The Pursuit of Excellence

The 47th Annual Rovenstine Lecture

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I OFTEN thought that there would be a day when the Rovenstine lecturer would not be old enough to have any connection to Emery Andrew Rovenstine (Professor of Anesthesia, New York University College of Medicine, New York, New York; 1895–1960), but that day has yet not arrived. Today is my second direct connection with Rovenstine. My first unknown connection was in high school. As pointed out by Mark Warner’s Rovenstine lecture, Rovenstine was a basketball coach in La Porte, Indiana.1 In high school, I played in three Indiana State High School golf tournaments in La Porte and played a jazzy trumpet solo at La Porte High School just a few yards from the office he may have occupied as a coach. So this Rovenstine lecturer and Rovenstine do have a close connection in time and in geography.

In the May 2008 ASA Newsletter, I was thrilled to read the article by Paul Knight and David Wartliert titled “The Right Stuff.”2 Knight and Wartliert reminded us that John Snow’s (Physician and Surgeon, London, England; 1813–1858) remarkable curiosity and “fire of investigation” included not only chloroform anesthesia, but also the identification of the causative factors regarding transmission of cholera in the mid-1800s. How remarkable! I believe that John Snow exemplified or even initiated the principle of not only facilitating the administration of anesthesia, but also making major contributions to medicine overall. John Snow is an example of an anesthesiologist who went beyond the boundaries of anesthesiology to pursue excellence. Other, more contemporary examples of this principle are highlighted in table 1.

Imagine the impact that Peter Safar, M.D., Dr.h.c., F.C.C.M., F.C.C.P. (Safar Center for Resuscitation Research, University of Pittsburgh, Pittsburgh, Pennsylvania; 1924–2003), had when reviving people who were near death by cardiopulmonary resuscitation! With the contributions of several individuals, John W. Severinghaus, M.D. (Professor Emeritus, Department of Anesthesiology and Perioperative Care, University of California San Francisco [UCSF], San Francisco, California), created the pathway that allowed patients, especially critically ill ones, to be monitored via intense analysis of arterial blood gases. The evolution of creating separate units to take care of our sickest patients via critical care medicine was initiated by many individuals, one of whom was Henrik H. Bendixen, M.D. (Columbia College of Physicians and Surgeons, New York, New York; 1923–2004), who was originally from Denmark, then Boston, and then was the first Chair of Anesthesia at the University of California San Diego before returning to New York. John J. Bonica, M.D. (Department of Anesthesiology, University of Washington, Seattle, Washington; 1917–1994), tirelessly promoted the concept of multidisciplinary care in the treatment of patients with chronic pain. Amazingly, current concepts of pain management include all of the aspects and more that were originally recommended by Dr. Bonica in the 1950s and 1960s. And John Lundy, M.D. (Professor and Head, Department of Anesthesiology, Mayo Clinic, Rochester, Minnesota; 1894–1973), was the first individual to start a blood bank in the United States at the Mayo Clinic.

These are examples of anesthesiologists who went beyond the usual boundaries of anesthesiology to pursue excellence. To be sure, these individuals not only are responsible for the enhancement of anesthesia, but also were recognized as anesthesiologists for their contributions to medicine overall.

Defining the Path

How will anesthesiologists be viewed 50 yr from now? To answer that question, I would like to reflect on how we should define the path forward.

Considerable conceptual evidence suggests that medical professions, including anesthesiology, are in danger of becoming trade unions. If so, what is the difference between a profession and a trade union? A profession is often defined as a collection of skilled workers who deliver a service or product. A profession is a group of individuals who not only deliver a product, but also develop the product (i.e., research) and make decisions regarding how the product is to be delivered."
There have been several learned individuals who postulated that the practice of medicine as a profession has dramatically decreased in the past 10 yr. Historically, the practice of medicine was based on professional autonomy, with regard to its scientific and clinical knowledge. Have we lost our professional autonomy? If so, is that bad? The answer to both questions is absolutely yes.

As anesthesiologists, we must control the intellectual content and resources of our specialty. However, in the past 20–30 yr, this autonomous position in society has been perceived by governments of many countries, and economists therein, as an impediment to an economically sound and responsive healthcare delivery system. The result is that the previously enjoyed professional autonomy is now being invaded by a variety of governments, economic, corporate, and political agencies.

How can we ensure that we control our autonomy, to some extent, to pursue excellence? The good news is that these agencies have insisted that basic standards and protocols be met, which anyone who has undergone inspections by the Joint Commission and the Centers for Medicare and Medicaid would know. However, where is the encouragement and even demand for the pursuit of excellence and creativity? The challenges and problems posed by all of these groups usually demand attention to short-term responses and solutions, leaving little time or energy for long-term vision. Yet our future is dependent on long-term vision, so what should we do?

Please understand that I do appreciate the current demands for safety for which our specialty was praised by the Institute of Medicine in its book To Err Is Human. But do these organizations or agencies, such as the Centers for Medicare and Medicaid, ever ask, “Give us examples of how you have successfully pursued excellence”?

As anesthesiologists, we need to be dedicated to creativity and the pursuit of excellence, which are crucial to both our professional autonomy and the development of long-term vision by the specialty.

My dominant theme is that the key to medical professions, including anesthesiology, is the control of their intellectual foundation, including encouraging and/or providing leadership development. Medical care and its influences are illustrated in table 2.

| Table 1. Examples of Key Contributions to American Medicine Since 1940 |
|-----------------|-----------------|
| Resuscitation   | Peter Safar     |
| Blood gas analysis | John W. Severinghaus |
| Critical care medicine | Henrik H. Bendixen |
| Pain management  | John J. Bonica  |
| Transfusion medicine | John S. Lundy    |

Contemporary examples of anesthesiologists who went beyond the boundaries of anesthesiology in the pursuit of excellence.

After medical school, I was heavily influenced by these individuals. My second year, I had the privilege of performing pulmonary function tests in the Cardiovascular Research Institute, where I learned that John A. Clements, M.D. (Professor Emeritus, Department of Anesthesia and Perioperative Care, UCSF), was busy determining the minimum alveolar anesthetic concentration (MAC) in various clinical situations and also determining the pharmacokinetics (i.e., uptake and distribution) of inhaled anesthetics. As mentioned previously, John W. Severinghaus, M.D., was very active in many aspects of respiratory physiology, including blood gas analysis. Sol Shnider, M.D. (Professor, Department of Anesthesiology, UCSF), had a sheep model that allowed a precise definition of vasopressors used to sustain blood pressure in pregnant women and their effects on uterine blood flow.

Specifically, Edmond I Eger II, M.D. (Professor Emeritus, Department of Anesthesia and Perioperative Care, UCSF) was busy determining the minimum alveolar anesthetic concentration (MAC) in various clinical situations and was also determining the pharmacokinetics (i.e., uptake and distribution) of inhaled anesthetics. After medical school, I was heavily influenced by these individuals. My dominant theme is that the key to medical professions, including anesthesiology, is the control of their intellectual foundation, including encouraging and/or providing leadership development. Medical care and its organizations gradually evolved from 1970 to 1995. During those years, many advances were made in our specialty, including the evolution of our specialty into many subspecialties. In addition, the duration of our residencies lengthened from 2 to 3 yr so that we could not only improve training in the operating room, but also expand into the entire perioperative period. This lengthening of duration also allowed our residencies to have dedicated time toward research, if so desired. There is no doubt that the American Society of Anesthesiologists (ASA) played an enormous leadership role in this evolution.

After medical school, how did my personal concepts about our specialty evolve? I was heavily influenced by what went on at UCSF in 1965. Highlights of those influences are illustrated in table 2.
was clearly an atmosphere about which I wanted to learn more and be an active participant.

The Potential Opportunity

The potential opportunity to pursue excellence beyond any preconceived boundaries was mind-boggling to me. When returning to UCSF from Vietnam and the military, I saw other approaches to the pursuit of excellence. For example, although we were concerned about financial well-being as junior faculty, I watched William K. Hamilton, M.D. (Professor Emeritus, Department of Anesthesia and Perioperative Care, UCSF), my predecessor as chair, worry about supervising our intensive care unit when we could not collect professional fee income. Covering the intensive care unit shifted funds from faculty salaries, which was not popular with our faculty, including me. Dr. Hamilton insisted that we continue a major leadership role in critical care despite the financial implications, and I am grateful that his instincts were so visionary. Our anesthesiology department now plays a dominant role in the provision of critical care at UCSF. I am also grateful that he allowed a very opinionated young faculty member, me, the opportunity to debate with him regarding the issues of those times as they related to anesthesiology.

However, during the most recent 10 yr, the rate of change has far exceeded that of the previous 25 yr. We have had extremely rapid change in several aspects of our daily professional lives, including hospital admission policies (e.g., being admitted the morning of surgery), reduced resident work hours, increasingly large amounts of outcome data, and a changing role of the surgeon, the implications of which surprised us, especially me, and many others. During that time, our specialty did achieve excellence in operating room anesthesia. We, and the ASA as an organization, should be congratulated. However, anesthesiologists, including myself, were concerned that as a profession we were not ready for the future.

As a result, the ASA leadership formed the ASA Task Force for Defining Anesthesia Paradigms in 2025, which I was honored to chair.7 The task force was charged with reviewing the inevitable change and new opportunities within our specialty, discussing concerns regarding the status quo, commitment to relying on the profession rather than a consulting firm for assessing the future, and exploring the idea of proactive inquiry versus defensive ness and inaction. Exploring these areas via the task force was inspirational and challenging to many of us. We interviewed many leaders in American medicine and even outside medicine, which led to the current conclusion regarding the increasing dominance of perioperative medicine and the need to increasingly review the entire perioperative process as one integrated unit, including emphasis on critical care medicine.

One prediction by those we interviewed was that anesthesia would not step up to the plate; the prediction was that, for financial reasons, anesthesiologists would not be leaders in perioperative medicine. Another prediction was that an increasing number of beds would be dedicated to perioperative medicine and critical care. That process has evolved more rapidly than even our task force anticipated, as indicated by the increased number of perioperative directors.

Has anesthesia stepped up to the plate? Has there been debate? One indicator that addresses the first question is the number of advertisements in the journals I read. By rough count, there has been a severalfold increase in the number of perioperative director advertisements in the United States since that task force report.7 This is not a precise analysis, but the dramatic increase in advertisements indicates the increasing importance of the perioperative concept. Furthermore, most of the appointed perioperative directors are anesthesiologists. We, as a specialty, did indeed step up to the plate. Another significant outcome of the task force is that it increased the attention level to anesthesiology’s future. Our future is widely discussed and debated, especially by our leaders. I have heard Mark J. Lema, M.D., Ph.D. (Chairman of Anesthesiology, Critical Care and Pain Medicine, Roswell Park Institute, Buffalo, New York), discuss many issues, especially our finances. Patricia Kapur wrote an article titled “The Future of Anesthesia Practice” in the summer 2008 Bulletin of the California Society of Anesthesiologists.8 I could name many others. With so many people probing our future, the chance that our specialty’s future is secure is much more likely. It is impossible to know what the impact of our task force’s report had on our specialty’s response, but with considerable bias, you can easily imagine my opinion.

Strategies and Questions

Can we use the same strategy as used with the ASA Task Force7 for addressing our current and future challenges? Does the pursuit of excellence have any boundaries as far as our specialty is concerned? The pursuit of excellence demands our attention both inside and outside the boundaries of our specialty, as exemplified previously by Snow, Bonica, Bendixen, and others. Furthermore, our specialty has a continued parade of challenges or opportunities to address. For example, what if robots become increasingly important for surgery and possibly anesthesia?9

What if the delivery of anesthesia becomes completely automated, especially with regard to drug administration and its monitors? An example is “Dr. McSleepy” from McGill10 (table 3). You can “Google” it if you want more information. Its effectiveness remains to be determined. If so, how will that influence our future?
What if acute pain management is dominated by self-administered devices by nonintravenous routes (fig. 1). How will that influence our future?

What if a “dedicated procedure center” dominated by hospitalists becomes common? These centers have been described and will insert central and arterial lines. How will this influence our future? I repeat the previous statement: To achieve excellence, we must examine both inside and outside our boundaries.

There are many more examples and possible future developments that could be listed. However, the fundamental question is, how do we respond to these questions and still pursue excellence? Do we need a specific process to address these developments?

Do we respond prospectively or react retrospectively? One approach would be to devise some type of organized survey and collection device and then have some learned group analyze the previously mentioned questions’ potential place in anesthesia when they become a reality. In my opinion, retrospective reactions usually are made in an atmosphere not conducive to the pursuit of excellence. Even with my passion for predicting the future, I could not have possibly imagined the impact of surgical resident work hours and reimbursement schemes on the practice of surgery, especially preoperative evaluation and postoperative care (or the lack thereof). These added responsibilities are generally desired by our specialty, but has that helped us plan for the future—or has it bound us down and made us less creative? I am encouraged that our specialty has stepped up to the plate in such a thoughtful and meaningful manner with regard to perioperative medicine, but I remain concerned about preoperative evaluation. In my opinion, preoperative evaluation needs to be performed by anesthesiologists or closely supervised by us. In the pursuit of excellence of every aspect of our specialty, I am concerned about the increasing trend to relinquish our responsibility of preoperative evaluation to other providers.

The Importance of Research

As indicated previously, the need for our specialty to be creative and in control of its intellectual content demands emphasis on research. The ASA has been acutely aware that our share of academic research funding has been inappropriately small when considering the importance of our specialty in American medicine. The ASA has placed added emphasis in research by celebrating it in a variety of ways, including increased funding to the Foundation for Anesthesia Education and Research and the establishment of the Severinghaus Lecture in Translational Science.

Along these lines, there is no doubt that anesthesiology research has increasingly penetrated and influenced basic science and other clinical disciplines—congratulations to those anesthesiologists. Despite the currently poor economy, I, perhaps, hopefully not alone, believe that some interesting opportunities may be on the horizon. These following points illustrated in an article by Kaiser in which Keith Yamamoto is quoted in Science clearly indicate that the National Institutes of Health (NIH) is trying to make the application process easier and is placing greater emphasis on “impact” rather than “methods”:

- Decrease maximum allowed length of applications from 25 pages to 12

Table 3. Automated Delivery of Anesthesia

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<thead>
<tr>
<th>Automated anesthesiology (“McSleepy”)</th>
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<tr>
<td>● No manual intervention</td>
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<tr>
<td>● Self-adapting</td>
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<tr>
<td>● Gives drugs and monitors their effect</td>
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<tr>
<td>● Performs more quickly and precisely than humans</td>
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<tr>
<td>● Automatic transmission versus manual</td>
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<tr>
<td>● No robot—still need a human anesthesiologist</td>
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How will developments such as “Dr. McSleepy” influence the future of anesthesiologists?10

Fig. 1. (A) A handheld sublingual patient-controlled analgesia (PCA) device with a cartridge containing a 2-day supply of Sublingual Sufentanil NanoTabs (AccleRx Pharmaceuticals, Inc., Redwood City, CA). (B) The recharging station for the Rechargeable Hand-Held Sublingual Sufentanil PCA. From AccleRx Pharmaceuticals, Inc.; used with permission.
remedies proposed by Reves and by Schwinn and Balser in 2006.13 In effect, Evers and I asked whether the low research productivity, including failure to attract top research talent. Why do physicians start research in the first place? One answer is that they dream that they will solve a major medical problem important to society overall. Physician–scientists are attracted to fields such as medicine and pediatrics because they dream of curing major healthcare problems such as cancer and Alzheimer disease. So the question is, if I were to ask all of you anesthesiologists what pressing clinical problems for the specialty of anesthesiology need research for a solution, what would I hear? I believe that an inconsistent and quite diverse answer, which would not be sufficiently concise for the pursuit of excellence, would follow. We need to know what these problems are. Evers and I presume that grant deficiency is our specialty’s manifestation of a more profound problem, but is merely a symptom of our intellectual lack of a clear mission.

I apologize for being a bit harsh with this statement: Although our specialty should be and is proud of our significant contributions to patient safety, it is inappropriate to content ourselves with the fact that few patients experience intraoperative death due solely to anesthetic mishap. For example, we need to take ownership of the substantial perioperative morbidity and mortality. There are many unrecognized problems in perioperative medicine, such as postoperative renal failure, systemic inflammatory response syndrome, and cognitive dysfunction, to name a few. Some of our anesthesia colleagues are moving into these areas, but we need more—a national commitment. We must identify, publicize, and embrace the problems that need to be solved. Compelling and solvable problems will attract the best and brightest to our field.

The Task Force Model

Let us now talk about tactics. Floyd Bloom suggests envisioning scientific life in the year 2050 in his article “Thinking Ahead.”16 Three of Bloom’s recommendations relevant to my discussion are as follows:

- Organize various groups to hypothesize what science will be in the year 2050.
- Yes, some findings are unanticipated and thrilling.
- If you envision what is over the edge of the horizon, perhaps we can invent the tools needed to get there.

With these recommendations in mind, my first tactic is to develop a long-range vision.

It is difficult to precisely chart the future of American medicine, generally, and our specialty, specifically; however, we must try. In the process of trying, our visual acuity will be increased, and, therefore, we will be more likely to detect opportunities or subtle changes that allow us to respond in a thoughtful and thorough manner. I also have always been incredibly impressed with the value of consulting with individuals outside our specialty for advice. It really hit home to me how valuable this outside advice was when chairing the ASA Task Force for Defining Anesthesia Paradigms in the Year 2025. With that general background, I would offer a reconstitution of the task force design to try to assess our future, specifically with the formation of new and different tasks. With considerable bias, I believe that the original Task Force for Defining Anesthesia Paradigms in the Year 2025 had considerable merit; however, with a newer task force, we most certainly can take advantage of those strategies that happened to work. In my opin-
ion, it was especially valuable to talk with people outside of our specialty, including politicians, economists, industrialists, and other specialties. Developing the following three ongoing and futuristic task forces is important for helping to shape the future of our specialty:

- The future of anesthesiology and perioperative medicine
- Analysis of the role and place of all new technology and pharmacology
- An international think tank to define the outstanding questions our specialty needs to answer

I have commented on my role on the Paradigms in 2025 task force, and the first task force noted above should continue and broaden this important topic.

A second, and equally important, new task force should analyze the role and place of all of our technology and pharmacologic additions. The ASA certainly helps members to adopt and integrate new technology and pharmacology into our practices. Can they do more? As indicated in some of my previous points, how will these changes change the practice of anesthesia? Will these changes even influence the type of personnel or coverage that we provide for general anesthesia? We should know. We should do it in a manner that allows us to act proactively rather than reactively. The proactive approach, obviously, opens the opportunity for our specialty and its leadership to influence the future use of this technology and pharmacology. There are some examples in the ASA and our specialty in which we have successfully done that. Most certainly, the Foundation for Anesthesia Education and Research and the Anesthesia Patient Safety Foundation have been terrific in some of these areas. However, I would recommend that we do that on a broad and consistent basis via a specific task force.

The third task force, perhaps structured as an international think tank, is desperately needed. The purpose of this task force would be to define the outstanding questions that our specialty needs to address as far as research is concerned. This would include not only basic science research, but also clinical research and translational research. I would submit that, as with the Future of Anesthesia Task Force, multiple sources of information should be sought, including industry and biotech companies. I can most assuredly tell you that a couple of my comments are based on my knowledge of what some biotechnology and pharmacologic firms are doing. I also believe that this task force must go beyond the boundaries of the United States. It is clear that many places in Europe, Asia, and Australia have been very active in creative investigation. We need to devise a technique by which an international consensus could be developed in a creative manner as to what the big, important questions are. I think it would be invigorating and productive, and perhaps could even influence funding overall for our specialty. One of the additional challenges would be the manner in which we, as anesthesiologists, should influence the many subspecialty areas (e.g., neuroanesthesia) that we have. That is a challenge in its own right.

Of prime importance is that that these new task forces or think tanks need to think big and dream. Whether there is a more productive strategy for addressing these important and ongoing issues remains for others to determine. I humbly suggest a task force approach. Perhaps there are better ways, but the importance of long-term and consistent attention to these three topics is crucial.

### Pursuing Excellence Today

In conclusion, our specialty has not always been dedicated to the pursuit of excellence. The degree of this dedication comes and goes depending on finances, political leadership, and academic leadership. I would argue that the pursuit of excellence should always be the number one agenda item for all anesthesiologists, but especially for our training programs and specialty overall. It is true that the attention to detail, the attention to finances, and the attention to politics are crucially important and occupy our minds on a daily basis. In the background, however, our vision needs to be acute and sensitive to pick up every opportunity to facilitate our specialty’s achieving the pursuit of excellence. I believe that even as you walk through the exhibits, if you are looking for new ideas for the pursuit of excellence, you are more likely to see them if they are in front of you, if you have that idea in your mind, rather than if you do not. Of course, we need to extend our attention to the pursuit of excellence well beyond the exhibits.

We should make it a practice in all committees and our daily practice to ask ourselves, “Have we tried to pursue excellence today?” If we do, our chances of achieving excellence are much more likely. To paraphrase Oscar Wilde, we are all trying to find our way, but some of us are looking at the stars.17 Thanks to all of you for joining me in looking at the stars during this plea for the pursuit of excellence.

### References

14. Reves J: We are what we make—Transforming research in anesthesiology: The 45th Rovenstine Lecture. Anesthesiology 2007; 106:826-55
15. Evers AS, Miller RD: Can we get there if we don’t know where we’re going? Anesthesiology 2007; 106:651-2