

Help Wanted: Must Have the Brain of an Internist, Hands of a Surgeon, and Heart of a Psychiatrist

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In my role as chair of an anesthesiology department at an academic medical center, every few weeks I have lunch with the medical students rotating on our service. These lunches are in part an effort to recruit our medical school's best students into our specialty. I share my thoughts and insights about a career in anesthesiology with these enthusiastic, aspiring physicians. My message is simple: anesthesiology is a wonderfully rewarding career. Imagine for a moment that you are one of these highly motivated medical students considering a career in anesthesiology. This is what you would hear from me over lunch:

A bit of history

Let us begin with a brief mention of the seminal moment in the history of anesthesia as reflected in this famous anesthesia-related painting, Robert C. Hinckley's 1893 work, "The First Operation Under Ether" (Figure 1) (*Anesthesiology* 1980;52:62-70). On October 16, 1846, on what has since come to be known as Ether Day, William Thomas Morton, a part-time medical student and practicing dentist, demonstrated the anesthetic properties of ether in a surgical amphitheater of the Massachusetts General Hospital (*Surgery* 2006;140:472-3; *Boston Med Surg J* 1846;35:309-17). After Morton had administered the ether from a hand-held, blown-glass vaporizer for some minutes, the patient, a Mr. Gilbert Abbott, was rendered unconscious. Turning to Dr. John Collins Warren, a venerated surgeon at the facility, Morton boldly stated: "Your patient is ready, sir." With a gallery of curious spectators mesmerized by the proceedings, Dr. Warren commenced the operation, the removal of a neck mass (Ether Day, 1st ed. 2002).

Upon completion of the brief procedure, with Mr. Abbott emerging from this historic first public anesthetic, Dr. Warren reportedly turned to the assembled on-looking physicians and students and declared: "Gentlemen, this is no humbug!" (*Anesthesiology* 2016;124:553-60). The crowd erupted with spontaneous applause, immediately appreciating the immense ramifications of this landmark event in medical history.

The case was subsequently published by Dr. Henry Jacob Bigelow, one of Dr. Warren's colleagues, in the *Boston Medical Journal* (*Boston Med Surg J* 1846;35:309-17). Dr. Bigelow didn't mince words:



Figure 1: "The First Operation Under Ether," Robert C. Hinckley, 1893 (oil on canvas, Boston Medical Library in the Francis A. Countway Library of Medicine, Boston, Massachusetts). While the historical accuracy is controversial, over a dozen people are depicted in attendance on the floor of the operating room. Chief among them are Gilbert Abbott (the patient), William Thomas Greene Morton (the anesthesiologist – although the term did not yet exist), John Collins Warren (the surgeon), and Henry Jacob Bigelow (the physician who published his observations of the event in a periodical that would eventually become the *New England Journal of Medicine*). Reproduced with permission.

"Great facilities will be offered to those who are disposed to avail themselves of what now promises to be one of the important discoveries of the age." Almost two centuries later, the *New England Journal of Medicine* asked physicians to name the single most influential article it had ever published (asamonitor.pub/3EsM3Fs). The clear winner was Bigelow's case report describing ether anesthesia. This simple case report provided the launch pad for the science and art of anesthesia. Anesthesiology, in turn, helped launch modern surgery.

Indeed, the implications of this pivotal moment in the fall of 1846 on the development of modern medicine are truly incalculable. In simple terms, when physicians administer a drug to alter physiology in the treatment of disease, we refer to that discipline as internal medicine. When we use a scalpel to alter anatomy in the treatment of a malady, we refer to that field as surgery. Morton's successful demonstration of anesthesia made a new, much more advanced approach to human illness possible. Prior to the advent

of anesthesia, surgery was, of necessity, quite primitive and rudimentary. With their patients awake, surgeons could only undertake the simplest of procedures that could be completed quickly (e.g., a tooth extraction, the lancing of an abscess, an amputation, among others). Once patients could be anesthetized, surgery could begin to develop rapidly as a more ambitious, methodical, and advanced discipline.

Accordingly, it is a bit of a trick question to ask what specialty was born on Ether Day. The obvious answer is anesthesiology. But one can argue that it was indeed a twin birth, because the discipline of surgery could not really get off the ground in a sophisticated way until the discovery of anesthesia made it possible to do longer, more complex operations. These two offspring of Ether Day, anesthesiology and surgery, have since grown up and matured together into the modern era, ascending to heights unimaginable to those congregated on that groundbreaking day in Boston in October 1846.

As the news of this earth-shaking event rippled across the world, Dr. Oliver



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Wendell Holmes, another Boston-based physician and noted man of arts and letters, wrote a missive to Morton suggesting that this new drug-induced physiologic state should be called "Anaesthesia" (with the diphthong), signifying insensibility to touch (*Anaesth Intensive Care* 2016;44 Suppl:38-44). Dr. Holmes also suggested that the adjective form of the word would be "anaesthetic," noting that drugs of this sort could be referred to as anesthetic agents. Following this general theme, the names of the specialty, the practitioner, and the drugs emerged as "anesthesiology," "anesthesiologist," and "anesthetics" (all without the diphthong in the United States).

Medical historians who weigh in on such things usually rank the discovery of anesthesia among the top five or so developments in the history of medicine (*JAMA* 1999;281:1437). As observed by the editors of the *New England Journal of Medicine*, few developments have had greater impact on human health than the discovery of anesthesia (asamonitor.pub/3EsM3Fs).

Why anesthesiology as a career?

While participating in a rotation on the anesthesia service, medical students naturally ask anesthesia residents and attending physicians why they chose careers in anesthesiology. As party to these conversations over many decades, several dominant themes often emerge.

Perhaps the most conspicuous recurring motif is that the practice of anesthesiology is extraordinarily broad. Anesthesiologists care for the young and the old, men and women, the healthy and the critically ill. We are present at the beginning of life on labor and delivery and also at the end of life in palliative care settings. Between those bookends of life, we practice in a diverse array of clinical environments: the operating room, the emergency department, the intensive care unit, procedural suites, the preoperative clinic, and the hospital ward (e.g., on a pain service).

It is useful to think of anesthesiology practice diagrammatically (Figure 2). There are parts of the practice of anesthe-

siology that are somewhat unique to the discipline, such as airway management, inhalation anesthesia, total intravenous anesthesia, regional anesthesia, acute and chronic pain management, and palliative care. While it is not widely known, many advances in clinical monitoring emanated in part or in whole from the discipline of anesthesiology, including invasive blood pressure measurement, arterial blood gas measurement, capnography, and pulse oximetry (*Anesthesiology* 1981;54:227-36; *J Clin Monit* 1986;2:174-89; *Adv Exp Med Biol* 1987;200:3-8; *J Clin Monit* 1990;6:217-25). Anesthesiologists are highly skilled in the application of these monitoring technologies. Critical care is also a large branch of anesthesia practice both in the operating room and the intensive care unit. Anesthesiologists are experts in circulatory and ventilatory support and other aspects of the care of seriously ill patients who often come to the operating room for urgent or emergent procedures.

Another common theme that arises in terms of attractive aspects of a career in anesthesiology is a function of the expansive knowledge base and skill set required of the anesthesiologist. The practice of anesthesiology includes significant chunks of numerous other specialties of medicine. Considered in terms of something akin to a Venn diagram (without the overlap depicted; Figure 3), anesthesiology includes significant components of internal medicine (e.g., cardiology, pulmonology, hepatology, and nephrology). It also includes major components of surgery such as trauma care, transplantation, and surgical technology (e.g., robotics and lasers, among many others). Along these lines, surgical patients bring physiologic and anatomic alterations to the operating room that reflect both their surgical illness (e.g., the appendectomy patient with intraabdominal sepsis, the patient with a tumor in the airway) and their other comorbidities (e.g., diabetes, congestive heart failure) that may require management in the operating room.

Slices of various other disciplines also constitute important aspects of anesthesia practice, including neurology (e.g., evaluation of stupor and coma), obstetrics, transfusion medicine, laboratory medicine (i.e., the interpretation of various laboratory studies in the acute care setting), and psychiatry (e.g., anesthetics for electroconvulsive therapy, the management of preoperative anxiety, and others).

The procedurally oriented nature of anesthesiology is attractive to many medical students. Numerous and varied procedures relating to airway management, gaining access to the circulation, clinical monitoring, pain management, and regional anesthesia, among others, are part of the anesthesiologist's day-to-day routine. Successful practice requires a high

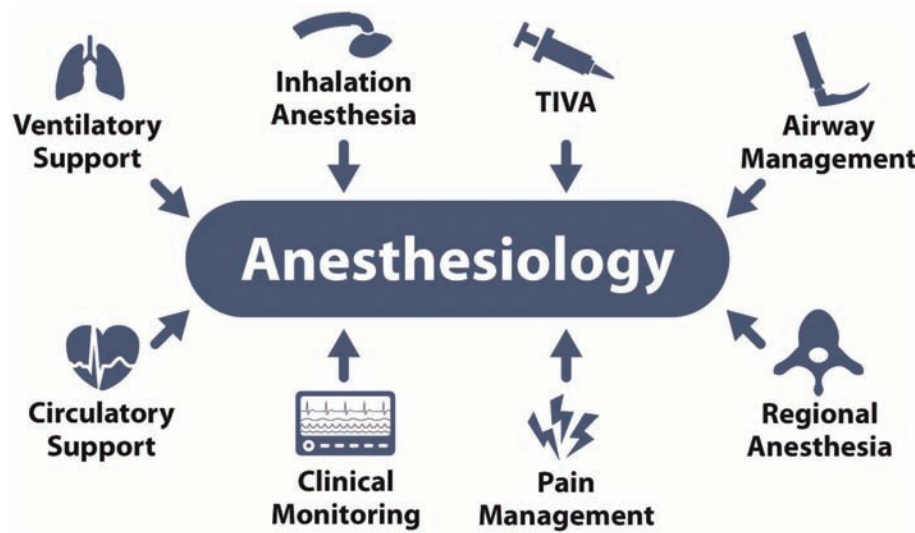


Figure 2: A diagram depicting the set of knowledge and skill considered to be key components of anesthesia practice, some of which are largely unique to the specialty (i.e., inhalation anesthesia, TIVA, regional anesthesia). See text for details. TIVA = total intravenous anesthesia.

level of manual dexterity and technical skill. Anesthesiology is a “hands on” specialty; rather than writing orders for others to carry out, the anesthesiologist executes the treatment plan personally.

In view of the broad nature of the practice, some observers have noted that anesthesiology is something of a “Swiss Army knife” in medicine, as are some other disciplines like general surgery. This is a helpful way to characterize the specialty.

A career in anesthesiology can take many forms, including careers that do not involve practice in the operating room. Some anesthesiologists practice exclusively in pain clinics, intensive care units, preoperative clinics, and hospital wards (i.e., acute pain management). A career in academic anesthesiology can include considerable time devoted to basic “bench” research, clinical investigation, data science, or development of new pedagogical methods. In the education domain, for example, manikin-based simulation grew out of academic anesthesiology (*Anesthesiology* 1988;69:387-94; *Anaesthesia* 1990;45:525-6). Given the broad practice and substantial interdisci-

plinary connections, anesthesiologists are often well-positioned to take on administrative roles within hospital management.

Why not a career in anesthesiology?

The flow of postgraduate trainees is overwhelmingly toward anesthesiology, not away from it. It is not unusual, for example, for residents or attending physicians from other specialties to seek training opportunities in anesthesiology at some point in their career development. But sometimes people do indeed leave the field of anesthesiology. Before deciding upon a residency in anesthesiology, it is critical to understand why resident (or attending) physicians sometimes decide to leave the specialty.

There are various reasons why a resident or practicing anesthesiologist might decide to leave anesthesiology in favor of another specialty. Over many decades in academic medicine, I have noticed that two common themes emerge in anesthesiology residency programs. The first reason for leaving the specialty relates to mistaken impressions about the lifestyle of the anesthesiologist. Some medical students erroneously

assume that anesthesiology is a “good life” specialty in terms of work schedule. Such students are inevitably disappointed. Anesthesiologists are in the hospital, on the job, every day, every night, every weekend, every holiday, throughout the year. Anesthesiology is a “24-7-365” profession. To express it in practical terms, in a busy academic medical center, for example, on Sunday morning at 2 a.m. there are often over a dozen anesthesiologists and trainees in the hospital doing urgent and emergent cases and patient management in operating rooms, trauma bays, labor and delivery units, and intensive care units. In this respect, anesthesiology does not resemble a “daytime” specialty like dermatology.

The second common reason for leaving the field relates to the critical care nature of the practice. During a brief rotation on an anesthesia service, medical students may not encounter the many life-threatening problems to which anesthesiologists must rapidly respond. Critical situations arise frequently in anesthesia practice. An otherwise routine case may suddenly present an unanticipated difficult airway, torrential hemorrhage, severe bronchospasm upon instrumentation of the airway, life-threatening anaphylaxis to a medication, or a hundred other such intraoperative emergencies. Some trainees eventually recognize that their personality and mindset are perhaps not well suited to tackle these kinds of very acute clinical problems and that they may be better suited to practice in a specialty with fewer emergency situations.

The anesthesiologist's job description

We've established that anesthesiology is a broad field, but what exactly do anesthesiologists do day to day? The question can be answered in a simple, straightforward way. The anesthesiologist has three main duties: 1) conduct the anesthetic, 2) support the patient's life, and 3) defend the patient's dignity (Figure 4).

The first duty, conducting the anesthetic, is the obvious part of the job description implicit in the title “anesthesiologist.” In the case of general anesthesia, the anesthetized state comprises a triad of unconsciousness (and amnesia), immobilization, and control of autonomic responses to surgical stimulation (*Anesth Analg* 2018;127:1104-6). The drug-induced, reversible coma of anesthesia can be produced with a variety of anesthetic agents, supplemented by adjunct drugs, regional blocks, and other techniques (*N Engl J Med* 2010;363:2638-50; *Anesth Analg* 2018;127:1246-58). Learning these methods for general anesthesia, and the many other approaches to anesthetizing a patient, is obviously the foundation and key focus of anesthesia training.

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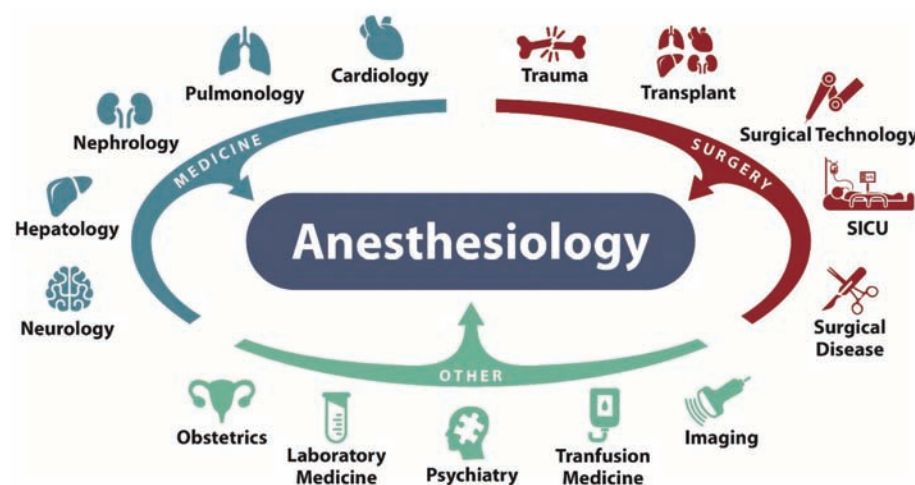


Figure 3: A diagram depicting the set of knowledge and skill emanating from other disciplines in medicine that are considered essential, additional components of anesthesia practice. See text for details. SICU = surgical intensive care unit.

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The second part of the job description, support of the patient's life, is also an integral aspect of anesthesia practice. Anesthesiologists are well-known for their contributions to code blue, trauma, and intensive care unit resuscitation. In places within the hospital where a critically ill patient is acutely dying, there is almost always an anesthesiologist in attendance to assist in the care of these patients in extremis (many intensive care units are staffed in part by anesthesiologists with special credentials in critical care). The operating room and postanesthesia care unit are also critical care units where these sets of life-preserving knowledge and skill are applied. It is important to emphasize that the support of vital functions extends beyond the cardiac and pulmonary systems to other vital organs such as the brain, liver, and kidney.

The third and final part of the job description, the defense of human dignity, is an aspect of the anesthesiologist's work that we perhaps do not discuss enough. From a certain philosophical perspective, by producing the anesthetized state, the anesthesiologist has objectified the patient, transforming them from a person (a subject) into a thing (an object) that can be temporarily manipulated by surgeons without the horrible suffering that would otherwise occur in the sentient subject (*Front Hum Neurosci* 2018;12:306). While the patient is in this objectified state, it is critical that

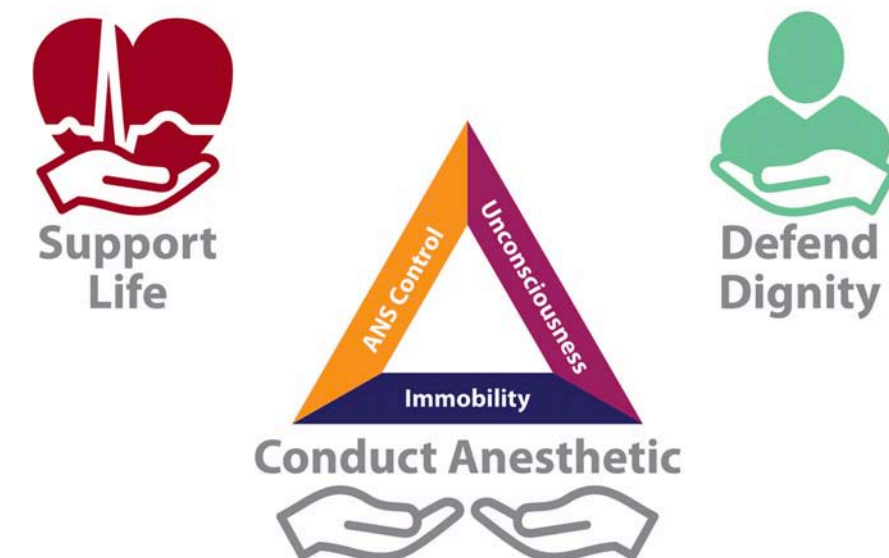


Figure 4: A diagram depicting the anesthesiologist's threefold job description in simple terms. The hands indicate the "hands-on" nature of the practice.

we defend the patient's personhood, their innate dignity as human beings. This means that while the patient is under anesthesia, the anesthesiologist must take the lead on insisting that no one in the operating room speaks ill of the patient, that no one makes fun of them, and that the patient's modesty is preserved, among other similar actions of respect and reverence. Defense of patient dignity is, of course, an important duty of the entire operating room team, but because the anesthesiologist has rendered the patient unconscious and defenseless, we have a special obligation to perform this function. This is a weighty part of the job description that we need to emphasize more fervently.

A uniquely heavy and rewarding burden

The anesthetized state is unlike any other circumstance in the course of human experience. There is no other time in human-to-human interaction where one person voluntarily surrenders their well-being more fully and absolutely to another person. The anesthetized patient is utterly and completely helpless. They can do nothing for themselves. In this very vulnerable and powerless state, the anesthetized patient is depending on the anesthesiologist to keep them safe by conducting the anesthetic, supporting their vital functions, and defending their human dignity. Physicians of all sorts take on heavy responsibilities in caring for patients; there is plenty of risk

to go around. But the unique nature of the anesthetized state means that the anesthesiologist carries a particularly heavy burden. It is the anesthesiologist who has rendered the patient wholly defenseless; it is therefore incumbent upon the anesthesiologist to take the lead in defending the patient's well-being, including their dignity as a person.

The day a person has their anatomy and physiology irrevocably altered by a surgeon's knife is a landmark day in their lives. The anesthesiologist is their guide on this sometimes perilous journey, standing by their side from induction to emergence and beyond, defending them against all the dangers they may encounter along the perioperative path. Executing this duty with skill, equanimity, and poise is an incredibly rewarding endeavor.

A simple conclusion

A job posting for an anesthesiologist could read something like this: "Help wanted! Must have the brain of an internist, the hands of a surgeon, and the heart of a psychiatrist." Our specialty seeks to attract the most talented medical students into the discipline. We need energetic, intelligent, compassionate people drawn from a diverse talent pool, and we will enthusiastically welcome them to the team and help them mature into terrific anesthesiologists who will, I am confident, enjoy a wonderfully rewarding professional adventure. ■

Disclosure: Dr. Egan is a scientific advisory board member for Acacia Pharma, a founder and equity partner of Applied Medical Visualizations, and a grant recipient of Medtronic.