Success in Academic Surgery
Series Editors: Lillian Kao · Herbert Chen

Andrea Gillis
Cary B. Aarons *Editors*

A How To Guide For Medical Students

Second Edition

Springer

Success in Academic Surgery

Series Editors

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All of the intended volume editors are highly successful academic surgeons with expertise in the respective fields of basic science, clinical trials, health services research, and surgical education research. They are all also leaders within the Association for Academic Surgery (AAS). The previous AAS book, Success in Academic Surgery: Part I provided an overview with regards to the different types of surgical research, beginning one's academic career, and balancing work and life commitments. The aims and scopes of this series of books will be to provide specifics with regards to becoming successful academic surgeons with focuses on the different types of research and academic careers (basic science, clinical trials, health services research, and surgical education). These books will provide information beyond that in the introductory book and even beyond that provided in the Fall and International Courses. The target audience would be medical students, surgical residents, and young surgical faculty. We would promote bulk sales at the Association for Academic Surgery (AAS) Fall Courses (www.aasurg.org) which take place prior to the American College of Surgeons meeting in October, as well as the AAS International Courses which take place year-round in Australasia, Colombia, West Africa, and France. Courses are also planned for India, Italy, and Germany and potentially in the United Kingdom and Saudi Arabia. As the AAS expands the course into other parts of the world, there is a greater need for an accompanying series of textbooks. The AAS has already received requests for translation of the book into Italian. These books would be closely linked with the course content and be sold as part of the registration. In 2011, there were 270 participants in the Fall Courses. In addition, we would anticipate several hundred participants combined per year at all of the international courses.

Andrea Gillis • Cary B. Aarons
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Part I
Exploring Surgical Specialties and Practice Settings

Chapter 1
Assessing your Interests, Skills, and Values

Amir A. Ghaferi

Abstract Leadership, communication, and resilience are three traits that are the marker of a successful surgical resident and future surgical leader. The following will help you assess your preparedness in these essential domains and help you determine where you need to focus your attention in the coming years. We are all lifelong learners, not only of the technical aspects of surgery, but also of professional development and self-improvement.

1.1 The Goal: Understanding your Personal Strengths and Opportunities as you Embark on a Career in Surgery

Students who choose to pursue a career in surgery have self selected as future leaders. Surgery is inherently a contact sport with surgeons, nurses, scrub technicians, and patients occupying the same octagon. Fortunately, they are all fighting the same opponent—surgical disease. This is a team of professionals who do not choose each other, but rather they are often thrown together during a critically important episode of care. It is important that they are immediately cohesive, confident, and focused. Most importantly, no one ever conquers a surgical disease without a surgeon who is an effective leader, a master communicator, and resilient in the face of adversity.

Leadership, communication, and resilience are three traits that are the marker of a wildly successful surgical resident and future surgical leader. The following will help you assess your preparedness in these essential domains and help you determine where you need to focus your attention in the coming years. We are all lifelong learners, not only of the technical aspects of surgery, but also of the professional development and self-improvement.

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1.2 Leadership Development

What are the core values every leader possesses? The following are neither all encompassing nor developed by consensus—respect, integrity, authenticity, service, humility, and wisdom. As a surgery resident, you will be called upon to be a follower and a leader at various times during your training. It is incumbent upon you to seek experiences during medical school to help foster these traits and/or develop them *de novo*. Leadership is not an inherent characteristic, rather it requires deliberate awareness of oneself and continually seeking to improve.

Surgical residents are recognized leaders in the hospital. There are stories of surgical residents being the "go-to" physician in the hospital whenever there was a crisis. The respect garnered by surgical chief residents was an important responsibility that they carried with them daily. However, there are also anecdotes of surgical chief residents being ineffective due largely to their leadership style. Leadership, practiced at its best, is the art and science of calling to the hearts and minds of others. It is engaging others in an enterprise of sound strategic focus, where they can experience a sense of ownership, of making a difference, of being valued and adding value. These attributes are important to the cohesiveness needed in the healthcare setting to care for the sickest and most complex patients.

As a result, surgery program directors are aware of the need for selecting medical students who have demonstrated the ability to lead others by example, by inspiring, and by learning. The question remains how to acquire the necessary experiences and skills to become an effective leader. While some leaders are born, the majority of people must seek development opportunities or are a product of the circumstances they find themselves in.

First, one should identify a mentor or individual whose leadership style resonates with him or her. Ideally this individual holds defined leadership roles, such as an administrative chief resident, leader of a clinical program, division chief, or director of a research program. Simply observing them in their habitat can be profoundly educational and inspirational. One should pay attention to the short-term goals set by the leader and how the team is motivated to achieve excellence and success. Beyond the short term, observe how the leader outlines a vision for the group. A vision gives everyone engaged something to shoot for and a larger context within which to plan and set strategy. It provides everyone with an essential sense of direction and purpose, whether it is which part of the task to own, or more profoundly, who and what the team is striving to become.

Second, discover an organization that resonates with your personal values and beliefs, such as a fraternity or sorority, charity group, religious organization, or educational mission. Fully engage in the group by organizing an event, keynote lecture, symposium, group meeting, workshop, or outreach activity. The key is to be wholeheartedly invested in the success and growth of the group. Substance over quantity is key here. Being a member in multiple organizations as a follower demonstrates the ability to attend meetings and eat a free lunch. Being a leader requires

courage and dedication. The seven acts of courage laid out by Robert Staub in *The Heart of Leadership* include:

1. The courage to dream and put forth that dream.
2. The courage to see current reality.
3. The courage to confront.
4. The courage to be confronted.
5. The courage to learn and grow.
6. The courage to be vulnerable
7. The courage to act.

Finally, be flexible in your leadership style and seek continuous feedback on how to improve. This may take the form of actively seeking feedback from peers, superiors, and juniors. Remember, seeking a pat on the back is not the goal here. It is important to create an environment where honest feedback is given without fear of offending you, creating an awkward work environment, or worry about reprimand. Often the best way of doing this is using anonymous feedback tools such as "360 evaluations" or online survey tools such as Qualtrics. This is becoming a widespread and accepted practice in medicine, especially surgery. There are many valuable resources such as books and online tools that also provide instruments for assessing your leadership style, your individual blind spots in leadership, and methods for improving daily.

1.3 Communication Skills

The ability to communicate with peers, consultants, and patients is of utmost importance to a career in surgery. We are often faced with difficult, complex patients with multidisciplinary pathology. Surgeons are expected to be the clinical champion for many patients by synthesizing input from multiple providers, the patients themselves, and family members. The ability to effectively communicate important facts and views is an invaluable attribute of a successful surgeon.

This begins during residency where an intern is viewed as a reporter of information. This is encapsulated in the notes that they write as communication to other providers and verbal communication to patients, families, and superiors. Toward the end of internship, surgical house officers are expected to begin synthesizing information into relevant pieces that explain the clinical story of the patient in a clear and concise manner. The learning curve is steep and there is always room for improvement. During the ensuing years, residents are expected create a more cohesive interpretation of objective and subjective data elicited from the patient, providers, physical examinations, and laboratory and radiologic studies.

Building and honing these skills is not a simple task. Much like leadership, this is a lifelong endeavor that requires hard work and a willingness to adapt, grow, and accept feedback. The following are some strategies on how to begin working on communication skills during medical school.

First, writing is one of the most important skills that all professionals should maintain and cultivate during their careers. The most obvious times that surgeons need to be effective writers are through operative notes, clinic notes, and letters to consulting physicians. In academic surgery, one of the most recognizable currencies is peer reviewed manuscripts. Each of these forms of writing require the ability to communicate plainly and succinctly without missing important details.

Medical students have the opportunity to write clinic and progress notes. This may be viewed as grunt work, and it is if there is no feedback loop. The act of writing notes is important and the more practice the better one becomes. However, it is important to seek meaningful feedback from other students, junior and senior residents, and faculty. The most powerful feedback comes during these formative years of training. Entering residency with sharpened writing skills can prove to be a valuable asset.

Another opportunity to practice writing is through manuscripts. While the research opportunities will vary across medical schools, there are many chances to write case reports, viewpoints, and review articles. Manuscript preparation is very much like patient care. It requires identifying a problem or question, gathering data, analyzing and interpreting facts, drawing conclusions from that information, and finally communicating it through writing.

Another important method of sharing research brings to light the second form of communication that is vital to a successful surgical resident/surgeon—speaking. Increasingly, local and national meetings are encouraging the participation of medical students in their programs. These meetings provide an exceptional occasion for students to gain exposure to high level research discussions, present their work and gain insight from others about their research, and to meet new people from medical schools and surgical residencies around the country. Depending on the environment of various medical schools, it may be easier or more difficult to access these types of events. However, seeking the input or mentorship of people outside your home institution is also encouraged.

1.4 Resilience

Resilience is a hot topic and buzz word in both business and medicine today. Surgery by essence is a field that requires the ability to constantly bounce back from difficult situations. Surgical training is a time that tests an individual's ability to tolerate grueling work hours, intense physical and emotional stress, and maximum absorption and comprehension of vast amounts of medical and surgical knowledge. There is no doubt that every surgical resident has at some point felt the elation and despair of patient care.

There are three key principles or characteristics of resilient people that Diane Coutu puts forth in a poignant Harvard Business Review article entitled *How Resilience Works*—face down reality, search for meaning, and continually improvise. Resilient people possessed three defining characteristics. They coolly accept

the harsh realities facing them. They find meaning in terrible times. And they have an uncanny ability to improvise, making do with whatever is at hand.

A common belief about resilience is that it stems from an optimistic nature. That is true but only as long as such optimism does not distort one's sense of reality. In extremely adverse situations, rose-colored thinking can actually spell disaster. Instead of slipping into denial to cope with hardship, one should take a silver "I'm a down-to-earth" view of the reality of one's situation. One will prepare themself to act in ways that enables one to endure—training oneself to survive before the fact. So, face down reality.

When hard times strike, a resident should resist any impulse to view oneself as a victim and to cry, "Why me?" Rather, they should devise constructs about their suffering to create meaning for oneself and others. One can build bridges from the present-day ordeal to a fuller, better future. Those bridges will make the present manageable, by removing the sense that the present is overwhelming. So, search for meaning.

When disaster hits, one should be inventive—even if that means letting one's inner child out in a world that is dominated by gravity and urgency. Individuals should make the most of what they have, putting resources to unfamiliar uses and imagining possibilities others do not see. So, continually improvise.

1.5 Summary

Surgical residency is a privilege and honor. Patients welcome surgeons into the most vulnerable moments and aspects of their lives. With this honor there comes significant responsibility to respect and value the day to day interactions needed to provide quality surgical care. The core of becoming a successful surgeon starts within oneself. The need to foster an environment conducive to effective teamwork, communication, and leadership is paramount to the performance of surgical teams. Continual self reflection and improvement is key to making this work. It is never too early to start.

Suggested Readings

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Chapter 2
Choosing a Surgery Training Environment: Military Programs

Suzanne Gillern

Abstract Making the decision to commit to military surgical training has a significant implication for the rest of one's surgical career. A military surgical career provides the unique opportunity to utilize one's surgical skills while serving the nation. However, this commitment comes with potential limitations on ability to make decisions about one's individual career path. One should give thoughtful consideration of the pros and cons before committing to military surgical training.

2.1 Choosing a Military General Surgery Career

The motivation for starting a military surgical career is often based in pride for serving one's country and the opportunity to practice surgical skills in austere environments serving soldiers, sailors, airmen, and marines willing to sacrifice their lives in the line of duty for the United States.

When one makes the choice to become a military general surgeon, they are taking on two jobs: *General Surgeon* and *Military Officer*. There are additional responsibilities for a military officer, including mandatory physical fitness standards, weapons qualification, as well as leadership training. While the number one priority of a military general surgeon is to be a safe, compassionate, and competent surgeon, when joining the military, one is also dedicating themselves to the values and principles of military service as an officer and making a strong commitment to leadership. This commitment cannot be forgotten and should be considered when choosing to train in the military.

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2.2 Benefits of Choosing a Military General Surgery Career

One of the most significant advantages of training in a military residency program is decreased financial stress during training. Students are entering residency with zero or minimal debt due to their military scholarship. In addition, the base salary for a PGY1, who is commissioned as an Active Duty Captain (Army and Air Force) or Lieutenant (Navy) is approximately $60,000–$80,000. In addition to one's base pay, a resident will get additional compensation referred to as Basic Allowance for Subsidence (BAS) and Basic Allowance for Housing (BAH) that is based on the location of the resident's program. This amount can range from an additional $21,500–$48,000 per year depending on location and if a resident has dependents. Therefore, more expensive locations will get a higher amount of money to offset the expensive cost of living. In addition, medical care is provided without any additional charge and family members are covered as well.

In addition to better financial well-being during residency, having the military career provides a sense of security throughout residency and one's surgical career. If a resident needs to take an extended leave of absence due to medical or family issues, they are still compensated. Military residencies offer significant paid time off for both maternity and paternity leave. Compared to civilian residencies, the only consideration when determining time off when having a family as a resident is how much time to miss from residency training and is not financially driven.

Distinct to a military career are opportunities to travel and encounter professionals and patients from all over the world. This opportunity can lead to learning about different cultures and practices and serves to further cultivate a well-balanced General Surgeon. It is possible to be stationed at remote geographic locations and support smaller medical facilities that can provide both unique personal and professional experiences.

Deployments are to be expected at the completion of surgical training. In no situation will a resident be pulled from resident training to be deployed. Deployments can be considered both a pro and a con to a military surgical career. On the positive note, they provide a sense of pride and a unique opportunity to practice surgical skills in a variety of different environments. These environments include but are not limited to field hospitals, air craft carriers, or far forward austere environments supporting active combat operations, and in particular, Special Operations Forces. The professional challenge as well as the ability to use one's surgical skills to serve those in need can result in significant professional and personal gratification.

2.3 Negative Implications of Military General Surgery Training

Although General Surgery military training programs provide equivalent training to civilian programs, it is one's surgical practice after graduation in the military system that is often a challenge. The operative case volume is often significantly decreased compared to civilian surgical practice. The variety and severity of cases will depend on the duty location, if there are specialists co-located, presence of an Intensive Care Unit, and the number of other surgeons present. Depending on where one is assigned, there are often Off Duty Employment (ODE) opportunities to both make additional money and gain increased operative experience by working in civilian facilities. While the pay during residency is far above the national average, compensation for General Surgeons and General Surgery Sub-specialists in the military is not competitive with most civilian positions. The military offers opportunities for getting additional significant monetary bonuses but this requires incurring additional time in the military.

After graduation, the surgeon does not necessarily get to choose where they will be stationed. That could mean being stationed far from family or in locations not personally desirable. Depending on one's military branch, there is also the expectation that a surgeon may need to move every 2–3 years. This lack of control over one's future can be frustrating at times.

Another important aspect of post-surgical training which is important to consider is the desire to complete a fellowship. While most General Surgery specialties are still needed in the military hospitals, there are some specialties in which only a few specialists are required. A resident or staff surgeon can only apply to a fellowship if their specific branch of the military needs a specialist in that specific area at that specific time. For example, if the Army is not in need of any surgical oncologist, and an Army General Surgery Resident wishes to pursue a fellowship in surgical oncology, the resident will need to wait until the Army gives them permission to apply. Therefore, one may have to wait several years or never be allowed to apply for a fellowship in the specialty of their choice. If a surgeon is granted permission by the military to apply for fellowship, they can then apply for civilian fellowships. The surgeon will incur a 1-for-1 year of obligation for each year of fellowship that is completed.

As previously mentioned, deployments are to be expected after completion of residency training. The frequency of deployments will depend on the current world and US military operational environment. Deployments can be extremely fulfilling or very frustrating depending on military operative tempo of one's deployment location. Deployments will be a disruption to one's surgical practice, which can be a source of dissatisfaction, especially if one is not performing many or any operations on deployment. In addition, deployment may serve as a stressor due to prolonged time away from family and significant others.

2.4 Military Surgical Career Opportunities

The Military provides unique career opportunities to the General Surgeon. Inherent to being a general surgeon in the military, one is also taking on the role of an officer and, therefore, a leader. This may involve running a team in a high-pressured deployment setting or taking on leadership roles in one's medical facility. Some military surgeons may choose to seek out additional military leadership courses available in all military branches and pursue elite positions in the military, such as Hospital Commanders, Consultants to the Surgeon General, Surgeon General or other high ranking positions that can provide the opportunity to effect change in medical processes throughout the military and across the nation.

Also unique to the military surgeon is the opportunity to take on more operational roles. Positions such as Forward Surgical Team or Fleet Surgical Team (FST) Commanders are readily available to general surgeons. These jobs allow a surgeon to both incorporate medical training, leadership, and military strategy in preparing to care for service members in forward settings. In addition, military surgeons may choose to pursue a career in working closely with special operation units which involves additional non-medical military training.

An academic career is also possible within the military surgical community. There is a large opportunity for research funding and avenues to pursue research both military oriented as well as clinically relevant. In addition, the presence of residency training programs, rotating Uniformed Services University (USU) medical students, and physician assistant training programs, allows exposure to teaching and involvement in advanced surgical education.

2.5 Who Can Apply to Military Training Programs

Only medical students who are a participant of a Health Professions Scholarship Program (HPSP) or attending Uniformed Services University (USU) are able to apply to a Military Training program. Uniformed Services University is an accredited medical school located in Bethesda, Maryland. Before entering school, students will select their desired service, predominantly the Army, Navy, and Air Force. At USU, a student is on active duty status and receives the salary of a First Lieutenant or Ensign. All books, study materials and required travel are paid for. Attending USU requires the student to pay back 7 years of military service after residency is complete. Refer to the USU webpage (www.usuhs.edu) for further information.

HPSP scholarships are offered for the Army, Navy and Airforce. Tuition is covered by the government and students receive a monthly living stipend. Reimbursement is also provided for required books, equipment and supplies. There is often times a monetary signing bonus offered. While on an HPSP scholarship, students are on Individual Ready Reserve (IRR). For both USU and HPSP students, medical training is the priority and there is no risk of being pulled from school for deployments

or other military trainings. HPSP scholarships require an obligation for a 1-to-1 commitment to military service based on the number of years of a scholarship the student receives. Of note, many military surgical programs are 6 years. There is no payback required for intern year, but if one attends a civilian or military residency program that is 6 or more years, they will need to pay back 5 years, even if they received a 4 year or less scholarship. For more information refer to the HPSP website (medicineandthemilitary.com).

2.6 Application Process to a Military General Surgery Program

There are major differences in the application process for military residency programs compared to civilian residency programs. There is a separate on-line application system, Medical Operation Database System (MODS). MODS can only be accessed on computers with a military network or when using a Common Access Card (CAC). All letters of recommendation and other supplemental information will need to be emailed to the student's respective service GME office.

The process for residency application starts earlier in the military system. The initial intent to apply is required by the end of August, any supplemental documentation is required by mid-October and the military residency and fellowship match results are released early/mid December. See Table 2.1 for an overview of the timeline. Besides the military residency programs in each specialty, there are the several military/civilian partnerships available, but the specific civilian programs available and number of available positions vary from year to year and with each military branch of service. Military/civilian partnerships are an opportunity to train in a civilian program while still getting paid the salary of active duty resident and being on active duty status. Interviews for these positions occur in late summer and early fall. These programs are part of the military match and therefore occurs with the MODS system with results released in December. The military match determines if a student is deferred to the civilian match. A student may rank all of the military programs available in their service (see Table 2.2), military-civilian partnerships and the desire to be deferred to the civilian match. All military applicants from both

Table 2.1 Military residency training Application timeline

July 1: MODs application opens
End of August: Submission of application
Mid October: Submission of all supporting documentation
Mid October: Applicant submits final rankings
Mid December: Match results released

Table 2.2 Military residency training locations

Program	Location	Military branch
Walter Reed National Military Medical Center	Bethesda, Maryland	Army & Navy
Eisenhower Army Medical Center	Augusta, Georgia	Army
Womack Army Medical Center	Fayetteville, North Carolina	Army
San Antonio Uniformed Services Health Education Consortium	San Antonio, Texas	Army & Air Force
William Beaumont Army Medical Center	El Paso, Texas	Army
Madigan Army Medical Center	Tacoma, Washington	Army
Tripler Army Medical Center	Honolulu, Hawaii	Army
Naval Medical Center San Diego	San Diego, California	Navy
Naval Medical Center Portsmouth	Portsmouth, Virginia	Navy
Wright Patterson Air Force Base/Wright-State University	Dayton, Ohio	Air Force
Nellis Air Force Base/UNLV	Las Vegas, Nevada	Air Force
Travis Air Force Base/UC Davis	Davis, California	Air Force
Keesler Air Force Base	Biloxi, Mississippi	Air Force

HPSP and USU should complete an ERAS application in addition to the MODs application. Students will not know until mid-December if they have been deferred for a civilian residency and therefore need to already have submitted the ERAS application.

The process for interviewing for military programs is also different. Students are encouraged to visit potential military programs and complete four-week interview rotations. Depending on one's branch of service, the military will fund one or two of these rotations, referred to as Active Duty Training (ADT) rotations. These rotations allow the student to get a good understanding of the program by first hand experiencing the academics, witnessing the operative experience, the graded level of responsibility awarded to residents, as well as the overall culture of the program. The program also gets a more comprehensive understanding of the candidate and idea of how they would function in the program. Non-ADT rotations are not funded and therefore travel and housing will need to be provided by the applicant. Ideally, an applicant performs three interview rotations, but at the very least, two rotations. If a student is unable to visit a program, they should reach out in July to set up a virtual interview with the remaining programs. The appropriate time to start reaching out to military programs to set up interviewing rotations is December through March of the third year of Medical School.

2.7 Overview of Military General Surgery Training

There is minimal difference in the actual surgical training between a military general surgery residency and a civilian residency. Most military surgical residencies are a 6-year program with a required research year. Most general surgery residents will be allowed to proceed directly through their medical training without interruption, however a small percentage of Navy general surgery interns will need to complete a tour as a General Medical Officer (GMO) before proceeding and completing surgical training.

Military hospitals care for active duty members, dependents (spouses and children), as well as retired military members and veterans. Therefore, all age groups with a variety of pathology is encountered in training. Most military programs have multiple civilian rotations incorporated into the curriculum, allowing the residents experience in both civilian and military settings. For the most part, military residents will not be training alongside fellows as there are only two military fellowships, Vascular Surgery at Walter Reed National Military Medical Center and Trauma/Critical Care at San Antonio Uniformed Services Health Education Consortium. Military Programs have a higher than average pass rate for Board Certification and typically average around the 50th percentile for cases performed by graduating residents.

2.8 Conclusion

In conclusion, a military surgical career can be filled with opportunities for adventure and gratifying professional experiences not available to civilian counterparts. However, a military surgical career can limit opportunities that would otherwise be obtainable. Careful consideration should occur, of both the benefits and limitations, before pursuing a military surgical career.

Chapter 3
Choosing a Surgery Training Environment: Independent Programs

Jonathan Dort

Abstract A surgical training program is defined as independent when it is connected to an academic medical center but not governed by a university based medical school. Approximately one third of the surgical training programs in the US fit into this category. Additionally, compared to their university-affiliated peers, these graduates have been shown to have increased confidence to practice independently, as well as enjoying improved program support and equivalent success with fellowship matches and practice opportunities. Herein, we describe the landscape of independent residency training programs in the United States.

A surgical training program is defined as independent when it is connected to an academic medical center but not governed by a university-based medical school. Approximately one third of the surgical training programs in the US fit into this category. While they are not geographically connected to medical schools, many of these programs will have an affiliation with a medical school that allows those students to rotate through the different surgical services. One misconception about independent programs is that they are either less academic or not academic at all and therefore do not carry the same potential for fellowship placement, employment opportunity, or research capabilities. This is not true, as studies have shown that graduates of these programs have equivalent success with fellowship matches and practice opportunities. Additionally, these graduates have been shown to have increased confidence to practice independently, as well as enjoying improved program support [1–4]. Independent programs lack only the physical presence of a four-year university, but many are otherwise fully resourced academic medical centers in every other way.

While sharing this common definition, independent programs can vary widely in their resident complement, geography, urban or rural setting, and focus of training. It is important when researching programs to determine which ones match your desired class size, history of placing graduates in practice in the community or into

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fellowships, requirement or allowance of research years, and strengths of the clinical services. This type of information can be found on program websites, social media accounts, or communication with residents and leadership within a program. Additional information to ascertain about programs include the presence of an affiliated medical school that provides opportunities for teaching and mentoring, the presence of advance practice providers that can assist with patient care without interfering with educational opportunities, and the amount and types of fellowships in the center. Fellows can offer great mentorship and enhance the educational experience of all the learners; however, it is important to gain assurance that they do not adversely affect the operative and patient care experience of the residents.

There are no specific circumstances or career pathways that cannot be achieved through an independent program. However, applicants looking for mandatory research years with entrenched basic science research opportunities within the home program are more likely to find those in university-based programs. While many independent programs offer strong opportunities in clinical outcomes, patient safety and quality, and educational research, their focus tends to be more in the clinical space and are generally not as likely to offer matured pathways to funded bench research. Many independent programs do allow for research years after the PGY 2 or PGY 3 clinical years, so applicants looking for this capability should investigate what specific programs are currently allowing and what their plans are for the future.

Contributing to the increased confidence of the graduates of independent programs are the traditional strengths of these programs, which include high operative volumes and case numbers, paucity of fellowship programs that can adversely affect the resident operative experience, and close mentorship relationships with faculty. Because medical students are most exposed to university-based surgeons, a bias against independent programs can exist because of a lack of familiarity with their resources and structure. This underscores the necessity for medical students to utilize the mechanisms available to research these programs so that they are in a position to make the best choices in applying for the programs that will offer the optimal environment to ensure the realization of their desired career paths.

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Chapter 4
Choosing a Surgery Training Environment: Rural Surgery Programs

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Abstract Rural surgery is the closest experience to practicing as a general surgeon in the twenty-first century, permitting a surgeon to pursue a broad scope of practice. It is recognized that 20% of the US population live in rural areas, but only 10% of physicians practice in these areas. In this section, we want to help medical students navigate the current system by discussing the topic of rural surgery, its rewards and challenges, career goals, rural surgery residency programs and tracks, support and mentorship and the rewarding career of a rural surgeon.

4.1 Rural Surgery

A career in rural surgery can be a stimulating and rewarding one. Rural surgeons have the opportunity to find creative solutions for patient care in lower-resource settings, utilize a broad scope of surgical skills in a diverse operative caseload, and contribute to making a difference within their community. Compared to their urban counterparts, rural surgeons perform more procedures each year and complete a broader variety of operations [1]. A rural surgeon may be the only surgeon practicing in a hospital that serves multiple counties. He or she may be the primary endoscopist for an area, performing cancer-screening colonoscopies and life-saving EGDs to treat upper GI bleeds. They may also be trained and required to perform c-sections and hysterectomies, plastic surgery, and urologic procedures such as vasectomies or hyrdrocelectomies and frequently also perform more specialized general surgery operations, such as parathyroidectomies, video-assisted throacoscopic surgery, and carotid endarterectomies [2]. Often rural hospitals are lower-resourced environments, and general surgeons may need to perform stabilizing surgeries such as for trauma patients prior to transfer. While it is true that rural surgeons need to be broad-based general surgeons, there are many opportunities and

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