American Society of Anesthesiologists™

A GUIDE TO ANESTHESIOLOGY FOR MEDICAL STUDENTS

Courtesy of the ASA Committee on Residents and Medical Students

American Society of **Anesthesiologists®**

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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.
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CHAPTER 1

History of Anesthesiology

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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.

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 Hoeffer 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!

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CHAPTER 2

Patient Safety and Outcomes

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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 anesthetist. 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.

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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 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.

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CHAPTER 3
Choosing a Career in Anesthesiology

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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.

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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.

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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 coursesyou'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)

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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.

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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.

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CHAPTER 5

A Career in Academic Anesthesiology

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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."

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).

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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.

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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.

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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

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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-feet-by-15-feet 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?

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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.

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 programs 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.

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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

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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.

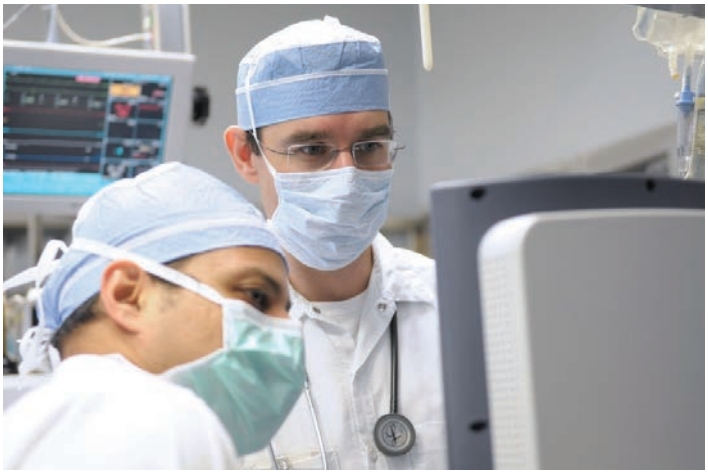
Self-Assessment

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.



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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.

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

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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.

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 rules[2] 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.

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CHAPTER 10

Transitional/Preliminary Year

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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.

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 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

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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

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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.