



Society for
Education in
Anesthesia

MEDICAL STUDENT GUIDE TO ANESTHESIOLOGY

FIFTH EDITION
2009

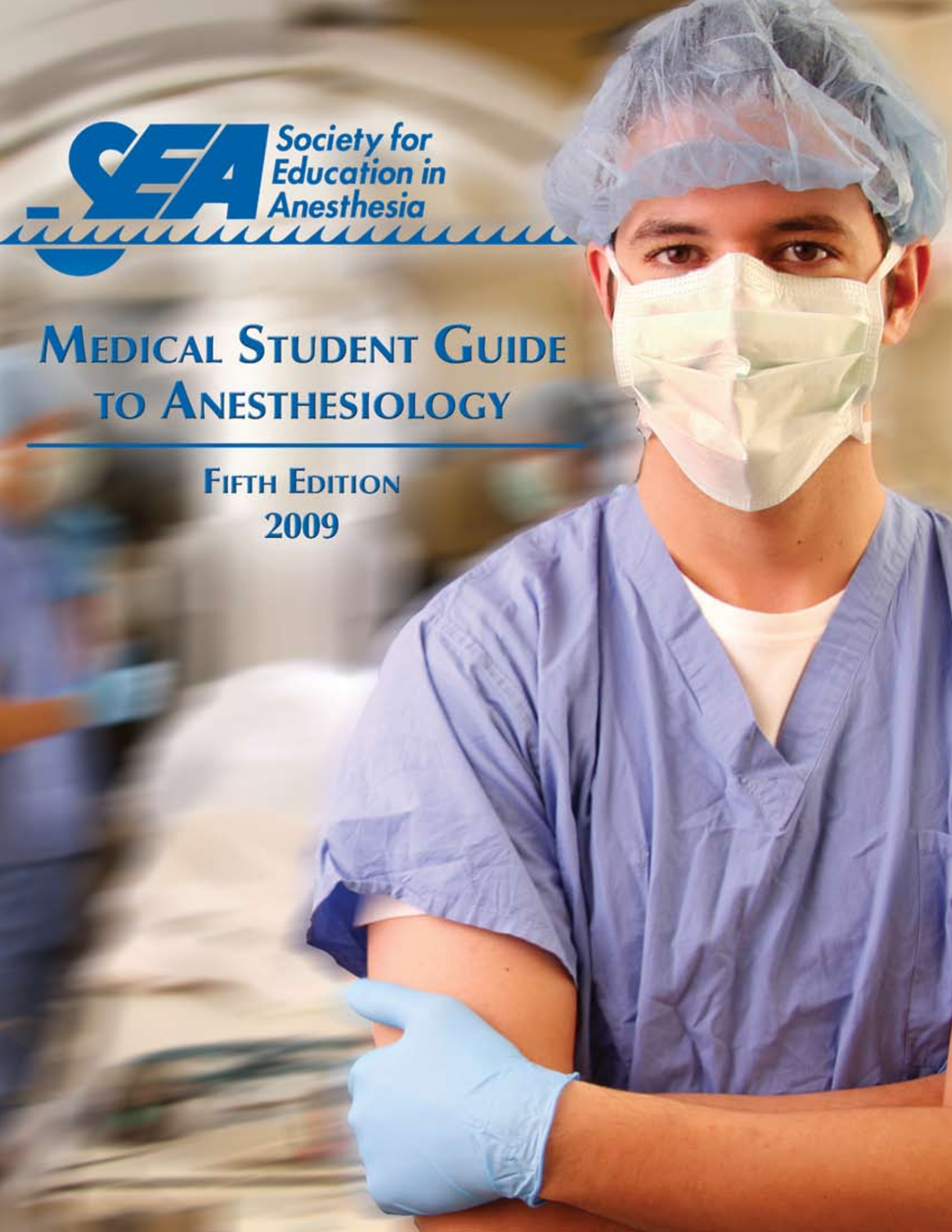


Table of Contents

Introduction _____ 5

Alan P. Marco, MD, MMM, FACPE

alan.marco@utoledo.edu

Professor and Chair

Department of Anesthesiology

University of Toledo

Toledo, Ohio

Why Anesthesiology? _____ 6

Joseph G. Reves, MD

revesj@musc.edu

Vice President for Medical Affairs and Dean

Medical University of South Carolina

Charleston, South Carolina

Elements of a Residency Program _____ 8

Mario Serafini, DO

serafinim@me.com

Associate Professor of Anesthesiology and Pain Management

Assistant Program Director

West Virginia University

David H. Wilks, MD

wilksd@wvuh.com

Professor of Anesthesiology

West Virginia University

Morgantown, West Virginia

Anesthesia Subspecialties _____ 11

Elena J. Holak, MD, PharmD

eholak@mcw.edu

Associate Professor

Department of Anesthesiology

Medical College of Wisconsin

Milwaukee, Wisconsin

Types of Residency Programs _____ 12

Academic Programs

Saundra E. Curry, MD

sc42@columbia.edu

Clinical Professor of Anesthesia

Columbia University

New York, New York

Freestanding Programs

Kathy Denchfield Schlecht, DO

kdschlecht@sbcglobal.net

Director of Medical Student Education,

Senior Staff, Department of Anesthesiology

Henry Ford Health System

Detroit, Michigan

Military Programs

Paul D. Mongan, MD, LTC MC US Army

pmongan@usuhs.mil

Residency Program Director
Bernard Joseph Kelly, MD, MAJ USAF
bernard.kelley@afncr.af.mil
National Capitol Consortium Anesthesiology
Associate Professor and Chair, Department of Anesthesiology
The Uniformed Services University
Bethesda, Maryland

Anesthesiology: Rich With Unique Opportunities for Research _____ 15

Rafi Avitsian, MD
avitsir@ccf.org
Assistant Professor
The Cleveland Clinic Foundation
Cleveland Clinic Lerner College of Medicine
Case Western Reserve University
Cleveland, Ohio

The Application Process: Preparing Your Curriculum Vitae and Personal Statement _____ 17

Susan H. Noorily, MD
noorily@uthscsa.edu
Clinical Professor
Department of Anesthesiology
Medical Director, University Perioperative Medicine Center
The University of Texas Health Science Center
San Antonio, Texas

What To Look For in a Residency Program: A Recent Graduate's Point of View _____ 20

Shawn Beaman, MD
beamst@upmc.edu
Assistant Professor
Associate Residency Program Director
University of Pittsburgh
School of Medicine
Pittsburgh, Pennsylvania

The Interview _____ 23

Jeffrey J. Schwartz, MD
jeffrey.schwartz@yale.edu
Associate Professor
Program Director
Department of Anesthesiology
Yale University School of Medicine
New Haven, Connecticut

Deciding _____ 25

Andrea L. King, MD
kingal@uthscsa.edu
Vice-Chair, Education Committee
Department of Anesthesiology
University of Texas Health Science Center at San Antonio
Rosemary Hickey, MD

Lois L. Bready, MD
bready@uthscsa.edu
Professor and Vice Chair, Anesthesiology
Associate Dean for Graduate Medical Education
The University of Texas Health Science Center
San Antonio, Texas

The Match and Anesthesiology _____ 27

John E. Tetzlaff, MD

tetzlaj@ccf.org

Director, Center for Anesthesiology Education

The Cleveland Clinic Foundation

Cleveland, Ohio

A Typical Day in the Life of an Anesthesiologist _____ 30

Devon McGee, MSIII, Nicole H. Tran, MD, and Marek Brzezinski, MD, PhD

Brzezinski@anesthesia.ucsf.edu

Department of Anesthesia and Perioperative Care

University of California–San Francisco

San Francisco, California

Free Anesthesiology Resources for Medical Students _____ 34

H. Nicole Tran, MD, Devon McGee, MSIII, Amy S Sargious, MSIII, and Marek Brzezinski, MD, PhD

Introduction

Alan P. Marco, MD, MMM, FACPE

The collection of essays in this booklet, written by educators in Anesthesiology, is intended to provide information about choosing a residency program to medical students who are interested in the medical specialty of Anesthesiology. This *SEA Guide to Anesthesiology Residency Programs*, now in its fifth edition, has been significantly revised to reflect changes that have occurred in medicine and training programs since previous editions.

This booklet is intended for students who are considering Anesthesiology as a career. Kudos to these insightful students who recognize the superiority of Anesthesiology as a medical specialty. In what other specialty does one get to deal with such extremes? Extremes of age (fetal surgery to geriatrics), extremes of size (neonates to bariatrics), and extremes of health status (totally healthy outpatients to moribund ICU patients) are all part of the practice of anesthesiology, and that doesn't even consider critical care, pain medicine, hospice and palliative care, or other subspecialties! We explore this fundamental choice in *Why Anesthesiology?* Descriptions of elements of a residency program, anesthesia subspecialties, and different types of programs, and a description of research opportunities can be found in following sections. Next, we explore *Preparing Your Curriculum Vitae* to help you get that interview. *What To Look For*, written by a recent graduate of an Anesthesiology residency program offers practical advice in collecting information during the process of decision making so you are prepared for the interview. Advice on the interview process and how to decide what program is best for you is next. *The Match and Anesthesiology* gives useful information on the Match process. Lastly, a new section, *A Day in The Life* offers some perspectives on different practice styles.

Contact information about medical student clerkships is not provided because of the frequent changes in this information. Typically, such information can be obtained from Departmental web sites and the respective Registrar's office.

Best wishes for a successful career in the medical specialty of Anesthesiology!

Why Anesthesiology?

Joseph G. Reves, MD

If I can ease one life the aching,
Or cool one pain,
Or help one fainting robin
Unto his nest again,
I shall not live in vain.

-Emily Dickinson

Medicine is a service profession: it is the most noble of all and we prove the poet correct about our lives when we alleviate the pain and suffering of our fellow man. Anesthesiology is certainly a field that enables the physician to use the expertise gained in training to make a difference in patient care that is readily visible. It is one of the most gratifying medical fields in the world.

The practice of Anesthesiology is extraordinarily broad. Patients range in age from premature infants to our geriatric population. Just as the ages range, so do the various responsibilities. These include anesthetic care, intensive care medicine, pain management, and various leadership roles in the hospital. These varied opportunities attract physicians who enjoy the relatively brief encounters seen in a busy ambulatory surgical center as well as those who prefer the extended relationship of the chronic pain manager.

The knowledge base required to practice Anesthesiology is primarily in the two general realms of physiology and pharmacology. Medical students who find these subjects of great interest will love Anesthesiology because it is the practice of clinical physiology and pharmacology. Probably no group of physicians has to understand and use as many drugs in daily practice as the anesthesiologist. Not only do we employ all the local and general anesthetics, but also we use catecholamines and other cardiovascular drugs, pulmonary drugs, antibiotics, analgesics and sedatives, and almost all drugs except the anti-cancer compounds. Using these drugs to alter the physiology and pathology commonly encountered in practice is gratifying since the responses to most of the drugs we use are immediate. In fact anesthesiologists sometimes become impatient if the drugs used do not “work fast” which means in seconds to minutes. Likewise, most operating room encounters are relatively short. We can quickly see the outcome and this gives both the patient and physician a keen sense of gratification.

Another factor in professional satisfaction is the leadership role that anesthesiologists enjoy in their work. Although at first glance the anesthesiologist may appear to be the quiet, almost anonymous, player in patient care, upon greater analysis one finds that it is the anesthesiologist who usually is the team leader. One team may be the “anesthesia care team” which can consist of the anesthesiologist and one or more Certified Registered Nurse Anesthetists working under supervision much like the cardiologist who supervises coronary care unit nurses. Just as often, the team is the entire operating room staff. Anesthesiologists are frequently the medical directors of operating room suites. They are the experts in attending to patient, nursing and surgical needs in a responsible and consistent manner while helping to make the operating rooms run in an efficient and cost-conscious manner. There is no greater satisfaction for the anesthesiologist than to have the daily schedule conducted in a safe, timely and patient-oriented way. The leadership skills required to do this are learned in a residency in Anesthesiology.

Another wonderful aspect of Anesthesiology is that it is a dynamic field and will continue to be so. Anesthesiologists are constantly developing new ways to care for patients, by developing new anesthetics and new ways to deliver them, and inventing new regional techniques and monitoring technologies. These innovations have positively affected outcome. For example, the death rate from anesthesia in 1950 was 1:1,500 and in 1995 it was 1:250,000. There are few other fields that can claim such phenomenal progress in reducing mortality. Anesthesiologists have also been leaders in reducing medical errors: in 1999 our specialty was singled out by the Institute of Medicine for leadership in patient safety research.

Anesthesiologists who participate in research are active in neuroscience, cardiac, and pulmonary laboratories using technologies ranging from molecular biology to computer science. They may be unraveling such problems as brain protection from ischemia or developing novel agonists for newly cloned receptors. There is much to be done in the basic sciences and the clinical implementation of scientific breakthroughs. This research keeps Anesthesiology vibrant and focused on a better future.

Society wants and needs high-quality anesthesia. This is provided by the anesthesiologist either alone, in group practice, or in a care-team model. Regardless of the practice make-up there is a demand for anesthesiologists because of recent short supply. The short supply as well as increased numbers of cases due to new procedures, more out-of-operating room procedures, and an aging population has increased the demand for well-trained recent graduates. Superb professional opportunities exist across the country.

In the final analysis, why choose Anesthesiology for one's life work? The answer is that patients want and appreciate the doctor who renders them free of pain and anxiety in one of the most stressful times of their lives. Likewise, the chronic pain patient appreciates the relationship he or she forms with the doctor who can give them an opportunity to return to a more normal life. And the patient in need of intensive care understands that our expertise may determine whether they have a life at all.

The immediate gratification of giving drugs or doing procedures that work within minutes is enormously satisfying. There is the sense of accomplishment that comes with quiet, effective leadership. Most importantly, at the end of each day there is the joy of professional achievement realized by knowing that one's work is complete and successful, and the confidence that tomorrow will bring the same opportunity.

Elements of a Residency Program

Mario Serafini, DO, and David H. Wilks, MD

Your future rests on the decision that you are currently making: the choice of where you will train for the next four years. During the residency years you will lay the foundation for the rest of your professional career. This section will define the factors that constitute a residency program so that you can match these elements with your personal learning preferences and lifestyle. Many residency programs are excellent but your personal factors will determine which program will allow you to reach your full potential.

The Anesthesiology Residency Review Committee (RRC) defines a "continuum of education" which consists of "4 years of training: the Clinical Base Year (CBY) and 36 months of Clinical Anesthesia training (CA-1, CA-2, and CA-3 years)."

Clinical Base Year:

The Clinical Base Year consists of "12 months of broad education in medical disciplines relevant to the practice of Anesthesiology." The Clinical Base Year generally but not always is completed before the CA-1 year, and "must be completed before the resident begins the CA-3 year." The Clinical Base Year consists of a minimum of six months of clinical rotations with direct inpatient care and additional months of emergency medicine and critical care; at most one month may involve training in Anesthesiology.

From the definition you can see that the goal of this year is to provide general medical training that will give you a background for specialty training in Anesthesiology. There are several paths for obtaining this training. Some Anesthesiology programs offer a Clinical Base Year as part of their program; to train in these programs you usually must match with them for the four-year continuum, referred to as "Categorical" by the National Resident Matching Program (NRMP). Other programs do not offer a Clinical Base Year; in these programs, you are in a three-year continuum ("Advanced" per NRMP terminology). Some programs offer both three- and four-year options.

Programs with four-year continuums vary widely in their offerings. As you evaluate the organization of various Clinical Base Years, you will see that some programs emphasize certain specialties such as Internal Medicine, Pediatrics or perhaps Surgery. Other programs may have a set program that is quite varied resembling a "Transitional" year program. When you develop interest in a specific Anesthesiology training program, you must decide if the Clinical Base Year offered by that program will suit your individual needs. For instance, if you should desire to become a pediatric anesthesiologist you may relish having numerous pediatric rotations; on the other hand, if you desire to be an intensivist you may be looking for a variety of intensive care rotations.

When matching with some Anesthesiology programs for the Clinical Base year, you may be sent to a location other than the home institution. These are frequently community programs. Many of these programs may be flexible and offer learning experiences different from university programs. You will need to evaluate the quality.

Most programs are organized to complete the Clinical Base Year by the end of the PGY-1 year; however, as mentioned previously, some four-year Anesthesiology programs may have you complete only part of the Clinical Base Year before beginning Clinical Anesthesia training. Later, but before the beginning of the CA-3 year, you will be rotated back to the Clinical Base Year curriculum. Some residents like this and want to split the Clinical Base Year; others don't. This may be a drawback if you decide to change programs as you will not have completed a base year.

As mentioned, other Anesthesiology programs do not offer the Clinical Base Year. Thus, when you match with these programs you are in a three-year continuum. You then have a separate Match into a Clinical Base Year. This can be either an advantage or disadvantage. You can look for a Clinical Base Year suitable to you and pick your Anesthesiology program based upon its clinical anesthesia training alone. You may desire to arrange these programs in different cities. However this increases the number of programs at which you must interview and increases the uncertainty around the Match.

Whether you match into a four-year program or a three-year program, you must make sure that the Clinical Base Year will meet your needs and will lay the foundation for your future Anesthesiology education. Be sure that you know the ground rules with each program. Above all, the internship must be in a high quality educational environment. Do not settle for anything less at the beginning of your career.

Clinical Anesthesia Years (CA-1, CA-2, CA-3):

The essential elements of residency programs as per the Accreditation Council on Graduate Medical Education (ACGME) are published by the American Medical Association in the *Graduate Medical Education Directory*. It is by these standards that the Residency Review Committee for Anesthesiology regularly reviews each training program and it is these same elements that will guide you in making your decision. The standards state that:

Providing residents with a sound didactic and clinical education must be carefully planned and balanced with concerns for patient safety and resident well-being. Each program must ensure that the learning objectives of the program are not compromised by excessive reliance on residents to fulfill service obligations. Didactic and clinical education must have priority in the allotment of residents' time and energy.

When you evaluate a program, ask the residents about the balance between clinical experience and didactic instruction. Make sure that you will be relieved from clinical assignments to attend conferences. You must have an adequate clinical experience. What is the optimal number of cases to do a year? Too few cases limits your experience, too many will limit your ability to acquire the necessary knowledge base. In most programs, you will perform between 400 and 700 cases per year.

In addition current standards state that:

There must be a minimum of two identifiable 1-month rotations in each of obstetric anesthesia, pediatric anesthesia, neuroanesthesia, and cardiothoracic anesthesia... These experiences must consist of at least 4 months of distinct progressive rotations in critical care medicine; at least 3 months in pain medicine ... 1 month in a preoperative evaluation clinic; and 0.5 month in a postanesthesia care unit.

Evaluate programs as to their ability to provide these experiences. To meet these requirements, some programs need to send residents to affiliated institutions. Whether the experience is in the home institution or in an affiliate, assess the quality of the experience. Has the program defined a curriculum describing the knowledge to be gained? How does the program ensure that the faculty teaches the necessary information? Are there subspecialty-trained faculty such as board-certified anesthesia intensivists available to teach you?

The standards specify exact minimum numbers of certain procedures, such as:

Forty patients undergoing vaginal delivery... Twenty patients undergoing cesarean sections... One hundred patients less than 12 years of age undergoing surgery or other procedures requiring anesthetics. Within this patient group, 20 children must be less than 3 years of age, including 5 less than 3 months of age.

You should read the complete list of procedures and ask how closely residents in each program meet these minimum standards. All programs have these records and faculty should be able to answer this question.

The first months of your CA-1 year lay the foundation for the next three years. Many programs offer special tutorials and lectures during the first month. In addition, the beginning residents may work with a limited number of faculty mentors during the first month. This allows close personal supervision during this critical part of training.

As to the didactic program, the standards state that:

Didactic instruction should encompass clinical anesthesiology and related areas of basic science, as well as pertinent topics from other medical and surgical disciplines. ... The material covered in the didactic program should demonstrate appropriate continuity and sequencing to ensure that residents are ultimately exposed to all subjects at regularly held teaching conferences. The number and types of such conferences may vary among programs, but there must be evidence of regular faculty participation.

When you evaluate the program, ask the faculty how the didactic program is organized. Has the didactic program been well planned? For example, how and when is pulmonary physiology taught and are all the sessions grouped together logically? Are all of the faculty involved in the didactic program? If not, who does participate and how is that decided?

Finally, you should inquire as to the methods for residents to receive and give feedback. Is confidentiality maintained? How are constructive criticisms managed? These mechanisms insure that a program can develop and improve.

Clinical Anesthesia 3 (CA-3)

For your final year of training, determine the amount of flexibility available to you in designing the CA-3 year. How is it determined that a particular experience will be available to you? How much elective time is there in the third year?

Are all of the various subspecialties of Anesthesiology available? How is it determined which residents get the various experiences if there is a limitation?

If you want to do research, how is your time funded? Are there experienced researchers available to guide you? How many residents typically elect to pursue a research elective?

All residents in their third year must complete an academic assignment. Inquire as to how the program achieves this requirement. Do residents typically give educational presentations, publish research or is a variety encouraged?

Summary

Any organization is judged by the quality of the product that it produces. The product of a residency program is you, the future graduate. After you have assessed the above aspects of a residency program, you should ask questions about graduates of the program. Do the graduates have a high passing rate on the Boards? How do current residents perform on the In-Training Examination? Finally, after information is gathered, you must determine if a program matches your lifestyle and your particular style of learning. There are many excellent programs and you must choose one in which you will feel happy and fulfilled. Some residents prefer highly structured environments; others prefer busy, informal settings. Some residents have no interest in research; others are stimulated by a research environment and are perhaps thinking of an academic career.

If you approach the process of choosing a residency program thoughtfully and carefully, you will find yourself experiencing four of the most stimulating and exciting years of your life. Good luck!

Anesthesia Subspecialties

Elena J. Holak, MD, PharmD

Anesthesiology is a dynamic and growing field that has traditionally provided perioperative care to surgical patients. Today the field has grown to include critical care medicine, acute and chronic pain management, hospice and palliative care, and patient care in sites remote from the operating room suites. These include the GI, pulmonary, electrophysiology and cardiac catheterization laboratories; interventional radiology suites; the magnetic resonance imaging and PET scanners, and radiation therapy suites. As the purview of Anesthesiology has expanded, so has an associated need for subspecialty training.

The Residency Review Committee (RRC) for Anesthesiology and the Accreditation Council for Graduate Medical Education (ACGME) accredit Anesthesiology residency training programs. A minimum of four years of graduate medical education is necessary to train a physician in the field of Anesthesiology. This consists of a Clinical Base Year (CBY) and 36 months of Clinical Anesthesia training denoted as the CA-1, CA-2 and CA-3 years. The CBY provides the resident with 12 months of broad education in medical disciplines relevant to the practice of anesthesiology. The CBY usually precedes training in clinical anesthesia.

The development of clinical skills and judgment requires that residents be given responsibility, under proper supervision and commensurate with their ability, for decision-making and for direct patient care in all settings. During clinical anesthesia training (CA-1 through CA-3 years), programs must provide an intellectual environment for the acquisition of knowledge, skills, clinical judgment and attitudes essential to the practice of Anesthesiology. In addition to training in the basics of Anesthesia and core competencies, Anesthesiology encompasses the theoretical background and clinical practice of a variety of subspecialty disciplines. Introduction to these areas may occur in the first two years of Clinical Anesthesia training. Program requirements dictate completion of a **minimum** of two month-long rotations blocks in each of the following subspecialty areas: obstetric anesthesia, pediatric anesthesia, neuroanesthesia, and cardiothoracic anesthesia. Three months of Pain Medicine training must be completed including acute pain, chronic pain and regional Anesthesia rotations. A maximum of one month of pain may be credited during the Clinical Base Year (CBY). Four months of training in critical care medicine are required during Clinical Anesthesia training with a maximum of two of these months occurring during the CBY. Additional requirements include two weeks in the postoperative care unit and one month in perioperative medicine. Other subspecialty rotations in Anesthesiology and related fields may take place in the CA-3 year. Additional subspecialty rotations are encouraged, but the cumulative time in any one subspecialty may not exceed six months during the CA-1 through CA-3 years. All residents must be ACLS certified. Details are available on the ACGME website, www.acgme.org. Follow the tabs to Residency Review Committees and Program Requirements.

Further subspecialty training may be acquired in the form of a fellowship. ACGME requirements mandate prior completion of an approved Anesthesiology residency for entry into a subspecialty-training program. A fellowship in a subspecialty of Anesthesiology is an educational experience of at least 1 year designed to develop advanced knowledge and skills in a specific clinical area. All educational components of the program should be related to program goals. The program design or structure must be approved by the RRC as part of the regular review process. Currently, Pain Management, Critical Care Medicine, and Hospice and Palliative Medicine offer subspecialty board examinations. Subspecialty certification is awarded to candidates who pass an examination after completion of a 12-month fellowship-training program.

Many other areas of subspecialty study are available. These include obstetric, pediatric, transplant, orthopedic, regional, trauma, neurosurgical, vascular, cardiothoracic, ambulatory and even education in Anesthesiology. To date, however, subspecialty board certification is not available in these areas. Many associated societies provide support in the form of research funding, publications, and meetings. One example is the Society for Education in Anesthesia, which provides this publication.

Anesthesiology requires a sound knowledge of physiology, pharmacology, and anatomy. These fundamental principles are the foundation of daily practice for an Anesthesiologist. In some respects the operating room resembles a human physiology lab as one can see the immediate effects of one's actions ranging from injecting a drug to changing a parameter such as inspired oxygen concentration. Both basic and subspecialty Anesthesiology couples clinical medicine with the most sophisticated and cutting edge technology allowing for an exciting, intriguing and gratifying career.

Types of Residency Programs

Saundra E. Curry, MD

Kathy Denchfield Schlecht, DO

Paul D. Mongan, MD, LTC MC US Army

Bernard Joseph Kelly, MD, MAJ USAF

Academic Programs

Choosing the correct residency program for you is important. Aside from location, reputation, call schedules and resident morale, you should consider the type of residency program. Is it an academic center, a private hospital not affiliated with a medical school (“freestanding”), or a military program? The kind of training you get will generally push your career in that particular direction, although the residency you choose does not limit your career path.

Most medical students’ first exposure to Anesthesiology is at an academic center because that is where medical schools are located. Academic centers have well developed specialty areas. University hospitals are often tertiary care centers so that all the surgical specialties such as neurological, cardiac, and pediatric surgery are represented. You can usually get the necessary full complement of cases in the one center, without the need to travel around. If you have a family this may be important.

The tertiary care university center usually caters to a diverse patient population. Diseases and surgical problems of unusual types are often referred to these centers. Though you may rarely see any of these so-called “zebras” in your future career, having been exposed to their anesthetic management will be helpful.

Academic programs tend to be large. This can be both good and bad. Large programs are usually located at busy centers where it’s easier to get a wide range of cases. More people to share the burden may lessen your call. However, one can get a bit lost in a large center and feel alienated from other residents that you don’t see very often. This is especially true if an academic program is spread out among several hospitals.

Academic centers tend to have a large and varied staff. Since there is rarely only one way to do a given case, a diverse staff will teach you many different anesthetic options from which you can ultimately synthesize your preferred approach.

Anesthesiology is not limited to the operating room. Anesthesiologists have naturally branched into the areas of critical care and pain management. Academic centers usually have one or more intensive care units in which anesthesiologists are actively involved. Pain treatment clinics are often linked to academic centers as they utilize a multidisciplinary approach to the treatment of pain. Anesthesiologists, internists, psychologists, and surgeons work together to solve acute and chronic pain problems.

Academic centers offer research opportunities. Early exposure to research activities can teach a true appreciation of the pharmacological and physiologic intricacies of administering anesthesia. It is possible to get involved in clinical or bench research as a resident and this may even lead you to choose research as part of your career.

Academic centers offer many teaching opportunities. You will be involved with medical students and junior residents, in the operating rooms as well as in classrooms. Skills in the teaching arena can be discovered and developed in this setting.

There are many areas of interest in Anesthesiology. Academic centers offer many options to residents; these options offer infinite variety in the way that your career may develop.

Freestanding Programs

“Freestanding programs” are residency programs offered by private health care systems that provide clinical training at major tertiary hospitals. These tertiary care centers must be massive enough to supply the diversity, complexity and multiplicity of cases required by the Accreditation Council on Graduate Medical Education (ACGME) to maintain accreditation of their training programs. Therefore, many private practice hospitals do not qualify for Anesthesiology residency programs. The institutions that do qualify are major trauma centers and referral centers with established networks in communities and ambulatory sites and may be affiliated with more than one medical school. Medical students may select Anesthesiology rotations at a freestanding program to learn about practices and procedures at a private institution.

Historically, students interested in private practice selected freestanding programs, while students interested in academic practice selected academic programs. However, the requirements for accreditation of Anesthesiology residency programs have eliminated many differences between freestanding and academic programs. These requirements specify the number of procedures, types of cases, specific rotations and topics that must be included in residency curricula for Anesthesiology. Market forces have also diminished the differences between academic and freestanding programs. Now, many residents graduating from freestanding programs are accepting Anesthesiology faculty positions and many academic-center residents are entering private practice.

All programs supplement clinical training with didactic instruction. Each program has developed a unique curriculum to prepare residents for the examinations of the American Board of Anesthesiology. The didactic programs are specific to each residency and will vary among the freestanding programs as well as among the academic programs. Practice management is mandated as part of the six “core competencies” delineated by the ACGME for residencies in every discipline; residents at freestanding programs experience private-sector practice management by implementing responses to health care reform, such as cost efficiency, outcome measures, and quality assurance.

Recognizing that it is difficult to generalize, academic programs produce both basic science and clinical research, while freestanding programs tend to produce more clinical research. Many freestanding programs have adjunct PhD research staff to perform basic science research and integrate their material into clinical studies that can be performed by the clinical anesthesiologists.

In summary, the differences between freestanding and academic programs are diminishing due to the pressures of health care reform and the ACGME requirements for Anesthesiology training. All high-quality residency programs will provide an environment of inquiry and scholarship to advance the field of Anesthesiology. Whether you select a freestanding or academic program, it is important to realize that even the best programs have their individual strengths and weaknesses. Therefore, assess each program and choose the one that will fulfill your objectives to ensure a rewarding training experience.

Military Programs

Current military Anesthesiology residencies include a combined Army-Navy program in Washington DC (Walter Reed Medical Center), a combined Army-Air Force program in San Antonio TX (SAUSHEC at Brooke Army Medical Center, or “BAMC”), and Navy programs in San Diego CA and Portsmouth VA. The number of annual training positions available for each service is different, with the Army currently offering approximately 14, the Navy 18 and the Air Force 7. Since increased interest in Anesthesiology has resulted in more applicants than military residency positions available, only fourth year medical student graduates with a U.S. military obligation (HPSP, USUHS, ROTC) may apply to the military first year graduate medical education programs. However, because of the shortage of anesthesiologists in the Armed Forces, in the past few years an additional 20-25 physicians with military obligations have been allowed to train in civilian Anesthesiology programs. Number of available anesthesia positions may vary somewhat from year to year.

Medical students interested in a military Anesthesiology residency should consider electives at their preferred programs as early as the late third year of medical school or very early during the fourth year of medical school and interviews with the Program Directors. ACLS and BLS knowledge is encouraged and expected per the military as early as possible. Most such rotations encourage a reading program in “Baby-Miller,” and it would be wise to have pre-read the central chapters within this text prior to starting such a rotation and to review the anatomy associated with basic nerve-blocks. This preparation will serve well toward gaining the confidence of Anesthesia teaching staff. Although each service has slightly different procedures, medical students seeking an Anesthesiology clerkship should contact the medical student education office and the Anesthesiology department at the desired program.

In recent years, both the Army and Air Force have selected 80-90% of residents as fourth year medical students for a combined internship/Anesthesiology residency. The Navy, however, continues to select all of their residency positions from the applications of physicians who are in or have completed their PGY-1 year of training. Medical students with military obligations requesting permission to train at a civilian internship/residency must go through their respective service application process. The availability and rules for attending a civilian internship/residency vary by service and year. For instance, the Army allows medical students to pursue a civilian internship/residency but rarely allows a physician to attend a civilian Anesthesiology residency once they have entered a military internship program. On the other hand, the Air Force will allow a physician in a military internship to pursue Anesthesiology training in a civilian program.

Each year, information and applications for military internships are sent to all Health Professions Scholarship (HPSP) students during the third year of medical school. Students interested in a military Anesthesiology residency who are not

HPSP should contact their local military recruiter. However, recruitment actions can take one to two years to complete and applications for military internships and residencies are generally due in September of the fourth year of medical school with results in early winter.

Because the rules and regulations regarding timing, eligibility, financial compensation and other contractual obligations pertaining to these programs are beyond the scope of this publication, individual applicants should obtain complete information through their military liaisons, their HPSP office, or by contacting the Anesthesiology Consultant or Advisor to the Surgeon General of their respective service. Access to “.mil” Web sites may be limited from non-governmental domains, but information for the Air Force Anesthesiology Program Director can be obtained through the Air Forces Anesthesiology Program Website <http://www.sammc.amedd.army.mil/staff/education/GME/residency/anesthesia/index.asp>

The Anesthesiology Consultant to the Surgeon General of the Army can be contacted through the leadership section on the Army Medicine Web site www.armymedicine.army.mil. Information regarding the application process for Army Residencies can be obtained on the Army Graduate Medical Information Web site (<http://www.mods.army.mil/medicaleducation/>). Information on the US Navy's programs is available at http://www.bethesda.med.navy.mil/Careers/Graduate_Medical_Education/index.aspx, <http://www.med.navy.mil/sites/nmcsd/Staff/Pages/AnesthesiologyResidencyProgramARP.aspx>, <http://www.med.navy.mil/sites/nmcp/EduTrain/Pages/Residencies.aspx>, and <http://www.med.navy.mil/sites/nmcp/EduTrain/Pages/Residencies.aspx>.

The following is information adapted from the respective Web sites:

USAF/ARMY combined residency training in Anesthesia at BAMC

Internships: Only 4th year medical student graduates with a U.S. military obligation (HPSP, USUHS, ROTC) may apply to the Army First Year of Graduate Medical Education (FYGME). Applicants are required to apply through the Medical Education FYGME Branch, Falls Church VA, in addition to applying to the Electronic Residency Application System (ERAS). For more detailed information on applying for FYGME, contact the Medical Education Office, FGYME Branch, Falls Church VA, 1-800-793-5970.

Residency/Fellowship: Active duty Medical Corps (MC) officers who are U.S. citizens and a graduate of an accredited U.S. school of medicine. Any MC active duty officer, who is a graduate from a foreign medical school, must possess a standard certificate from the Educational Commission for Foreign Medical Graduates (ECFMG).

<http://www.sammc.amedd.army.mil/staff/education/GME/residency/anesthesia/index.asp>

Combined Army and Navy Residency Training Program at Walter-Reed Medical Center

The primary goal of this program is to provide specialty-trained physicians to support the many missions of the United States military. Beginning in the clinical base year, prospective residents are given a strong clinical internship to include exposure to the subspecialties of surgery and medicine. Training specifically designed for the military physician is incorporated into this internship. Examples of military-focused training include the Advanced Trauma Life Support Course, the Combat Casualty Care Course, and military emergency room rotations.

An Anesthesia Simulator located at the Uniformed Services University School of Medicine in Bethesda, MD is incorporated into the residents training schedule.

<http://www.wramc.amedd.army.mil/Patients/healthcare/surgery/anesthesiology/Pages/residencyprogram.aspx>.

Anesthesiology: Rich With Unique Opportunities for Research

Rafi Avitsian, MD

Although a relatively young specialty, anesthesiology has contributed enormously to many areas of medical science. If one had to summarize an anesthesiologist's goal in regards to the patient in only a few words, it would probably be "Keep the patient safe." Many consider the anesthesiologist a guardian of the patient, protecting him or her from all harm during, and even beyond time when intense treatments are being implemented.

The modern anesthesiologist utilizes important concepts from physiology, pharmacology, molecular biology, the neurosciences, genetics, computer science and other disciplines on a daily basis to affect the best outcome for patients.

Although other medical sciences have contributed greatly to the sophistication of modern anesthesiology, anesthesiologists are now one of the most important driving forces behind the continued evolution of the specialty. The breadth and depth of the ongoing research in anesthesiology spans from the fundamentals of basic science to practical aspects of establishing "best practices" for perioperative care. Anesthesiologists have been pivotal in the development and testing of pharmaceuticals, drug delivery techniques, and clinical protocols, all of which are utilized to achieve safe and effective muscle relaxation, sedation, unconsciousness, and pain relief. They have advanced our understanding of neurotransmission, cerebral ischemia, cardiac function, coronary ischemia, gene expression, pulmonary gas exchange, septic shock, myocardial ischemia, uteroplacental pathophysiology, spinal cord reflexes, pediatric pharmacology and many other exciting areas of medical knowledge important in the everyday care of both routine and complex surgical patients.

The role of anesthesiologists in the advancement of safety in the operating room can be recognized by the number of research protocols related to anesthesia. The Web site www.clinicaltrials.gov, which provides updates about federally and privately supported clinical trials, can be used as a guide to find research trials in any area of anesthesiology. Using the search term "Anesthesia," more than 1974 trials were found half of which are currently open and active. Areas of research related to anesthesiology include a plethora of topics including such things as the mechanism of action of inhaled anesthetics, techniques of anesthesia care, neuromuscular transmission, pharmacogenetics, molecular biology of cell signaling, and health system management.

With an increase in life expectancy and a change in complexity of candidates for surgical procedures, anesthesiologists are facing more challenging and difficult cases every day. Anesthesiologists have taken the lead in transforming their practice in concert with the important changes in today's health care environment. Beyond clinical care, anesthesiologists, as the gatekeepers of perioperative care, have taken on an increasingly important role in the management of perioperative care at the hospital and health system level. Research into health care delivery systems and practice management has led to the literature of the business of medicine being replete with articles by anesthesiologists establishing metrics for standards of care, best practices, and management of perioperative medicine.

Advancements in patient safety in anesthesiology have been by far one of our most important and laudable goals and have been the focus of national organizations that provide opportunities for funding and mentorship for young researchers. Organizations within anesthesiology have dedicated their activities to research and development of the science of patient safety. The Foundation for Anesthesia Education and Research (FAER) has a mission "to advance medicine through education and research in anesthesiology" through promoting the generation of new knowledge in anesthesiology that advances patient care, and fostering career development of anesthesiologists dedicated to research and education in perioperative, critical care, and pain medicine. FAER offers a number of grants for residents and fellows focused on both basic science research as well as education. A full listing of opportunities can be found on their web page (<http://www.faer.org/>). For those looking for help in getting their research careers started, FAER also has a mentoring program designed to help junior faculty link up with national known mentors from across the specialty. The International Anesthesia Research Society (IARS), an international society committed to improving clinical care, education and research in anesthesia, pain management and critical care, also offers many research grants. Many subspecialty organizations in anesthesiology also support research in basic science as well as clinical areas starting from residency levels. These include the Society for Ambulatory Anesthesia (SAMBA), the American Society of Critical Care Anesthesiologists (ASCCA), the Society of Cardiovascular Anesthesiologists (SCA), the Society for Education in Anesthesia (SEA), the Society for Neuroanesthesia and Critical Care (SNACC), the Society for Obstetric Anesthesia and Perinatology (SOAP), and the Society for Pediatric Anesthesia (SPA). Links to all these societies' web sites can be found by going to the American Society of Anesthesiology web site and looking under "Links of Interest" (<http://www.asahq.org/Links/associationsus.htm>).

Medical students who want to continue their postgraduate education in anesthesiology are strongly encouraged to inquire about research activities and opportunities that residency programs offer. For those who are interested in research this may be an important criterion in choosing the residency program; but even for those not considering an academic position in the future, a sound background and understanding of research is essential to keeping abreast of changes in the specialty and fully understanding when to adopt new techniques or practices. As part of its program requirements, the ACGME specifies that every resident participate in an academic project as part of their training and that the program include exposure to research as part of their teaching program. As a result of this requirement, many residency programs have developed specific programs to enhance and expand research opportunities and allocate faculty positions and financial resources to create an environment that is conducive to research and investigation. Many residency programs reach beyond these requirements resulting in initiatives to facilitate early exposure to research opportunities. These programs allow residents to start a research project early in their training and continue it through residency. In other instances, anesthesiology departments have created a separate section or division dedicated to research in basic and clinical science focusing manpower and resources where they can be most productive. Residents can have rotations in these sections and receive guidance and help to develop and improve their research skills.

The future of anesthesiology is cradled in part by the vigor with which its physicians participate in the scientific underpinnings of the specialty. Medical students of diverse backgrounds will find the wealth of opportunities and excitement that abound in the field of anesthesiology both stimulating and intellectually challenging. The specialty of anesthesiology is more than just IV access and airway management, it is the driving force that advances the science and understanding of clinical physiology, pharmacology, pain management, and patient safety.

The Application Process:

Preparing Your Curriculum Vitae and Personal Statement

Susan H. Noorily, MD

Congratulations! You have survived the most difficult years of medical school and would like to pursue a career in Anesthesiology. It is time to secure a position in an approved residency training program. You undoubtedly have many talents and accomplishments. Your primary method of communicating these qualifications and experiences to Anesthesiology Chairs and Program Directors is by writing a well-organized and informative Curriculum Vitae (CV) and Personal Statement. These documents, in addition to your “Dean’s Letter” and letters of recommendation, will support your application.

A list of all Anesthesiology training programs in the U.S. is available through the ACGME website (www.acgme.org) simply click on the “Search Program/Sponsors” tab and follow the links. Most programs participate in the Electronic Residency Application Service (ERAS). A few programs may use their own application or the *Universal Application for Residency*. The list of ERAS participating programs is available at www.aamc.org/eras. You cannot use ERAS to apply to a program that is not available on the ERAS website. Contact your Dean’s Office for further information about this service.

ERAS® – the Electronic Residency Application Service

The Association of American Medical Colleges developed ERAS to transmit residency application materials (applications, personal statements, CVs, recommendation letters, Deans’ Letters, transcripts, and other supporting credentials from medical schools) to residency programs using the Internet. ERAS processing fees are based upon the number of residency programs selected. For further information and guidelines regarding the application process through ERAS, see the ERAS website (www.aamc.org/students/eras).

The Curriculum Vitae

The purpose of the CV is to get an interview. This is accomplished by giving the program director (employer) a snapshot of what you have done and how to contact you. It should be an honest and accurate representation of your qualifications for Anesthesiology residency training. If you are applying to a residency program using ERAS, a CV will be generated for you using the information you provide to ERAS on the Common Application Form (CAF). Therefore, all applicants applying to residency programs through ERAS will have CVs formatted in the same manner. The computer-generated CV will be supplied to the residency programs with your application materials. Once submitted to ERAS, information on the CAF cannot be edited. In contrast, information entered in “Your Profile” (for example, contact information) can be updated at any time during the application process.

It is useful to have prepared a CV before completing the CAF so that all information is in one place and to distribute to individuals who will be writing letters of recommendation for you. A basic CV should include: name, address, permanent address (if different), e-mail address, telephone numbers, and FAX number; education: undergraduate, graduate, medical school; license or qualifying exam data; honors and achievements; professional associations; work experiences; references (it is appropriate to state “available on request” if preferred); and optional items such as foreign language ability, special skills, publications and research activity, and other interests. Think about what hobbies/interests you want to list. The goal is to spark some conversation or create a link with the interviewer.

Your CV should be a concise document, preferably two to three pages. The person reviewing your CV should be able to gather the most important information about you by reading the first page. Most CVs are organized in chronologic (or reverse chronologic) order, as this format is useful in presenting an overview of your education and experience. Do not leave unexplained gaps in the timeline. You need not explain the three months between college and medical school, but if you took a year off to backpack the Pacific Coast Trail, say so; otherwise, the reviewer might presume that you are hiding something. Print your CV on high quality paper for a professional appearance. Avoid fancy fonts or other embellishments. There can be no errors in spelling, grammar, or punctuation. Above all, be factual. Remember that Anesthesiology is a specialty that requires a compulsive attention to detail. It is helpful to have your advisor/mentor or other faculty member review your CV. Included at the end of this section is a template for a basic CV.

The Personal Statement

The Personal Statement accompanies the CV and should not repeat the same information. The CV lists facts and is not intended to reflect your personality. In contrast, the Personal Statement is your opportunity to convey information not found elsewhere in your application. Its content should allow the reader to see you as an individual set apart from other applicants.

Most medical students dread the process of writing a Personal Statement and do not know what to include. It can be difficult to write about oneself. Because you may not recognize your own strengths and talents, it may be helpful to ask someone who knows you well for feedback. If all else fails, just start writing. Once you get something down on paper, editing will be easier.

Before writing your Personal Statement, obtain and read some previously written Personal Statements as examples. Identify styles that appeal to you and incorporate these when you write your own statement. Next, think carefully about your own special strengths, talents, qualities, interests, accomplishments, and experiences and write them down in a list. Be honest! These attributes are what make you “stand out from the crowd.” Compare the items on your list with your idea of what might make a “perfect” resident in Anesthesiology. Select attributes from your list which resemble or support the characteristics of the “ideal” resident and incorporate these as the focus of your Personal Statement. Do not concentrate on items shared by most applicants (e.g., “bright and hard working”). Emphasize those items that show you to be the best possible candidate for a residency training program and how you will enhance the medical specialty of Anesthesiology.

Now you are ready to write your Personal Statement. Try to limit this document to one page. To help you organize your thoughts, make a detailed outline of what each paragraph will discuss, preferably centered on a main theme. You may want to describe a special event which led you into medicine or helped you choose Anesthesiology. Don't forget your special attributes. The first paragraph, or introduction, must be attention-getting. Other paragraphs may describe your special skills, hobbies, or family life. You might want to write about your goals and what you are looking for in a training program. Be sure to end with a strong conclusion which relates back to your theme. Reference #3 provides numerous worksheets and examples to help you create a Personal Statement.

Your Personal Statement should be unique and leave a lasting and favorable first impression of you. As always, your final composition must be free of any spelling, punctuation, or grammatical errors. Remember that Anesthesiologists are compulsive and must pay careful attention to detail. Ask your Faculty Advisor to review your Personal Statement and offer constructive comments. Ask a few other individuals to proofread the document.

Hopefully, these suggestions will make the process of writing your Personal Statement less painful and, quite possibly, an enlightening experience for you.

References

1. **Accreditation** Council for Graduate Medical Education. www.acgme.org Accessed May 2009.
2. ERAS Residency and Osteopathic Internship Applicants Site. Association of American Medical Colleges. www.aamc.org/students/eras Accessed May 2009.
3. Tysinger, JW. *Resumes and Personal Statements for Health Professionals, 2nd ed.* Tucson, AZ: Galen Press Ltd, 1999.

Name (Larger Font)

Address

Phone Numbers/Fax/e-mail

Education

Year School, Location, Degree

Year School, Location, Degree

Honors and Awards

Year Award

Special Experiences (Teaching/Research/etc.)

Year Description

Year Description

Employment

Year Job/Location/Specifics

Year Job/Location/Specifics

Languages

Spoken/Written/Fluency

Professional Associations

Extracurricular Activities

Year Description

Year Description

Professional Interests

What to Look For in a Residency Program: A Recent Graduate's Point of View

Shawn T. Beaman, MD

The credence in my thoughts on what to look for in an anesthesiology residency program is not in my vast experience educating residents as it is for the other authors of this guide. Rather, the validity of my thoughts stem from the fact that I recently survived the process. I think it is also important to note that I am also now profiting from it, both financially and professionally. After all, I think it serves the prospective resident well when confronted with the many often confusing issues surrounding graduate medical education to keep in mind that the ultimate goal is to become a board certified anesthesiologist and get the job of your choosing. In the following sections I will detail the principal variables often confronted when you evaluate residency programs. The comments that follow are an amalgamation of my own opinion, experience, and observations coupled with a lot of good advice I received along my own path. I have omitted the bad advice. I intend for my comments to be as balanced as possible, however, by their very nature as my comments, bias is inevitable. This leads me to my first piece of advice, talk to as many other medical students, anesthesiology residents, and anesthesiologists as possible and weigh every opinion you receive.

Location, Location, Location

Location is a hot topic on the interview trail. Who wouldn't look forward to a sunny destination when traveling from the north in December or January? In my experience, medical students fall within three categories when discussing location of a residency program: I'll never leave home, I have to leave home now, and home is where the top program in the country is, at least for this year. Which category you fall into will likely heavily depend upon your personal and family circumstances. A few words follow for each.

It is true that most physicians practicing in most geographic regions of the United States trained in that area. If you are fortunate enough to have a solid grasp on where it is you want to live and practice, training in that area is very likely to be beneficial. You will naturally develop professional relationships and gain valuable insights into the available practice settings. Most commonly, you will also train with the loving (maybe even financial) support of friends and family members which can be extremely important during residency. The potential cost of the comfort of staying in or near your hometown for training is that you may risk becoming a product of your hometown's program. If it is an outstanding and innovative program, there may be little downside. If it is a stable program that resists change, it is unlikely that you will bring anything new to the community once you have completed your training.

Residency can be a great time in a young adult's life to experience a new city or town. The experience is time limited and well defined. It can be a time to grow both professionally and personally. However, I caution, be honest about the time and energy you will or should have available as a resident to surf, ski, parasail, and climb volcanoes in your "dream" location. Making a drastic move across the country simply to pursue a hobby is seldom advisable. However, making a well informed move to a location that is desirable to you may invigorate your residency education and life overall.

I cannot discourage anyone from moving in order to benefit from a training program that will serve their needs, be it the arguably "best" program in the country or a program that simply suits you perfectly. However, be sure to research the community surrounding your "dream" program so that you can assess how likely it is you will be happy living there for three or four years.

Reputation = Quality?

After location, the most common variable considered by medical students is the program's reputation. This is often a marker of the quality of a program, but not always. That is, training in an institution that carries a household name outside of medical circles will not always afford the best training. Unfortunately, a good dose of perception goes into reputation. The only antidote is to actually assess the quality of a program.

I have to admit that truly objective measures of a program's quality are hard to come by. However, a few exist, and you should make it your mission to find out where your perspective programs lie on these measures. First, find out when the program's last review by the Accreditation Council for Graduate Medical Education (ACGME) was. The ACGME conducts regular site visits and reviews all of the training programs in the United States. The best programs in the eyes of the ACGME are awarded five year accreditations. Struggling programs are awarded only one year accreditations or are put on probation.

Second, find out what the pass rate is for each program's graduates on the American Board of Anesthesiology Certification Examination. This data was not routinely released to programs prior to 2008 by the ABA. A good question to ask is how many graduating residents passed in the prior few years. Most residency program directors will have this information at hand.

Third, come away from each interview with an understanding of how the program's didactics work. How exactly do they teach you what you will need to know to become a board certified anesthesiologist? The approaches vary greatly, but the most common answer will be via a combination of clinical work and a lecture series. Find out who is providing the lectures, the frequency with which they occur, and whether or not residents are able to be freed from their clinical duties to attend. While the details of the education will be provided by the faculty you meet at interviews, the necessary confirmatory information must come from residents you meet informally during your interview experience. This is as good a place as any to state that you should be very wary of programs you visit that do not provide an opportunity for you to speak directly with their current residents.

Fourth, uncover the true volume of cases available to residents. The ABA sets forth requirements of case numbers and procedures each resident must attain by the end of his or her residency in order to be eligible to sit for the ABA's exam. Find out when the residents at your prospective programs attain these numbers during the course of their training. Does each institution offer an ample number of each variety of case or do the residents have to do "away" rotations at other institutions. While programs in very small hospitals may struggle to offer enough cases, very large university settings might be rife with competition among residents, fellows, and student nurse anesthetists.

Finally, ask your interviewers what recent graduates of the program are doing. Are they able to get jobs in the immediate community? Are they competitive nationally for jobs? Are they competitive in the geographic or subspecialty areas that you envision your self working in? Can they get the fellowships they want? Where do they go for their fellowships? While, assessing the quality of any one program can be exceedingly difficult, the above are the most common objective measures available.

Academic vs. Community

Both academic and community programs across this country offer superb training in anesthesiology. Be sure to subject both types of programs to the above more objective quality measures. Beyond that, choosing on this variable is largely dependent upon personal preference and only slightly on future professional aspirations. In many community programs the exposure to research and to life as an academic physician may be limited. However, some universities employ private groups of anesthesiologists to staff their operating rooms that may not be substantially different from community practices. Unless, research is a top priority of yours, I believe prospective programs are better evaluated by the few available objective criteria above rather than this classification.

Three-Year Program? Four-Year Program?

As you hopefully know by this point in our guide, currently to sit for the ABA Board examination and become a "certified" anesthesiologist, residents must complete a one-year internship and three years of clinical anesthesiology training. Traditionally, programs in anesthesiology only offered the three years of anesthesiology training and medical students arranged for their first year experience by matching to a transitional year, a medicine internship, or a surgery internship. Most commonly, this is all done during a student's match that takes place during the second half of their fourth-year of medical school. The match allows students applying to specialties requiring an initial year of training prior to specialty training to designate a sublist of internship choices for each residency choice. Many universities and community hospitals offer quality transitional years or internships in medicine and surgery. First-year programs that seem too good to be true on the basis of work hours or perks may sacrifice true teaching for protocol driven management by attending physicians off-site.

Increasingly, many residency programs in anesthesiology are also offering integrated internships. What that means is that the applicants need only to apply to one program and the internship requirements are satisfied by the program overall. The most obvious benefit of such a system is streamlining the application, match, and interview process.

I believe it is difficult to demonstrate that the location of one's internship will alter the caliber of an anesthesiologist that he or she ultimately becomes. However, I do believe it can impact upon the ease with which a resident transitions into their clinical anesthesiology training. Quality four-year programs offer an integrated internship that is overseen by the anesthesiology faculty. That is, even though the majority of the rotations during the internship may take place outside of the anesthesiology department, anesthesiology faculty members are choosing and supervising these rotations. Such an approach can lead to a well-trained intern that has been exposed to other fields of medicine that have

strengthened their skills and prepared them for anesthesiology. Programs with this design often ease the transition from internship to residency by frequent exposure of the interns to the other residents.

Summary

I hope this perspective will be helpful as you consider your residency options. I regret you did not find many answers, just more questions. The good news is that the best residency program for you is the one that addresses your particular needs, desires, strengths, and weaknesses. Like many things in life, it is difficult to make a decision until we can really discover what we want. I challenge you as you prepare to select prospective residencies in anesthesiology to query yourself about what your likes, dislikes, and goals may be.

The Interview

Jeffrey J. Schwartz, MD

You've gotten an interview. That's great! Something in your application has gotten the attention of the program director or interview committee and they want to know more about you. Programs interview candidates in many different ways. Nonetheless, the common goal is to gain information about you not readily obtained from materials in your Electronic Residency Application Service (ERAS) application (which includes your USMLE or COMLEX scores, supporting letters, and the Dean's medical student performance evaluation).

Many questions go through the minds of the people who interview you. How strong are your interpersonal skills? How well do you communicate? Are there personal matters which will affect your performance? Are you trying to coordinate your plans with those of your spouse or significant other? Do you display any sign of substance abuse? Have you thought out plans for the remainder of your medical school education and for your Clinical Base Year (if not an integral part of their program)? Remember that the Association of American Medical Colleges and many program directors discourage students from spending their senior year doing repeated "audition" electives in their chosen field, preferring that the senior year broaden your skills in general medicine.

Remember that your interviewers will appraise your appearance, dress, and demeanor. Promptness in arrival is an absolute necessity. Should there be any difficulty in arriving on time, call ahead to explain, estimate your delay, or if necessary, reschedule your interview. Most program directors will eliminate unexplained "no-shows" from further consideration. If you have decided not to attend an interview after you have scheduled it, call the program so that your "slot" can be offered to another candidate. Should your travel plans pose a strict time limit, let the program know clearly at the outset.

No matter how the interview is structured, the session entails formal evaluation of you, the candidate. Do not act overly familiar, casual, effusive, or chatty. Do not "name drop" or make inappropriate comparisons between programs. Do not try to reach interviewers outside of the hospital unless specifically invited to do so. Be true to yourself. Above all, be honest!

Common courtesy and thoughtfulness are essential. Remember that proper rules of behavior apply to everyone involved in the application process. More than one selection committee has rejected a candidate who has behaved rudely to secretarial or administrative staff.

Do your homework. Never come to an interview without at least reviewing the material provided you by the department. Seek additional information about the department in advance, so that you will know as much as possible before arrival. How else will you have a basis for intelligent questions? Resources can include a personal mentor, your home institution Anesthesiology faculty and residents, and even other candidates you meet while interviewing.

Prepare to answer frequently asked questions by organizing your thoughts prior to the session. After each interview, recall your responses and reflect on how you might better reply to similar questions in the future. Rehearsal and practice are both important in developing your communication skills. Many medical schools offer mock interviews with experienced faculty interviewers outside the specialty in which you are applying. If your school offers this, it is an outstanding opportunity to take advantage of. If your school does not offer mock interviews as an organized service, you may still be able to coax some faculty to take you through an interview.

More programs are beginning to use the technique of 'behavior description interviewing'. This is an interview technique that has its origins in the corporate world. The premise is that the best predictor of future behavior is past behavior and the more recent the behavior, the more predictive. A program decides in advance what important behaviors are for their residents, say, thinking quickly on their feet. A question is then formulated such as "Tell me about a time you had to think quickly on your feet and how you arrived at your decision". The response can then be graded objectively. It is intrinsically difficult to prepare for such questions and that is one reason they are used.

You, and your interviewers, should be aware that there are questions that cannot legally be asked during an interview. These include questions about race, color, ethnicity, sex, religion, national origin, birthplace, age, disability, family and family plans. An interviewer can, however, ask if you will be able to perform the duties of an anesthesiology resident, if you are eligible to work in the United States, or if there are barriers to relocation. If you bring any of these topics up, however, the interviewer may inquire further.

You will experience a wide variety of interview formats. Some institutions interview all candidates, while others screen applicants and interview only candidates who meet certain criteria. Candidates will usually have a tour of the facilities and an opportunity to meet current residents, as well as a chance to ask questions at one or more actual interviews. Individual interviews are common when a large number of faculty are involved in the selection process. Individual interviews are also undertaken when an applicant is unable to attend a scheduled group session. Group sessions are often more structured, involving one or more presentations and orientation lectures by the faculty. In either case, be prepared to meet several interviewers at varying levels of seniority. Regardless of group or individual format, realize that program directors may seek feedback from current house staff and will usually weigh opinions of both housestaff and faculty.

Use the tour as an opportunity to help evaluate your future working environment. If an opportunity exists to meet casually with current residents, take heed of their perspectives. Try to assess whether residents are pleased with their program. If you are not allowed to freely interact with residents, evaluate the program with extra care.

You should have some questions for the program director, as the interview is a two-way process. Certain questions may remain even after you have carefully reviewed the information sent to you: rotations; teaching conferences; CA-3 subspecialty programs; scheduling of meetings and vacations; relations with Certified Registered Nurse Anesthetists and student nurse anesthetists, medical students, and other disciplines, and so on.

You may have other kinds of questions. What is the educational philosophy of the program? How is responsibility for education divided between residents and faculty? How do residents perform on the American Board of Anesthesiology In-Training and Board examinations? What are the specific areas of faculty interest and expertise? Are residents included in research or teaching opportunities? Asking similar questions to different faculty members may be revealing. Directors of subspecialty areas may better answer questions about their own rotations, as well as the CA-3 subspecialty and fellowship programs they direct.

Ask the residents about their views on all of these points. No one is in a better position to reveal the practical aspects of daily routine. You may partially assess the strength of your own candidacy by judging how closely you match current residents in their educational backgrounds, goals, learning styles, and interests.

While each program seeks its own set of desirable characteristics in an applicant, certain traits are sought in all applicants. Every program director hopes to find candidates with a genuine interest in the field, a broad background in the basic sciences (especially pharmacology and physiology), and a firm grasp of general medicine (particularly cardiopulmonary disease). A prospective resident should have no legal, moral or ethical impediments. Interpersonal skills, communication skills, and stress-management skills are especially important, as judged by the interview and letters of recommendation. When seeking entry into a specialty with such ready access to drugs with a high potential for abuse, anyone with a history of substance abuse bears responsibility for proving that a problem no longer exists.

Aside from the general criteria, individual programs may seek candidates with specific qualities. These can include educational background, career interests or learning style. Your mesh with the training program can influence how comfortable you will be and how much you will learn. While a practice-oriented candidate can certainly obtain excellent training in a highly research-oriented program, such an individual may be happier in a more clinically oriented setting. Similarly, an independent learner can flourish in a loosely organized program but others may need the clear expectations of a highly structured curriculum or the pressure of frequent tests. Be honest with yourself about your learning style, goals, interests, and future plans. Every program has its strengths and weaknesses. None is perfect overall. Strive to match the program to your knowledge about yourself.

As with everything these days, the Internet is a tremendous source of information. One of my favorite sites is “sdn: The Student Doctor Network” at <http://www.studentdoctor.net>. There are lots of forums to ask questions and many articles written by experts on all aspects of medical education. There is a two part article on Getting Into Residency by Dr. Jessica Freedman. Part 2 (<http://www.studentdoctor.net/2009/02/getting-into-residency-part-2>) discusses the resident interview in depth.

You have faced interviews at many stages in your education. Your last interview was probably four years ago as you applied for medical school. While the details may change, the ground rules do not change. Do your homework. Be prompt and courteous. Plan questions as well as answers. Most important, be yourself.

Deciding

Andrea L. King, MD, Rosemary Hickey, MD, Lois L. Bready, MD

You may feel slightly overwhelmed after the interview process is finally complete. Formulating your Match list can be a daunting task after you have visited numerous programs, and gathered vast amounts of information during the interview process. Many factors should be taken into account when deciding on your program rank order. Prioritizing your career goals and educational needs will help to simplify this process.

Ultimately, we all desire to train within a program that best suits our personal needs and goals. What constitutes a good learning environment for one resident may not be true for another. Personalization is key to your decision making process. Does this program fit my career goals and educational needs? Do I fit this program? Factors to consider include: the national reputation of a program and its faculty, a program's accreditation cycle, availability of first year (PGY-1) positions within the program, familiarity with the program (e.g. externship experience), didactic programs, availability of research opportunities; strength in anesthesiology subspecialty areas (e.g. pediatric, obstetric, critical care medicine, neuro, cardiothoracic, and/or pain management). Case volume and resident morale are also important factors to consider. In addition, geographic and family requirements may contribute to the final decision making process.

Residency programs may be based in medical schools and teaching hospitals, within large, well-known private health systems, and in some cases in community hospitals. Academic programs serve as the primary training sites for medical schools, and are staffed by Anesthesiology faculty members. Planning a career in academic medicine? A well-respected university affiliated program is the most advantageous choice to a career path in academics. Take care in appraising the clinical exposure and didactic commitment of a program, as well as the availability of research opportunities should that be of interest to you. In all programs, your responsibilities within the structure of each teaching hospital should be carefully assessed as you consider the residency options available to you.

How do you judge the national reputation of a residency program? Many factors contribute to a program's reputation, including the prominence of the medical school and its faculty members, research and publications, funding dollars for research, and the development of novel and innovative techniques. In addition, the interest of and commitment to education by faculty, as well as the professional outcomes of graduates from the program should also weigh heavily in the assessment of a program's reputation.

Much of a program's reputation is based upon its research efforts and publications. If you are interested in pursuing a career in research and academics, these programs may have a lot to offer. However, a research oriented program may not always be able to provide the same quality of clinical teaching. Many times, "high-profile" faculty will not always be available to assist in your education efforts. Thus, while advantageous for programs to have well-known and well-respected faculty, it not essential that all faculty be of this caliber, and indeed may be undesirable.

Often, many of the best clinical teachers are unknown outside of their own institution. Some of the best educators in anesthesia are unpublished. Some are only just getting started in their careers, while others prefer to devote their professional energies to teaching. It is important to gain as much knowledge and experience during your residency as possible. Exposure to a wide variety of anesthesiologists, including your colleagues in training, fellows, and faculty at all levels of experience, up to and including the chairperson of the department, will add great depth to your knowledge and experience base. Look for faculty who are active in organizations such as the Society for Education in Anesthesiology (SEA), the ASA committees on education, and/or involved in teaching programs within the medical school. These are faculty members with a strong commitment to your resident education.

Another factor to consider is that of the professional outcome of a program's graduates. What is the program's board pass rate (this is reported as a rolling five-year average)? Where do they tend to practice after graduation? Do they enter private practice, or remain in academic settings as fellows or faculty? How are they viewed professionally? You should inquire about these important topics during your interview. Expect concrete answers, rather than bland reassurances, as much of this information is readily available to the program.

Board certification is an essential goal of the residency education process. Program directors have information about resident's performance on In-Training Exams, as well as whether they have become board certified on schedule. Many factors contribute to achieving board certification, however high pass rates are usually reflective of a program's ability to provide a solid educational program and sound clinical training. All of this information must be taken in the context of the overall information available to you about a given residency program.

An additional consideration is the availability of a Clinical Base Year within an Anesthesiology residency program. It may prove a significant advantage in preparing you for a career in Anesthesiology. Important to your discovery process is the composition of that training year. What rotations are required? Does it provide a well-rounded experience, with significant exposure to all areas of medicine? Has the Anesthesiology program developed the curriculum specific to the needs of the resident in anesthesiology and consistent with the ACGME requirements? Many programs offer an outstanding PGY-1 year, providing a strong foundation upon which to build during residency.

Finally, factors personal to you and your family must weigh into the final decision making process. Where do you want to live? Geography, climate, cost of living, and community size can be major factors. In addition, one's family circumstance may play a large role in your final decision. Prioritizing all of the considerations above, plus others specific to your individual situation, will allow you to make a well considered rank order list of programs for final submission to the Match. Continue to seek guidance from your medical school advisor, or Anesthesiology program director and chairperson, to help you determine which programs are ultimately most suitable for you. Ideally, your match list should include programs both highly competitive to you, as well as those which are less so. Do not include any programs on your match list to which you would not want to attend.

The Match and Anesthesiology

John E. Tetzlaff, MD

The National Resident Matching Program (NRMP) is an independent process established to provide medical students with a fair means of choosing a residency. The process is sponsored by the Association of American Medical Colleges (AAMC) and co-sponsored by the rest of the “alphabet-soup” of organized medicine: the American Medical Association (AMA), the American Board of Medical Specialties (ABMS), the American Hospital Association (AHA) and the Council of Medical Specialty Societies (CMSS). Since 1952, one day of each year has been designated “Match Day” when the selection results are announced to the students, usually at a celebratory event sponsored by the medical school.

The purpose of the Match is to provide a predictable time interval for applicants and programs to make choices. It is intended to allow the medical student to have the opportunity to evaluate different programs without undue pressure from program directors to make a choice. Both sides agree to binding commitments, based on the outcome of the Match. Programs that enter the Match agree to accept senior students **ONLY** through the Match and to abide by rules that prohibit deals to “bypass the Match.” Students who enter the Match agree to fulfill commitments that result from the Match. Deans of Students and the applicants are entitled to report Match violations, and the Match can sanction programs that do so. Uniform adherence to the Match process allows medical students to rationally schedule their electives, and to prevent excellent students from experiencing recruitment pressure during these electives. The agreement that both the applicant and the program director will not disclose their “Match lists” prevents this perceived pressure, and allows students to have a somewhat “level playing field” with senior faculty who are either Chairs, Program Directors or members of selection committees.

The Match is available to any allopathic or osteopathic student who is seeking a residency position in an ABMS-approved specialty. In 2009, almost 1400 students entered the Match for Anesthesiology, and less than 50 were not matched. This is in sharp contrast to prior years, both because of the increase in the number of positions offered, and the sharp increase in number and quality of students entering the Match for Anesthesiology. The early evidence for 2010 points to continued increase in the interest of American medical students in Anesthesiology.

When a medical student decides to enter the Match for Anesthesiology, some decisions must be made. The continuum for Anesthesiology as specified by the Residency Review Committee for Anesthesiology is four years of training. The first post-graduate year is designated the Clinical Base Year (PGY-1) and the remaining 3 years are designated as Clinical Anesthesia (PGY 2-4). Some programs sponsor the full four years of training. Other four-year programs provide training within the same institution in “preliminary” years of Internal Medicine, Surgery or Pediatrics, or in “Transitional” programs with rotations in several areas. Some programs start with the Clinical Anesthesia years (PGY-2), and assume the applicant will seek an independent PGY-1 year either in the same geographic area or in a different location. The trend is toward a four year continuum, and for 2008-9, a majority of the programs offered at least some positions for four years. The number of CBY positions continues to trend upward.

The applicant needs to decide whether to seek a PGY-1 position and match into Anesthesiology at the PGY-2 level or to seek the four-year program option. Clearly, there are advantages and disadvantages to both. Some will choose the four-year option to avoid moving or applying to both PGY-1 programs and Anesthesiology programs, resulting in a hectic “interview season.” Some will select a four-year program because they are specifically attracted to the structure of the PGY-1 program at a given site. Others will choose the three-year option because they want a PGY-1 year in a specific location, or want to train in a hospital they have worked in as a student. Some osteopathic students will choose an osteopathic-sponsored PGY-1 in order to make practice in osteopathic hospitals easier later when they are fully trained. For programs that sponsor a CBY year as a transitional or preliminary year, the anesthesiology program director must maintain oversight over the rotation selection. Even for independent PGY-1 choices, the anesthesiology program must receive competency-based quarterly performance reports, and ensure that required rotations have been completed, or added during the clinical anesthesia continuum. There is an option within the Match that allows the student to apply for both the three- and four-year curricula at programs that offer both options.

In 2001, Anesthesiology became a participant in the Electronic Residency Application Service (ERAS) sponsored by the AAMC. Any applicant who wants to enter the Match for Anesthesiology must apply through ERAS. ERAS is a system that receives documents from applicants, certifies their accuracy, and transmits applications to programs selected by the applicants. The documents handled include the Common Application Form, personal statement, photograph, letters of recommendation, Dean’s Letter, transcript, and USMLE or COMLEX scores.

The process starts with the medical schools. Applicants seeking residency positions identify this to their Dean of Students. The Deans register their students via the Dean's Office Workstation, and give the student a password. Applicants can then log on and complete the application, personal statement and designate programs for record transmission on the ERAS website. The Dean of Students handles supporting documents, such as letters of recommendation; these are scanned in or imported by disc. Medical Student Performance Evaluations (MSPE-formerly known as the Dean's Letter) are released to programs at a standard, pre-determined date after November 1. All other documents are available to programs selected by applicants after the ERAS post office opens on September 1. USMLE and COMLEX scores are provided directly by the National Board of Medical Examiners (NBME) and the National Board of Osteopathic Medical Examiners (NBOME) respectively and are verified to be accurate. Rules for handling documents and activating the student's application in ERAS are set by the Dean's office. The student will be disappointed if last minute processing is expected, because there are fixed delays in document handling. It should be the task of the student to identify the rules in advance ("the early bird gets the worm"). Individual programs set their own rules about deadlines. Applications that become complete late in the season can have disappointing outcomes even when the profile of the student is very good, because programs have a limited number of interview slots. Keeping track of ERAS passwords and not changing e-mail addresses during the Match process are strategies to keep in mind. Students should remember they cannot apply to programs until the ERAS application is both submitted and certified.

The Couples Match was created to assist couples who want to train in geographically related areas. When a senior in the Match for Anesthesiology is also in the Couples Match, the degree of difficulty is determined by the specialty choice of the partner. It is more difficult when the partner is seeking a position in a smaller specialty (e.g. radiation oncology) or a high demand specialty (e.g. ENT, Ortho). When the couple is within anesthesiology or with a high volume specialty (Peds, Internal Medicine, Family Medicine) the outcome is determined mostly by the accomplishments of the partners. One element that many seniors do not understand is the dynamics between programs within institutions involving the couples match. The Anesthesiology program director can call the program director for the partner and indicate interest (or vice versa). However, deals cannot be made and there can be no expectation that one program will disclose its list to another simply because of the Couples Match. To do so would be a Match violation.

The Educational Commission for Foreign Medical Graduates (ECFMG) acts as the designated dean's office for students and graduates of medical school located outside the United States. They verify credentials from these schools and process USMLE requests from these applicants. Since the ECFMG establishes the rules for eligibility to enter the Match based on the required examinations for graduates of non-US medical schools, they provide a certification of ECFMG status report on all applicants for whom this is relevant. This relieves programs of the challenging task of verifying international credentials, and explains why most will only receive materials through ERAS.

Students often ask what elements of their application influence the outcome most. The answer is best separated into two elements. The first decision by a program director is which candidates to interview. This is a critical element because most programs, and all good ones, will not rank a candidate they did not interview. This decision is made very early in the year. When a specialty is popular, as anesthesiology has been for the last few years, there is a modest advantage to those students whose ERAS application is complete enough to review early in the season. Most program directors will review an application when transcript, USMLE 1 score, personal statement and letters of recommendation are present. Some students have incorrectly assumed that the entry of the MSPE would be the trigger for action (first week of November). Program Directors often have given away most of their interview slots prior to release of the MSPE.

The second phase is the actual interview. Preparation is a key element of success. The candidate should obtain information about the program from any possible source, including the brochure, program web site, and the internet. Using a search engine to determine details about the program and key faculty is easily within the skill set of most seniors. This enables the candidate to actively participate in the interview and demonstrate interest in the program, with favorable influence on the interview score. This boost in interview performance can make an important difference for a candidate with the program, given that most programs value the interview scores highly in creating a rank list. Creation of the personal statement is another element of preparation for success during interviews. An important task for the candidate is to convince the interviewer that he/she has appropriate motivation for seeking anesthesiology residency. Although income potential and life-style are factors, the best tactic is to focus on elements of practice like pharmacology, physiology or acute care medicine. Another effective motivation is interest in a subspecialty of anesthesiology (pain, critical care, cardiac, etc.) or an experience in the extended family. Humor is probably a bad risk choice.

The obvious elements-reputation of the medical school, transcript, and honors are important but not as much as students think. Presentations, research experience and publications are valuable and should be represented honestly. Students also speculate about the value of letters. This is partly driven by the rule that limits the candidate to four let-

ters of reference per program at a maximum. Candidates have the option to change letters of reference before they are sent to a program. This is relevant for high profile, late arriving letters of reference. Clearly, letters from individuals within anesthesiology have the highest value. Detailed, favorable letters from rotation directors, program directors, or chairs within anesthesiology have still more value. This fact clearly influences the scheduling of senior electives. One or more rotations within anesthesiology, including critical care and pain medicine, is clearly an important element of an application. Another strategy issue is the timing of USMLE 2. Very few programs require the score, but all are positively influenced by good scores. When both scores are available, many program directors will pay more attention to USMLE 2 CK, because of the clinical emphasis. If a student expects to do well on USMLE 2 CK, there is a distinct advantage to having this score prior to the creation of match lists, preferably before interviews.

The one element of the Match that undoubtedly generates the most anxiety is the strategies for creating the Match list. Students often revert to college or medical school application tactics, which work for those processes but can be counter-productive in the Match. The “safe” school in college application is good way to be sure of being accepted somewhere. In Anesthesiology where the number of applicants and positions are relatively close in numbers, the applicant should focus on exactly where training would be best scientifically and geographically. Decisions about large versus small and urban/suburban/rural should be made. Putting a “safe” program high on a Match list decreases the probability of the candidate matching with a program they want since the Match algorithm is biased towards the applicant’s choices. The candidate should not be influenced by guessing what programs think about the candidate’s Match list, because programs do not have access to this list.

To find out about ERAS, students usually turn to the office of their Dean of Students. Alternatively, ERAS details can be obtained at www.aamc.org/eras. Help with using the system can also come from the Dean of Student’s office or from ERAS directly at (202) 828-0413 or erashelp@aamc.org (e-mail). Candidates and the programs that they select can communicate with one another using ERAS e-mail about issues like interview dates and program details. The mailbox system (ERAS Post Office) allows the applicants to see actions that have been taken by the programs (application reviewed, selected to interview, on-hold, inactivated).

Best wishes for success in your application to Anesthesiology residency programs!

A Typical Day in the Life of an Anesthesiologist

Devon McGee, MSIII, Nicole H. Tran, MD, and Marek Brzezinski, MD, PhD

I. INTRODUCTION

The development of anesthesia and the ability to perform surgery without pain is arguably one of the greatest achievements of modern medicine. It is, thus, unfortunate that many medical schools do not require a rotation in anesthesiology, sedation analgesia, or pain management. Many medical students share the common misperception that anesthesiologists are simply technicians who place IVs, put patients to sleep, and wake them up at the end of surgery with no meaningful function in-between. This is like saying the surgeon's main job is to cut people open and to close them up at the end of surgery with no real function in-between. While anesthesiologists are in charge of pre-operative evaluation and their technical skills are an essential pre-requisite for being able to perform any kind of anesthetic safely, the real "meat" of their responsibilities lays in the period between the "cut" and the "suture" part of the surgical procedure—a task easy to miss as everyone's attention is focused on the surgical procedure. The main task of the anesthesiologist is to reduce the perioperative risks, i.e., to reduce the perioperative complications and to make the increasingly challenging and medically complex patients survive the surgical procedure. Imagine an ICU patient needing a surgical procedure—the anesthesiologist provides the entire care like the intensivist does. However, the anesthesiologist makes the plan and carries it out instead of ordering nurses and technicians to do it. With the additional challenge of dealing with blood loss, perioperative stress, or surgical manipulations of internal organs that often lead to major hemodynamic compromise, the anesthesiologist, unlike the intensivist, monitors and administers to the patient one on one. Therefore, in addition to giving powerful anesthetics, providing respiratory support and monitoring every medical need of the patient throughout the surgery, the anesthesiologist tailors the anesthetic procedure to protect any particular organ that seems to be at high risk of compromise. The anesthesiologist should be comfortable with brain protection techniques in someone with severe carotid artery stenosis, or renal protection techniques in a patient with elevated creatinine, etc. An extensive working knowledge of physiology, pathophysiology, pharmacology, and anatomy to be able to prevent or if necessary to treat the various complications that may arise during the course of any given surgery is a prerequisite for every anesthesiologist. The more complicated the surgical procedure and the sicker the patient, the more complex is the part of the anesthesiologist.

Furthermore, an anesthesiologist's job is by no means limited to the operating room. Anesthesiologists are increasingly asked to provide care in radiologic, GI, or cardiology suites ("extraterrestrial" locations) for procedures such as GI endoscopies, cardiac catheterizations, MRI scans, interventional neuroradiologic procedures, and others. This trend is likely to increase in the future, as patients get older and more complex. Anesthesiologists are routinely called to assist with emergency care of difficult trauma patients in the ED. They play an essential part in making labor and delivery a pain free experience. Many anesthesiologists work as intensivists in ICUs or run pain clinics as pain medicine physicians.

Many students do not realize that the field of anesthesiology actually combines many aspects of medicine: formulation of immediate differential diagnoses, application of clinical pharmacology to correct physiologic problems, meaningful and intense patient interactions, and numerous hands-on procedures. Like a family medicine physician or an emergency medicine physician, anesthesiologists work with patients of all types – men and women, young and old. The job requires a unique blend of technical skills with intellectual capacity (i.e., knowledge of: pediatrics, internal medicine, geriatrics, obstetrics, and surgery – nearly all fields of medicine and surgery) When you combine all of these aspects with a highly enjoyable lifestyle, it is not hard to see why anesthesiology may very well be the best kept secret in medicine. In the future, the demand for anesthesiology services will increase. Technology has allowed many more procedures, which even though they seem less invasive, require a still, pain-free patient. Many areas such as interventional radiology, cardiac electrophysiology and catheterization labs, and GI endoscopy, are asking for more anesthesiology presence to monitor the sedation and overall status of increasingly critical patients. This allows the operators to concentrate completely upon the performance of the procedure while the anesthesiologist keeps the patient safe.

II. A DAY IN THE LIFE OF AN ANESTHESIOLOGIST

The decision faced by 3rd and 4th year medical students as to which field of medicine to go into can be incredibly difficult and challenging. A careful inspection of what a typical day entails for a practicing physician in a particular field can be highly informative for students, yet is often overlooked. In this section, we attempt to break down exactly what a "typical day" looks like for anesthesiologists in various practice settings for surgical anesthesia. It is important to note that job duties and responsibilities can be highly variable among anesthesiologists working in different settings or even in similar settings. For example, a typical day for an anesthesiologist in private practice can be very different than a typical day for an anesthesiologist in academic medicine. When you throw in anesthesiologists who primarily practice in the critical care setting or in pain medicine, the "typical" day can be even more different.

Private Practice

There are numerous options for anesthesiologists in private practice and one can shape the practice to meet individual needs and desires. For example, depending on the private practice setting, an anesthesiologist may spend all of the time in one hospital or may work at a different hospital every day. If you are one who values a variety of settings, you might be more happy working in a practice that enables you to work at many different surgery centers or even office-based anesthesia. If you are one who values familiarity and complex medicine, then you might consider working in the same large hospital every day. Similarly, a private practice anesthesiologist may work in a setting in which s/he works with a different surgeon every day or s/he may work in a setting in which s/he work very closely with the same surgeons for many years.

Anesthesiologists in private practice must also decide if they want to run the practice by themselves or if they want to hire nurse anesthetists (Certified Registered Nurse Anesthetists-CRNAs) or Anesthesiologists Assistants (AAs) and practice in the Anesthesia Care Team (ACT) model where they would medically direct several anesthetics concurrently. In the MD-only model, the anesthesiologists do everything by themselves - from setting up the OR prior to seeing the patient (preparing the anesthesia machine, gathering necessary drugs, checking intra-op monitors), to performing the pre-op interview and physical exam, writing the pre-op note, obtaining the anesthesia consent, etc. They literally do the entire case alone. In this model, the anesthesiologist has more control over the conduct of the case, and through constant practice maintains the highest level of skill, as well as rapport with the surgeons. This type of setting typically has longer hours, fewer breaks, and a higher volume of cases in comparison to other private practice settings. It does not usually require management of employees, and the accompanying worry about the skill level of supervised practitioners.

In the *anesthesia care team* model, the physician directs multiple anesthetists (CRNA or AA) in multiple ORs. The anesthetists perform many of the technical aspects of anesthesia care, such as preparing the OR and drugs, and placing routine monitors and intravenous access. Depending on patient flow, either the anesthetist or the physician will perform the pre-anesthetic assessment, but the physician is ultimately responsible for the entire care of the patient. In comparison to the MD-only practice described above, in ACT setting the physician is doing less hands-on work in the operating room and assumes primarily a supervisory/team leadership role. In performing the required elements of medical direction, the physician is involved in key aspects of the initial assessment, anesthetic plan, frequently checks on the progress of the anesthetic, and provides post-operative care, among other duties.

In both the physician and ACT setting, the day typically starts around 6:15-6:30 am and finishes when the cases assigned to the individual physician are completed, depending on the arrangements for late coverage in a group. Depending on the setting, it can be as early as 10 am or as late as 10 pm (in fact all night work is not completely out of the question). Depending on the size of the group, the anesthesiology may be on call from home and need to return to the hospital for emergency or obstetrical cases. Both physician-only and ACT setting are typically fast-paced with a high volume of procedures and high performance pressure. Despite the high pressure, it is often a very pleasant atmosphere as the anesthesiologist and surgeon often know each other very well and work together collegially. Potential income is high relative to other specialties in medicine as well as surgery. Overhead such as office expense is low.

Academic Medicine

In the academic setting, the anesthesiologist's job responsibilities are divided into: clinical, teaching, and research. Typically, the week consists of clinical days and academic days devoted to research/teaching/administrative duties, with the distribution between these two depending on grant funding, departmental research funding and other academic duties. Since the academic setting is dedicated to teaching, the cases are often discussed on the phone with residents the night before, so not all work is done at the hospital.

The attending anesthesiologist typically arrives between 6:30-7 am. Main responsibilities include: seeing the patient before the surgery, assisting the resident, and facilitating the progress of the procedure. In addition to making sure that patients receive optimal care, the attending anesthesiologist has the added duty of teaching the residents, students, and other learners. Balancing these objectives can be difficult (how many attempts at intubation do you give the student or resident?). The anesthesiologist is responsible for making sure everything runs smoothly. Because of the teaching role, there is less direct hands-on work and more leadership responsibility. Whenever a difficult situation arises, the faculty anesthesiologists are there to help – e.g. difficult IV, intubation, unstable vitals, etc. They also always make sure to be present during the key moments of the procedure. Generally, every attending directs one or two ORs with residents, depending on the complexity of the case and the training level of the resident. Teaching takes place during the pre-op discussion/planning, during the operation, and after the case via a feedback session. The attending also is responsible for providing supplemental educational resources to residents such as handouts, presentations, journal articles, etc. Keep in mind that with the growing need for anesthesia services and the cap on residency positions, more academic practices include the ACT model in their system.

Like in private practice, the clinical day ends when the cases are done, typically between 4-6 pm, except for the add-on cases and call coverage. After this time, the on-call team takes over the care of the patients. Overnight call can depend on your subspecialty, size of the program, and other factors. It is important to note that academic medicine can be very time demanding. Often after the clinical day is complete, the anesthesiologist has to work on his other job (e.g. working on research projects, preparing lectures, writing manuscripts, or completing administrative work). Also, the income is typically lower in academic medicine than in private practice.

While the general job description may be similar for all anesthesiologists providing care in operating or procedure rooms, you can hopefully now see that not all anesthesiologists have the same job. One must carefully evaluate his/her values, interests, and desires before deciding which setting to practice in. For example, if you love teaching and want to be involved in research, you may be willing to sacrifice the higher income potential for the satisfaction of academic medicine. If you have a lot of outside interests or would really like to focus on building a family, then private practice may offer more setting in which you can more easily structure your time. It is important to bear in mind that these descriptions are imperfect and incomplete. Many anesthesiologists have typical days that don't resemble the aforementioned typical days at all. For example, many anesthesiologists work in the ICU as intensivists or in the pain clinic as pain management anesthesiologists and their days are very different.

III. ANESTHESIOLOGY AND PATIENT CONTACT

The amount of patient contact that anesthesiologists have with patients is significantly underestimated by most medical students and physicians. The common misperception is that anesthesiologists put the patient to sleep and have very limited patient contact. While this has some basis, it is false in many respects. During the pre-op consult with every patient, the anesthesiologist obtains the medical history and performs a physical examination. Perhaps more importantly, however, the anesthesiologist answers any questions the patient may have about the surgery and helps to allay his/her anxieties. Understandably, patients are often very nervous before undergoing surgery and receiving anesthesia. This period of time (in which they have some sort of medical condition necessitating surgery) is often the most stressful episode of their lives up to that point. During that brief, stressful period we as anesthesiologists must establish patient rapport and trust and have only one chance to get it right. The anesthesiologist must be compassionate, sensitive, supportive, and have excellent interpersonal skills. It is imperative that the anesthesiologist be able to immediately gain the trust of the patient because the patient must essentially surrender control of his/her life to the anesthesiologist.

The anesthesiologist's face is the last face the patient will see before losing consciousness and the first face they will see when they regain consciousness. Thus, an anesthesiologist can have a profound impact on a patient's life during this intense/emotional experience. Although the interaction may be limited in terms of time, it can nevertheless be immensely rewarding. It is important to note, however, that the general public often doesn't understand the critical role of the anesthesiologist. They are often unaware that they receive the same length of training as most other physicians or that they even are physicians! Often, patients only remember the name of the surgeon. An anesthesiologist must be able to be okay with the fact that he/she is not going to be an expert whom patients will come to see from around the world. Personal satisfaction must come from within.

IV. QUALITIES OF INDIVIDUALS WHO ENJOY AND EXCEL IN THE FIELD OF ANESTHESIA

Anesthesiology is incredibly challenging and fast-paced. Although most of the time things go smoothly, emergencies do occur and patients can die very quickly. When crises arise, rapid intervention and quick thinking are a must. An anesthesiologist must be able to draw on and apply his/her vast medical knowledge in an instant. Equally important, an anesthesiologist must be able to remain calm in the face of extremely stressful, intense situations.

The anesthesiologist must also be able to pay attention to detail for long periods of time. It is not uncommon for surgeries to go on for more than five hours. The anesthesiologist must constantly manipulate monitors, pumps, ventilators, and other high-tech equipment, as well as be on the look-out for potential problems such as blood loss or airway complications. S/he must also be meticulous about mentally preparing for potential disaster and making necessary preparations for each and every case.

Although scientific knowledge is definitely essential, there is also an art to practicing anesthesia. In order to excel in the field, one must be able to work well with hands and be able to smoothly perform numerous procedures. For instance, anesthesiologists are commonly in charge of the emergency management of difficult airways. The ease of endotracheal intubation, like most procedures, depends largely on manual dexterity.

In general, anesthesiologists are often congenial, confident, and easy-going. It is important that they communicate well because they often work as a team with the surgeons, nurses, and other OR personnel. Anesthesiologists also need

to be able to take over during emergencies and lead the team. Although the surgeon may be in charge of performing the operation, the anesthesiologist is in charge of keeping the patient alive. Thus, the anesthesiologist must be confident enough to inform the surgeon when to start, stop, or continue operating.

Students tend to enjoy anesthesiology if they like to see immediate results of their work. Anesthesiologists are the only physicians who routinely bypass pharmacists and nurses and administer medications themselves. This ability enables them to administer pharmacologic therapy and see immediate physiologic outcomes, which can be very gratifying. Anesthesiologists see a problem, develop a solution, and then witness the results right in front of their eyes.

Students tend to enjoy anesthesia if they have a great amount of intellectual curiosity. There is certainly much more to be learned and uncovered about the mechanisms of the drugs commonly used in anesthesia. Also, as anesthesiologists continue to do research and advance the field of patient safety, more complex and invasive procedures are able to take place.

FREE Anesthesiology Resources for Medical Students

H. Nicole Tran, MD, Devon McGee, MSIII, Amy S Sargious, MSIII, and Marek Brzezinski, MD, PhD

I. Introduction

Dilemma: Only a short rotation, and you do not want to buy big, expensive books, but you want to learn the essential knowledge and technical skills that are needed for any physician.

Solution: Save time and money with free resources!

Here, we will give you information about excellent anesthesiology textbooks, online literature search engines, online study material, anesthesiology podcasts and information about anesthesiology societies and medical associations.

II. Anesthesiology Textbooks on the Web

- Free online anesthesiology textbooks: <http://books.google.com/books?uid=8808851429044019567>

Online library divided into:

1. Educational Anesthesiology Resources for medical students and residents
2. Anesthesiology Basics: The basic science and labs
3. Clinical Anesthesiology and Subspecialties: Practicing anesthesiology and its subspecialties.

- Recommended textbooks that can be found in the library:
 - **For the medical student starting an anesthesiology rotation:**
 - o *NMS Clinical Manual of Anesthesiology* by Randall S. Glidden and Gloria P. Craig, Lippincott Williams & Wilkins, 2002.
 - o *Blueprints Pocket Anesthesiology* By Robert Gaiser, Lippincott Williams & Wilkins, 2006.
 - **For the medical student who has become more interested in anesthesiology:** *Clinical Anesthesiology* by Edward Morgan, et al., McGraw-Hill Professional, 2005.
- More free literature in the form of books or journals, abstracts and texts is available on Google at <http://books.google.com>.

III. Online Literature Research

- PubMed www.pubmed.com
- Google Scholar <http://scholar.google.com>
- Blogspot by Josephine Tan at UCSF <http://mededlit.blogspot.com>. It is a great resource of information and tips on how to use PubMed and the Google Scholar.
- To find out more about how you can use PubMed, check out Josephine's Web site and these free tutorials on how to use PubMed: <http://www.nlm.nih.gov/bsd/disted/pubmed.html>.

IV. Anesthesiology Online Study Material

- To look-up procedures, diagnoses, physiology, treatments and medical games: <http://www.anaesthetist.com>.
- Tutorials on acid base physiology and anesthetic pharmacology as well as an extensive link list to practice multiple-choice questions is available at <http://www.anaesthesiamcq.com/>.
- Check out the Question of the Day and complete peer-reviewed, references answers authored by faculty from Harvard Medical School or other distinguished institutions at <http://www.theanswerpage.com/>.
- For the hard-core" anesthesia student, then go to the American Society of Anesthesiologists' Web site. Here you can find In-Training Exams, information on the annual meetings and the career center. <http://www.asahq.org/continuinged.htm>.

V. Anesthesiology Podcasts and Multimedia

- To prepare for a special procedure in advance, listen to lectures or grand rounds:
<http://www.anesthesiapodcast.com>
<http://www.muschealth.com/multimedia/Podcasts/index.aspx?type=topic&groupid=50>
<http://www.podcastdirectory.com/podcasts/39577>
- Useful clinical videos and tutorials is available on the Web site of the *New England Journal of Medicine* (e.g., how to place a central line): <http://content.nejm.org/misc/videos.shtml>
- Here is a selection of useful videos and tutorials that you might enjoy:
<http://www.anesth.uiowa.edu/rasci/movies.html> (very cool videos and tutorials on regional anesthesia).
<http://www.capnography.com/> (all you need to know about CO₂ and capnography).
<http://www.acc.org/qualityandscience/clinical/guidelines/perio/update/fig1.htm> (perioperative cardiovascular evaluation tools for non-cardiac surgery).
<http://vam.anest.ufl.edu/> (virtual anesthesia simulations).
<http://www.ccmtutorials.com/index.htm> (critical care management tutorials).

VI. Anesthesiology Societies & Medical Associations

Finally, when you have set your course on a career in anesthesiology, go where the anesthesiologists go! The following Web sites will provide you with the information about anesthesiology societies and their meetings, patient care, finding a residency, educational resources and research.

Society for Education in Anesthesia: Learn about education and research in anesthesiology, get tools for training and evaluation, medical students' FAQ and medication list, and much more useful information <http://www.seahq.org/>.

American Society of Anesthesiologists: Find out about annual meetings, patient care, career center, continuing education resources, patient education and links: <http://www.asahq.org/>.

American Medical Association: Resources for medical students: Information on financial aid, choosing a specialty, medical licensure, finding a residency, understanding medical ethics and much more: <http://www.ama-assn.org/ama/pub/medical-students/medical-students.shtml>.