual patients on a micro-level in their practices, the future of our profession and of health care in the United States will be determined at the macro-level by the federal government in Washington, D.C., and in the various states by legislators and regulators. It is only through the strength of organized medicine, the ASA and AMA, where physicians can influence processes that will shape their futures.

Consider the following:

1. The United States spends more than any other nation on health care, some \$6,300 per person annually or 15 percent of the Gross Domestic Product.²
2. Forty-five million Americans are uninsured.
3. Some sources rank the United States 37th in the world in terms of value received for money spent on health care.³
4. Voters consistently rank “affordability of health care” second only to the economy as a major concern.⁴
5. Levels of reimbursement are not controlled by physicians but are dominated by the federal government through the Medicare program, which determines both the manner and amount of reimbursement for physician services.
6. In the private sector, the consolidation of health plans into a few dominant payers, who frequently reimburse a percentage of Medicare’s payments for similar services (sometimes less than 100 percent), has severely limited the ability of physicians and physician groups to negotiate for non-government controlled payments.
7. The hugely flawed sustainable growth rate (SGR) formula for determining physician reimbursement under Medicare has resulted in reimbursements falling behind the government’s own estimates of the growth in practice costs by 12 percent over the last 4 years with further **reductions** projected to be 37 percent by 2015, a period during which practice costs are projected to rise by 22 percent. Clearly we cannot sustain these reductions.
8. The Affordable Health Care Act and its impact on patients, doctors, different health care providers and the health care industry in general.

Can you and I resolve these enormous issues individually? Of course not. Under the leadership of AMA, ASA, all specialty societies and the state medical associations, we must come together with all of our colleagues to exert our collective influence at the national level. If we fail, the increasing number of uninsured and underinsured, ever rising costs for patients and their employers, and the growing perception that the

quality of American health care has declined, make the threat of a single-payer system very real. A decision to move to such a plan will be irrevocable and the fate of medicine’s future will be sealed. Failure to actively participate in the political process is not an acceptable or realistic option for any physician in today’s world.

Even as AMA and ASA deal with these complex and dangerous issues at the national level, we must also deal with the annual efforts of non-physician practitioner groups in state legislatures to expand their scope of practice by regulation, not education. Organized medicine does not battle these efforts to “protect our turf” or enhance income; it does so solely to protect our patients, who know virtually nothing about the education and qualifications of health care providers, from being misled about the identity and qualifications of different providers.

The AMA and ASA are responding effectively in this arena. The AMA House of Delegates, at its June 2006 meeting, passed ASA Resolution 211 titled, “Need to Expose and Counter Nurse Doctoral Programs (NDP) Misrepresentation.” The resolution was prompted because of a plan by the American Association of Colleges of Nursing to convert their advanced practice nursing degrees from a master’s level to a doctor of nursing practice degree by 2015. ASA was concerned that patient safety could be jeopardized in the clinical setting by nurses and other NPPs identifying themselves as “doctors” when they have not earned a medical degree.

Additionally, in February 2005, the AMA created the Scope of Practice Partnership (SOPP), which includes ASA as a member of its executive board, to coordinate nationwide activities concerning practice issues with the various specialty and state medical associations.

The creation of the SOPP is clearly “on target” based on the June 2006 creation of the Coalition for Patients’ Rights (CPR), which consists of some 25 organizations of NPPs including the AANA, various other nursing organizations, chiropractors, psychologists and physical therapists. The CPR attempts to counter the SOPP’s efforts to clarify the true qualifications of NPPs for the public by characterizing it as an effort to “reduce provider options for patients.”

Excerpts from the CPR’s Joint Statement include the following:

1. “It is inappropriate for physician organizations to advise consumers, legislators, regulators, policy makers or payors regarding the scope of practice of licensed healthcare professionals whose practice is authorized in statutes other than medical practice acts. **The erroneous assumption that physician organizations should determine what is best for other licensed healthcare professions is an outdated line of thinking that does not serve today’s patients.**” (Emphasis added)

2. “With America’s population aging, we are the answer to the challenge of keeping pace with the demand for quality health care services.”
3. “Our members are not physician adjuncts, and are independently responsible for their actions, regardless of whether physicians are involved.”

You have probably heard little, perhaps nothing, in your medical school education about the issues I have briefly addressed, yet these are major, “real world” issues that ASA and AMA are attempting to address on behalf of every physician in the nation. The outcome of these issues will affect the way you practice medicine for the rest of your career.

Staying on the sidelines, “above the fray,” with others fighting the battle for you is not an honorable or acceptable option. The minimal acceptable level of participation is membership in the organizations of medicine (your local and state medical associations, the AMA, your local and state anesthesia societies and the ASA) and at least the minimum contributions to all of these organizations’ PACs (political action committees).

Let me close with the wise words of the 2006 president of the ASA, Dr. Orin F. Guidry: “We must be politically active and politically astute in medical politics as well as in governmental politics. AMA is important (really important!).”⁵

References:

1. Unger BD. Killing two birds with one stone: ASA offers \$1,000 grants for resident leadership and education. *ASA Newsletter*. 2006;70(1):31-32.
2. Williams, MS. Unknown Title. [Lecture] Hilton Head, SC: Georgia Society of Anesthesiologists Summer Meeting; 2006.
3. Ibid
4. Finkelstein, JB. Health insurance access is back on America’s agenda. *Am Med News*. 2004; 47(5):1-2.
5. Guidry, OF. Another side of awareness. *ASA Newsletter*. 2005;69(2):2-3.



CHAPTER 27

Pediatric Anesthesiology and The Society for Pediatric Anesthesia

Anne T. Lunney, M.D.

Department of Anesthesiology
Geisinger Medical Center
Danville, PA

Pediatric Anesthesiology

The practice of pediatric anesthesiology is an exciting and challenging subspecialty of anesthesiology practice. Working with children requires a broad understanding of the fundamental anatomical, physiologic and pharmacologic differences between the pediatric and adult populations. The unique mix of developmental age, temperament, parental relationships, health, illness and surgical needs ensure that the practice of pediatric anesthesiology is consistently engaging.

It is not uncommon when having a routine procedure, such as tonsillectomy, that the parent is most concerned about the anesthetic. The art of pediatric anesthesiology entails the ability to communicate effectively with children and parents, and engender their trust in a limited period of time.

Since the inception of anesthesiology practice in the 1840s, anesthetic techniques have evolved and are increasingly tailored to the unique needs of children. The ability to perform increasingly complex surgical procedures is a direct result of the increased safety of pediatric anesthesiology perioperative care. Pediatric anesthesiology practice has progressed from the ability to provide three to four minutes of unconsciousness after inhaling from an ether-soaked rag to the ability to safely anesthetize a 600 gram, 24-week premature infant for a tracheoesophageal fistula repair.

Anesthesiology residency training can include exposure to general pediatrics during the intern year and pediatric anesthesiology rotations during the CA-2 and CA-3 years (though some programs offer rotations during the CA-1 year). The goal is for the resident to manage the perioperative care for children with diverse age ranges, variations on the health-illness continuum, and who require a variety of surgical procedures. The management of pediatric acute, chronic and perioperative pain is also an important aspect of pediatric anesthesia practice.

Additional training through a one-year fellowship in pediatric anesthesia is available. Pediatric fellowship presents the opportunity to develop the clinical judgement and skills to provide perioperative care for complex patients such as neonates, children with craniofacial and metabolic syndromes, and children with congenital cardiac defects. The fellowship also includes experience in the management of critically ill children in the pediatric intensive care unit, management of chronic pain, and performance of regional techniques such as peripheral nerve blocks and epidurals under general anesthesia.

The Society for Pediatric Anesthesia

The Society for Pediatric Anesthesia (SPA) has been and continues to be instrumental in the advancement of pediatric anesthesiology. Established in 1986, their mission “to foster quality anesthesia perioperative care and alleviate pain in children” is an ongoing venture. This mission is accomplished by: 1) Assembling in one group anesthesiologists who practice and have a strong interest in pediatric anesthesia, 2) Advancing the study of pediatric anesthesia and contributing to its growth and influence, 3) Encouraging research and scientific progress in pediatric anesthesia, 4) Serving as a forum for discussion of issues (scientific and political) of importance to pediatric anesthesia, and 5) Supporting the goals of the American Society of Anesthesiologists (ASA) and the American Academy of Pediatrics (AAP).

The membership of the SPA includes more than 3,000 members from the United States and abroad, and the membership is comprised of anesthesiologists from a broad spectrum of practice models. The biannual SPA meetings, held in conjunction with the American Academy of Pediatrics (AAP), provide a venue for critical review of current research, lectures, skills workshops and networking. The membership of the AAP provides invaluable expertise regarding the care of the pediatric patient, and the SPA–AAP collaboration is a key component to the richness of the SPA learning experience.

Subspecialty research grants are provided by the pediatric counsel of the Foundation for Anesthesia Education and Research (FAER). The grants target budding researchers at both the resident and faculty level. The research grants support individuals with a focus on education, clinical and basic research, and development of the skills required to compete for National Institutes of Health funding.

Medical students who are interested in anesthesiology, pediatrics, pain management, teaching and research will find the subspecialty of pediatric anesthesiology to be a fulfilling career.

Please refer to the SPA website (www.pedsanesthesia.org) for additional information about pediatric anesthesiology, SPA, and the SPA quarterly newsletter.

CHAPTER 28

The American Board of Anesthesiology: Part of Your Lifelong Career

Patricia A. Kapur, M.D.

American Board of Anesthesiology

The American Board of Anesthesiology (ABA) is the certifying body for physicians who have completed residency training from a residency program accredited by the Accreditation Council for Graduate Medical Education (ACGME). The ACGME accredits residency programs in all specialties and many subspecialties. As distinct from board certification, ACGME accreditation of a residency program signifies that the program is meeting national standards for its faculty, its breadth of patient conditions and types of clinical training, its teaching facilities, and its educational and research programs. Board certification of individuals who graduate from such programs indicates that they have satisfactory professional standing and have demonstrated expertise in the specialty at the level of a consultant. The key distinction is that the ACGME and its individual Residency Review Committees (RRCs – one for each specialty) accredit programs, while the ABA certifies individuals.

Anesthesiology residency training consists of a clinical base (CB) year plus three years of clinical anesthesia training (CA-1 to CA-3 years). Prospective anesthesiology trainees entering the National Internship and Residency Matching Program (NIRMP) may match either into a categorical internship as part of an overall four-year CB and CA program. Alternatively, they may match into a preliminary internship that will serve as the CB year, plus match into a separate “advanced” anesthesia residency position for the CA-1 through CA-3 years of training. On a case-by-case basis, departments can apply to both the Anesthesiology RRC and the ABA for approval to offer a prospective combined five-year program consisting of a CB year, a residency, plus an extra year of unaccredited research, or a CB year, a residency, plus an extra year of accredited fellowship training. In the scenario of a combined residency plus fellowship, at least three-fourths of the fellowship training time must occur in the fifth year, when the resident has sufficient experience to function at the fellowship level. A department offering either or both such an options usually has a small number of such positions, e.g., one to five. There can be a separate NIRMP match number for those five-year combined programs, requiring a commitment from the graduating medical student for the full five years.

A prospective anesthesiologist's lifelong record with the ABA is opened at the moment when the residency program enrolls them with the ABA. This occurs either at the beginning of the CB year for a categorical program or at the beginning of the CA-1 year for an advanced anesthesiology position. Thereafter, the residency program submits a clinical competency report to the ABA for each resident every six months throughout the individual's entire training period. The ABA requires that each training program have a Clinical Competency Committee (CCC), composed of a number of faculty experienced in residency education, chaired by a faculty member who is neither the residency program director nor the department chair. The every-six-month CCC reports include evaluations of character traits such as reliability, accountability and responsibility, as well as evaluations of other matters such as professionalism, clinical and technical skills, medical knowledge, judgement, interpersonal skills, ability to work within the health care system, and so on.

Based on the resident's satisfactory CCC reports, a final end-of-training approval by the residency program director solicited directly by the ABA, and satisfactory medical licensure standing, the ABA may approve the application of a residency graduate to enter the ABA's examination system. The examinations for primary certification in the specialty consist of two examinations, taken at minimum nine months apart.

The ABA Part 1 examination is a written examination of factual knowledge in the field of anesthesiology and in related medical and scientific content areas. It is administered in commercial computerized testing centers over a several day window once per year, currently in August. Applications are taken via the ABA website approximately eight to 10 months in advance. All final application deadlines are absolute. After approval of the prerequisite qualifications by the ABA, candidates are contacted by the testing company to select a testing venue and date for their Part 1 examination. Grading and equating of the examination to national standards are done and results are available four to six weeks following the examination dates.

The ABA Part 2 examination is an oral examination. The ABA administers its Part 2 examination twice a year in the spring and fall, each in a hotel in a single city over a one-week period. The Part 2 examination experience consists of an initial orientation session, followed by two 35-minute examination sessions in two adjacent hotel rooms, separated by a 10-minute gap for the candidate to change rooms. Each 35-minute session has its own question material and is conducted by two anesthesiologist examiners who are selected and have no knowledge of or acquaintance with the candidate. Thus, the candidate will be examined by a total of four examiners. While the Part 1 examination is designed to test factual knowledge,

the Part 2 examination is designed to test judgement in clinical situations, application of knowledge to clinical care, adaptability of knowledge to changing clinical situations, and the ability to organize and present clinical information at the level of a consultant anesthesiologist. The evaluations by the examiners are psychometrically analyzed and results are available on the ABA website within approximately four weeks following the Part 2 examination.

The oral examiners are outstanding anesthesiologists in academic or private practice, who make a great commitment of 19 years for participation in the examination process, giving up a week of their other commitments each time they contribute. The examiners already have a track record of educational and clinical accomplishment to be selected, are heavily mentored the initial years, and are audited throughout their entire tenure as oral examiners to ensure consistency in administration of the oral examination.

All ABA certificates issued after the year 2000 are valid for 10 years. Once an anesthesiologist achieves board certification, he or she is automatically enrolled in the ABA's Maintenance of Certification in Anesthesiology (MOCA) program. Completion of a 10-year MOCA cycle assures that a diplomate's certificate remains valid for the subsequent 10 years, as long as they continue to participate actively in the MOCA program, completing a cycle every 10 years. The American Board of Medical Specialties (ABMS), which oversees over 20 member boards in various specialties, has mandated MOC in every specialty to assure the public that certified physicians are keeping up with advancing knowledge in their specialty as time goes by following their initial certification. The ABMS requires that MOC in every specialty includes a 1) secure examination (SE), 2) lifelong learning and self-assessment (LL-SA), 3) participation in practice performance assessment and improvement (PPAI), and 4) satisfactory professional standing (PS).

Each successive MOCA cycle is 10 years long, commencing on January 1 of the year following the year of initial certification or of the year following completion of a prior MOCA cycle. Satisfactory PS is demonstrated by maintenance of unrestricted medical licenses in every state in which the MOCA participant holds a license. LL-SA is demonstrated by the physician recording learning activities on their personal portal on the ABA website. LL-SA activities can include continuing medical education (CME) credits acceptable for the American Medical Association (AMA) Physician Recognition Award category 1, such as attendance at CME-approved medical education meetings or participation in approved CME online educational activities, or category 2 activities such as professional committee work, teaching hours, and the like.

PPAI is met by participating in one of three categories of activities in each of the three-year segments composing years one to nine of the MOCA 10-year cycle. The three PPAI activity categories are: 1) participating in a practice improvement activity from one's own practice, by comparing baseline clinical outcomes to published benchmarks or to evidence-based standards, implementing a change in practice, and then measuring the improvements in patient care; 2) completing an ABA-approved patient safety education module, currently from the ABMS; and 3) participating in a human patient simulator education course. The ASA Committee on Simulation certifies simulation education centers to offer courses that meet the ABA MOCA PPAI requirement.

Like the initial ABA certification Part 1 written examination, the SE for MOCA is administered at commercial computerized testing sites. It is administered during one-week testing windows, twice a year. Following acceptance by the ABA that all SE prerequisites have been met, the SE may be taken any time after the seventh year of the 10-year MOCA cycle. If the examination is taken and passed prior to the end of the 10-year MOCA cycle, the certification period still extends to December 31 of the tenth year following the prior certification. The subsequent MOCA cycle will start on January 1 of the eleventh year after the prior certification was achieved.

If an ABA diplomate fails to complete a MOCA cycle before the end of their 10 years of certification, his or her certificate will expire, the ABA website will no longer list that physician as a certified anesthesiologist, and he or she can no longer represent himself or herself as a board certified anesthesiologist.

The ABA also administers subspecialty certification programs for ABA diplomates who are graduates of ACGME-approved subspecialty fellowship programs in either pain management or critical care. Fellows in those subspecialties similarly are enrolled with the ABA and have CCC reports submitted to the ABA every six months during their fellowship. After a candidate meets all of the other ABA subspecialty prerequisite requirements, the ABA may admit the candidate to its subspecialty examination systems. The subspecialty certification examinations are written examinations administered in commercial computerized testing centers. Following initial certification in an anesthesiology subspecialty, the subspecialty diplomates are eligible to become recertified prior to the tenth year expiration of their subspecialty certificate, by demonstrating satisfactory PS and taking a recertification examination. It is expected that the subspecialties that have ABA certification programs will also come to have fully developed subspecialty MOCA programs, including the LL-SA and PPAI components.

All of the details of the ABA examination programs are updated annually in the spring of each year and are published online in the ABA's Booklet of Information, which may be accessed at the ABA's website (www.theABA.org). Residency programs also have helpful information for residents regarding how to ensure that the appropriate ABA prerequisite requirements will be met in order for their graduates to be eligible for acceptance into the ABA's examination systems. Residency programs also regularly assist residents to prepare for both the primary anesthesiology certification Part 1 and Part 2 examinations.

The ASA, on behalf of its members, works with the ABA to facilitate the board certification and MOCA processes. First, the ASA and the ABA together administer the ASA-ABA in-training examinations for residents at the end of the CB and CA-1 to CA-3 years, to assist residents in assessing their progress during residency, as well as for preparation for the ABA Part 1 examination. Second, the ASA has representatives participating on the Council for the Continuous Professional Development of Anesthesiologists (CCPDA). The CCPDA advises the ABA on the structure and content of the MOCA program. Third, the ASA has a Patient Safety Education Editorial Board that develops and maintains a patient safety education module to meet MOCA PPAI requirements. Finally, the ASA Committee on Simulation is identifying and approving simulation centers that can offer simulations education sessions to meet the MOCA PPAI simulation education requirement.

CHAPTER 29

The Society for Obstetric Anesthesia and Perinatology (SOAP) and Its Relationship With ASA

Joy L. Hawkins, M.D.

Director of Obstetric Anesthesia
University of Colorado School of Medicine
Denver, CO

The Society for Obstetric Anesthesia and Perinatology (SOAP) is a group of roughly 1,000 members who share an interest in the care of the pregnant patient and newborn. Founded in 1968, SOAP provides a forum for discussion of problems unique to the peripartum period. To quote from the SOAP website: "The mission of the Society is to promote

excellence in research and practice of obstetric anesthesiology and perinatology. Through the newsletter, Internet site, and annual meetings, this Society allows practitioners of several specialties to meet and discuss clinical practice, basic and clinical research, and practical professional concerns.”

SOAP is the official obstetric anesthesia subspecialty society of the American Society of Anesthesiologists (ASA), representing those members who include care of the pregnant woman in their practices. As a subspecialty society, SOAP chooses a delegate and alternate delegate who attend the ASA House of Delegates’ meetings at the annual meeting. SOAP members plan the obstetric anesthesia track at the ASA annual meeting. Additionally, SOAP has a journal affiliation with *Anesthesiology*; a journal-sponsored, scientific, oral-presentation session at the ASA annual meeting highlights the best research in the subspecialty area. Furthermore, the *ASA Monitor* (formerly *ASA NEWSLETTER*) has a yearly article authored by the SOAP president that describes issues addressed and activities organized within SOAP, keeping the general ASA membership updated on topics and concerns in obstetric anesthesia practice.

The ASA also has a Committee on Obstetric Anesthesia whose members are virtually always active in SOAP. The chairperson of the ASA Committee sits on the SOAP board of directors and also serves as the liaison to the American College of Obstetricians and Gynecologists (ACOG). This liaison activity with ACOG has led to collaboration on an excellent ACOG practice bulletin, “Obstetric Analgesia and Anesthesia,” and a joint ASA/ACOG patient education pamphlet entitled “Pain Relief During Labor and Delivery.” Through the ASA Committee, several additional documents related to obstetric anesthesia have been produced and are available at the ASA website. These include: “Pain Relief During Labor” (jointly with ACOG), “Optimal Goals for Anesthesia Care in Obstetrics” (jointly with ACOG), and the “Guidelines for Regional Anesthesia in Obstetrics.” Having the chairperson of the ASA Committee on Obstetric Anesthesia sit on the SOAP board of directors ensures these documents are developed with close collaboration. Thus the activities of ASA and SOAP are intertwined on many levels.

SOAP has a variety of activities centered on its annual meeting in the spring. A variety of research presentations, pro-con debates on controversial issues, panel presentations and discussions, case-based learning, and “What’s New” lectures educate and invigorate members. Obstetric anesthesia practice includes labor analgesia, cesarean anesthesia, postoperative pain management and critical care management of obstetric patients. The scope of active research includes safety and outcomes measurements, genomics and physiology of labor pain.

An affiliation with the Obstetric Anaesthetists Association (OAA) brings its president and many of our British colleagues to the SOAP meeting, as well as sending the SOAP president to the OAA meeting each year. Cooperation with the North American Society of Obstetric Medicine (NASOM), a group of internists specializing in medical care of pregnant women, has led to obstetric anesthesia speakers at their annual meeting and a “What’s New in Obstetric Medicine?” lecture at the annual SOAP meeting.

Obstetric anesthesia is a unique part of an anesthesiologist’s practice that differs from typical practice in the general operating room setting. We become an integral part of an intimate event, one of the most important in a woman’s life. We interact with the woman’s spouse, family members and friends for hours or days and even bring them into the operating room during cesarean delivery. We rarely use sedatives or hypnotics, instead relying on various regional anesthetics and our interpersonal skills for their comfort. We often perform these regional anesthetics in the presence of a spouse or family member. Many or most of our patients on labor and delivery come with preconceived ideas of how they wish their care to be provided, including an array of opinions (valid or not) about anesthesia. Although these may have come from the Internet, friends or magazines rather than medical sources, we need to be aware of what our patients are reading and hearing. Women may have a desire to experience “natural childbirth” and may be using a variety of complementary and alternative therapies that can have importance for drug interactions. Despite their initial intentions, over 90 percent of women will ultimately require some kind of pain medication and roughly 60 percent of those will receive a neuraxial (spinal and/or epidural) anesthetic. About 30 percent of deliveries in the United States are now performed by cesarean, and all of those women will require our services. Our goal is to help all these women achieve the childbirth experience they desire.

References:

1. Society for Obstetric Anesthesia and Perinatology (SOAP) website. <http://www.soap.org>. Unknown accessed date.
2. Goetzel LM. ACOG Committee on Practice Bulletins-Obstetrics. ACOG Practice Bulletin. Clinical Management Guidelines for Obstetrician-Gynecologists Number 36, July 2002. Obstetric analgesia and anesthesia. *Obstet Gynecol.* 2002;100(1):177-91.
3. North American Society of Obstetric Medicine (NASOM) website. <http://www.nasom.org>. Unknown accessed date.
4. Camann W. Obstetrics – never a dull moment. *ASA Newsletter.* 2003;67(10):13-14,28.
5. Hepner DH, Harnett MJ, Segal S, et al. Herbal medicine use in parturients. *Anesth Analg.* 2002;94(3):690-3.
6. Kannan S, Jamison RM, Datta S. Maternal satisfaction and pain control in women electing natural childbirth. *Reg Anesth Pain Med.* 2001;26(5): 468-72.

CHAPTER 30

The Role of the American Society of Regional Anesthesia and Pain Medicine

Jan J. Kraemer, M.D.

St. Annes Hospital
Fall River, MA

Richard Rosenquist, M.D.

Professor of Anesthesiology
Chair, Department of Pain Management
Cleveland Clinic, Cleveland, OH

Introduction

The American Society of Regional Anesthesia was founded by Gaston Labat and his colleagues in New York City in 1923.¹ Subsequently, ASRA joined with another New York society to create the American Society of Anesthesiologists. (The history of the creation of the ASA is well described as: “On October 6, 1905, a small group of nine physician-anesthetists whose particular interests centered on anesthetics met at Long Island College Hospital at the invitation of Dr. A. Frederick Erdmann for the purpose of “promoting the art and science of anesthesia.” From this small group came the Long Island Society of Anesthetists and it was this organization that gave rise to organized anesthesia in the United States and its present body, the American Society of Anesthesiologists (ASA) (www.asahq.org).

As interest in anesthetics and the scientific sessions of the new society grew throughout those first years so did the need to broaden the scope of membership. On October 28, 1911, at the New York Academy of Medicine, 40 East 41st Street in Manhattan, the name of the society was changed to the New York Society of Anesthetists. On February 7, 1912, its new constitution reiterated the precepts of its founders for “the advancement of the science and art of Anesthesia ...” (www.nyssa-pga.org/about).²

Reformed in 1975, ASRA has been working closely with the American Society of Anesthesiology in all issues related to regional anesthesia and pain medicine. Today, there are more than 7,400 members in ASRA. The mission of the organization is to address the clinical and professional educational needs of physicians and scientists practicing regional anesthesia and pain medicine; to assure excellence in patient care utilizing regional anesthesia and pain medicine; and to investigate the scientific basis of the specialty.

Regional Anesthesia

Regional anesthesia will be one of the most exciting parts of your anesthesia training. During your CA-1 year you will learn to perform many basic blocks such as axillary blocks to provide anesthesia and analgesia for the forearm and hand, and interscalene block for shoulder, arm and elbow surgeries. You will

learn about spinal and lumbar epidural anesthesia, and thoracic epidural analgesia, commonly used to provide postoperative analgesia for thoracic and abdominal procedures. Anesthesia of the lower extremities may be provided by femoral, sciatic and popliteal blocks, while anesthesia for obstetrics may be performed with combined spinal-epidural blocks.

In the past, many patients believed that general anesthesia was the only option for surgery. However, an increased number of studies have demonstrated the benefits of intraoperative and postoperative regional anesthesia, the Internet has made information readily available, and our patients are more aware now of regional anesthesia as an alternative to general anesthesia for many surgical procedures. Regional anesthesia provides anesthesia not only during a surgical procedure but also provides analgesia after the procedure, thus reducing the requirements for opioids and the possible side effects of those medications. For example, for outpatient shoulder surgery, patients may have the option to receive both an interscalene block, which can be performed in the holding area, and general anesthesia for the surgery itself. A patient who receives these two types of anesthetics (a combined technique), will wake up from anesthesia without pain, require less anesthetic during the surgery, and require less opioid after the surgery. The patient can be sent home the same day of the surgery without any discomfort. The only disadvantage is that the shoulder may be numb until the next day.

Increasingly, patients have the option of going home after surgery with a catheter that an anesthesiologist will place when performing the regional anesthetic. This catheter allows patients to get a continuous infusion of a local anesthetic that provides analgesia at home for a few days after the surgery. This procedure reduces the amount of pain medication needed, increases functional status of the patient, and encourages early physical therapy and return to daily activities and work.

The field of regional anesthesia and the number of procedures are becoming so complex that after finishing your anesthesia training you will have the option to acquire more expertise in the field by doing a 12-month fellowship in regional anesthesia. Guidelines have been published for this training. A recent survey among anesthesiologists who completed a regional anesthesia fellowship revealed that 95 percent were pleased with the quality of their education, and 75 percent of them viewed their fellowship credentials as a positive influence on their employability and their relative attractiveness as a candidate for jobs in anesthesia.

Pain Medicine

Pain is considered by some as the “fifth vital sign.” Pain medicine is the fastest growing field among the subspecialties of anesthesiology. During your anesthesia training you will learn the basic skills to diagnose and manage some of the common acute and chronic pain conditions, as well as the different treatment options to manage acute postoperative pain.



Reprinted with permission, The Cleveland Clinic Center for Medical Art & Photography © 2015. All Rights Reserved.

During your pain management rotation and patient encounters during residency, you will learn that every patient is different. You will learn a variety of approaches to deliver steroids into the epidural space, such as lumbar epidurals, caudal epidurals or transforaminal selective nerve root blocks, and to perform other interventional procedures using fluoroscopic guidance. You will become familiar with normal spine anatomy and will learn how to identify those structures on X-ray.

Patients who in the past had no other option after failing back surgery, or who refused surgery as the first alternative, now have many medical, physical and interventional pain procedures as alternatives.

If you desire additional training in this area, a pain medicine fellowship is an ACGME-accredited fellowship that consists of 12 months of pain medicine training after completing your residency. Anesthesiologists trained as pain physicians can offer many alternatives to their patients such as spinal cord stimulation, intradiscal electrothermal annuloplasty, intrathecal pumps, nucleoplasty, vertebroplasty and more advanced, fluoroscopically-guided blocks.

The ASRA is actively involved with anesthesia pain medicine programs. They have developed the ASRA Pain Medicine Fellowship program to advance training and education within the area of pain medicine. ASRA's goal is to financially support

pain medicine training centers dedicated to train Fellows in state of the art pain medicine evaluation and treatment modalities, with three \$60,000-fellowship grants per year.

ASRA

As a medical student you have the opportunity to learn more about ASRA and even become a member at no charge. ASRA hosts two meetings each year. The fall meeting is primarily about chronic pain. During these meetings you will meet the experts in the field of pain medicine and you will be exposed to all the new trends in the field. The spring meeting is primarily about regional anesthesia and acute postoperative pain, with experts from the United States and other countries around the world as faculty. Residents and Fellows can attend regional anesthesia workshops in basic procedures as well as advanced procedures such as ultrasound-guided blocks. Every year ASRA sponsors the airfare and hotel fees for a number of residents who submit abstracts to the national meetings.



Reprinted with permission, The Cleveland Clinic Center for Medical Art & Photography © 2015. All Rights Reserved.

Residents can opt to become members of the resident section of the ASRA. The resident section is a great forum where you can voice your concerns and ask questions about regional anesthesia, and is a great opportunity to meet other residents interested in regional anesthesia from all parts of the United States. You will also have the opportunity to attend workshops and meet all the experts in this interesting field. This is definitely a unique experience.

Conclusion

Regional anesthesia and pain medicine will be two of the cornerstones of your anesthesia training. ASRA can provide you with the tools you need to become a consultant in these fields during your training and during your professional career as an anesthesiologist.

References:

1. Bacon DR, Reddy V, Murphy OT. Regional anesthesia and chronic pain management in the 1920s and 1930s: The influence of the American Society of Regional Anesthesia. *Regional Anesth* 1995;20:185-192
2. Mandabach MG, Wright AJ. The American Society of Regional Anesthesia: a concise history of the original group—its birth, growth, and eventual dissolution. *Reg Anesth Pain Med*. 2006;31(1):53-65.
3. Hadzic A, Williams BA, Karaca PE, Hobeika P, Unis G, Dermksian J, Yufa M, Thys DM, Santos AC. For outpatient rotator cuff surgery, nerve block anesthesia provides superior same-day recovery over general anesthesia. *Anesthesiology*. 2005;102(5):1001-1007.
4. Weber SC, Jain R. Scalene regional anesthesia for shoulder surgery in a community setting: An assessment of risk. *J Bone Joint Surg Am*. 2002;84-A(5):775-779.
5. Hargett M, BS, Beckman J, Liguori G, Neal J. Guidelines for Regional Anesthesia Fellowship Training. *Reg Anesth Pain Med*. 2005;30(3):218-225.
6. Martin G, Lineberger CK, MacLeod DB, El-Moaleam Neal JM, Kopacz DK, Liguori GA, Beckman JB, Hargett MJ. The training and careers of regional anesthesia fellows—1983-2002. *Reg Anesth Pain Med*. 2005;30(3):226-232.

CHAPTER 31

Ambulatory Anesthesia

Shireen Ahmad, M.D.

Professor of Anesthesiology and Obstetrics & Gynecology
Northwestern University Feinberg School of Medicine
Chicago, IL

Ambulatory anesthesia is defined as a formal, organized program for conducting anesthesia for elective surgical procedures, in patients who are admitted and discharged from the facility on the same day. The earliest written reference to an ambulatory surgical facility appeared in the *American Journal of Surgery* in 1919. The legendary United States anesthesiologist, R. M. Waters, M.D., opened the Downtown Anesthesia Clinic in Sioux City, Iowa, where he provided care for dental and minor surgery cases. The next written description of an ambulatory surgery center appeared in *Arizona Medicine* in 1969. John Ford, M.D., and Wallace Reed, M.D., published an article in which they described their concept of a “Surgicenter.” They opened the Phoenix Surgicenter in 1970, the first “free standing surgicenter.”

The Society of Ambulatory Anesthesia (SAMBA) was organized in 1984 and was the first subspecialty society to be formed within the American Society of Anesthesiologists.

The primary mission of SAMBA is to encourage specialization in the field of ambulatory anesthesia, to contribute to the growth of the subspecialty and to foster research, education and scientific progress in ambulatory anesthesia and thereby encourage high ethical and professional standards in ambulatory anesthesia.

SAMBA has approximately 1,669 members who practice throughout the United States and 83 international members. The majority of the members devote a significant percentage of their professional activity to the perioperative care of the ambulatory surgery population.

SAMBA is committed to providing high-quality continuing education activities for physicians and other health care professionals. Since 1991 the Society has also had its own annual meeting, which focuses on various aspects of ambulatory anesthesia and in 1997 a mid-year meeting was established that also continues to be held yearly. The Society for Ambulatory Anesthesia held its first educational meeting in April 1986. Since then SAMBA has held an annual and a mid-year meeting each year. The meeting focuses on presentation of scientific abstracts and discussions of practice trends in the field of ambulatory anesthesia. The annual meeting in 2006 presented four days of refresher course lectures, interactive workshops, problem-based learning and lecture sessions on a broad range of topics related to ambulatory anesthesia.



The Society also participates in the development and promotion of the programs of the American Society of Anesthesiologists (ASA) and other organizations relating to ambulatory anesthesia. In 1987, SAMBA was granted membership on the ASA Committee on Subspecialty Representation and hosted the first breakfast panel on ambulatory anesthesia at the ASA annual meeting that year and topics on ambulatory anesthesia continue to be a major component of the ASA annual meeting. This session continues to be very popular at the annual meeting of the ASA. Additionally, as of 2007, ambulatory anesthesia has been designated one of the 10 “learning tracks” at the ASA annual meeting with refresher course lectures, panels, clinical forums, workshops and general sessions devoted to topics related to ambulatory anesthesia. The SAMBA leadership has been actively involved at all stages in the development of this ambulatory anesthesia track.

Anesthesia and Analgesia, which is the oldest anesthesiology journal in the United States and has been published continuously since 1922 by the International Anesthesia Research Society (IARS), has been the official journal of the Society of Ambulatory Anesthesia (SAMBA) since 1995. This journal has an international circulation in excess of 21,000 and has a monthly section on ambulatory anesthesia.

SAMBA has published the newsletter “*Ambulatory Anesthesia*” since 1986. This newsletter continues to be published each month since that time and is distributed in print and electronic versions.

Another goal of SAMBA is to support, encourage, and participate in the development and promotion of policies and programs of the American Society of Anesthesiologists and other professional organizations regarding ambulatory anesthesia. In 1989, national recognition of the SAMBA was enhanced by it being represented in the ASA House of Delegates as an anesthesia subspecialty organization. As of 1992, SAMBA members have served as representatives for the ASA to various health care organizations, such as the Joint Commission on Accreditation of Healthcare Organizations (JCAHO) and its Professional and Technical Advisory Committee (PTAC) and the Accreditation Association for Ambulatory Health Care (AAAHC), in accordance with the Society’s mission to participate in the development of policies and programs related to ambulatory anesthesia, at a national level.

SAMBA has an active resident membership category whose 2,850 members are residents in anesthesiology training programs throughout the United States. The mission of the resident section is to encourage resident interest in ambulatory anesthesia, and to inform residents of the purpose of SAMBA in promoting research and education in ambulatory anesthesia administered in a hospital outpatient center, an ambulatory surgery center or in an office setting; and to encourage continued membership involvement during residency and beyond.

The resident committee organizes resident education seminars regarding the practice and current issues of ambulatory anesthesia and encourages residents to gain experience in organized medical societies, thereby promoting their development in the future.

In 1987, SAMBA established awards for the best scientific research presentations and in 1991 the first Resident Travel awards were presented for resident physicians presenting research abstracts at the annual meeting.

SAMBA has participated in the development of guidelines for postgraduate education for qualification as a subspecialist in ambulatory anesthesia and guidelines for approval of postgraduate training programs in ambulatory anesthesia.



American Society of
Anesthesiologists™

1061 American Lane ■ Schaumburg, Illinois ■ 60139 ■ (847) 825-5586 ■ www.asahq.org