Anesthesiology 2010; 112:779–85

We Need Leaders

The 48th Annual Rovenstine Lecture

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IT is an extraordinary honor to be here today to deliver the 48th Annual Rovenstine Lecture. I am reminded of the tremendous journey that anesthesiologists have traveled over the last half century: a journey that started when anesthesia was in its infancy, and patients died needlessly; a journey that required great vision and determination, that reduced preventable harm, and that made patient safety in anesthesiology a model for all of medicine.

Today, this journey continues. The healthcare industry faces daunting challenges. Physicians must play a significant role in evolving health care to ensure that all patients receive the best and safest care possible, while at the same time controlling healthcare costs. This is a heavyweight responsibility on anesthesiologists, whose job has traditionally been to keep patients safe in the operating room (OR) and whose concerns with healthcare costs ended at those doors. In the days to come, our responsibilities will only intensify.

Dr. Rovenstine started this journey of vision and excellence with his scholarly work and great leadership. Today, there is an even greater need for leadership. We use the word leadership slackly, often without clearly defining its meaning. Some describe leadership as being in charge or providing protection. Others describe leadership as a position of power. Yet, neither description is accurate. Leadership is helping people address problems that will make the world better. It means focusing on a goal and inviting everyone to help achieve it. It means serving others more than ourselves. It is inherent in each of us; something anesthesiology, health care, and the world need desperately.

You do not have to be the smartest or the strongest or the most powerful or the most influential. You also do not need to be the department chair to show leadership. You simply need to have courage to think of what could be, clarity about the task at hand, and commitment to convert these thoughts into a reality.

I remember being on a camping trip. I was in one of the three groups of eight campers; each group had a lead counselor. We set out early in the morning to hike a local mountain, but we had to choose, from among a number of peaks, which one to climb. One counselor took an autocratic approach. He decided which peak to climb and provided excruciating detail about what we would do every step of the way. Needless to say, there was little enthusiasm from the group. The second counselor took a noncommittal approach. He said, "There are a lot of great hills. I do not care where we go. Which one do you want to climb?" This vague directive also garnered little enthusiasm. The third counselor took a collaborative approach. He said, "You see that peak over there, I think that is the one we should climb; it has an amazing view from the top. I am not sure we will make it. It is going to be difficult, and I will need your help. However, if we all work together I am pretty confident we can reach the summit." As expected, everyone wanted to be a part of his group.

You do not need to have all the answers to be a great leader. You will never, but you must actively lead. You must take a stand, set a course, and inspire people to lift themselves and others to new heights and make the world a better place. It is not about individualism; it is about teamwork. It is not about judging and blaming. It is about accepting responsibility for what can be accomplished. For every great achievement, there is an army of leaders helping to make it happen. Leaders must see beyond the barriers, and they must focus on the goal and inspire others to do the same. It is the power of that collective vision—when the team and the leader see the same future—the one that enables the group to make the world a better place.

Anesthesiology has had many visionary leaders. Beecher and Todd[1] first unveiled the problems of patient safety and preventable harm with their groundbreaking work on anesthesia-related deaths in 1954. Never before had anyone questioned our methods, encouraged us to study ourselves, and

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Received from Departments of Anesthesiology and Critical Care Medicine, The Johns Hopkins University School of Medicine, Baltimore, Maryland. Submitted for publication November 12, 2009. Accepted for publication December 2, 2009. Support was provided solely from institutional and/or departmental sources. Presented at the Annual Meeting of the American Society of Anesthesiologists, New Orleans, Louisiana, October 19, 2009.

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inspired us to do better. Then, in 1959, Phillip *et al.*[2] showed that anesthesia was a principal cause of mortality in 6% of surgery-related deaths. This shocking revelation led Phillip *et al.*[3] to declare that anesthesia-related mortality was a major public health problem. Similarly, in the work by Beecher and Todd,[1] this information was not welcomed. These studies met tremendous resistance and were challenged by many prominent members of the field, yet these brave leaders persevered.

It is understandable that these findings would meet opposition. An anesthesiologist's job is to protect and heal patients not harm them. However, patient safety is one of the biggest problems that health care faces today. It is our duty as physicians to reduce preventable harm and improve patient outcomes. To achieve this, we need to learn from each other and develop strong teamwork. As long as preventable harm is common, and it is, we must address the problem together with surgeons and nurses, with regulators and insurers, and with hospital leaders and consumers. We cannot simply hide our heads in the sand. We must be leaders.

This pioneering work continued in 1978 when Cooper *et al.*[4] conducted the first critical incident analysis in anesthesiology. They identified that technical mistakes (things anesthesiologists do) were the most common contributor to adverse events. They recommended that we train and educate, use appropriate monitors and protocols, and organize our workspace. In 1984, Cooper *et al.*,[5] took us even further when they hosted the first international symposium on preventable anesthesia morbidity and mortality and created the Anesthesia Patient Safety Foundation.

All of this great work seems to have paid off. The American Society of Anesthesiologists' Web site states that over the past 25 yr, the number of deaths attributable to anesthesia has dropped 25-fold, from 1 in 10,000 to 1 in 250,000. Indeed, anesthesiology is widely heralded by the Institute of Medicine in its influential report, *To Err is Human*, for its marked reduction in anesthesia mortality.[6]

We have undoubtedly made progress. However, how much is uncertain; we still have much work to do. The reported numbers likely overestimate how much we have improved because it is difficult to measure safety. It takes science, which is prone to bias. As an example, we can examine the numbers cited on the American Society of Anesthesiologists Web site. The 1 in 250,000 number was based largely on deaths from malpractice claims, but only approximately 1 in 7 preventable adverse events (and likely fewer deaths) leads to claims. In fact, in 1989, Lagasse[7] concluded that the mortality rate is more similar to 1 in 13,000. These studies did measure different things and use different data sources. However, such a wide discrepancy suggests that what you measure and how you measure it makes a significant difference. It highlights the dangers of not having a standardized and transparent measurement system. Twenty years later, we are still uncertain about how safe we are.

The same is true about regional anesthesia complications.[8] We say that the risks are small, even negligible, but the risks are likely substantially underestimated. Risk assessments stem largely from physician self-reports or liability claims, and neither is very accurate or complete. A more accurate approach would be to conduct direct follow-up with all or a sample of patients. However, this is seldom if ever done. We liked what the available data revealed and looked no further.

The concern with measuring progress in improving patient safety is perhaps best demonstrated by our inability to prevent wrong-site surgeries, something you have all worked hard to prevent. The number of wrong-site surgery reports has increased annually since we started counting them. Now, the scientists among us may conclude that our efforts have effectively increased wrong-site surgery events. I do not think that is the case. However, we established a national policy with a superficial understanding of these events, with no pilot testing to discover whether the interventions actually worked, and no system to measure whether patients were actually safer. Thus, the increase in these events likely represents reporting bias; but we do not really know. We need to know. Patients deserve better.

To reduce patient harm and improve care, we must establish clear goals and valid measures to determine where we stand and what we need to do to improve.[9] The patient should be the focus not the clinician. We need to move away from labeling deaths as anesthesia related or surgery related. When a patient dies from a hemorrhage, it is easy to ascribe this to the surgeon. However, in most cases, good teamwork would have saved the patient's life. Patients certainly do not care how we categorize death.

This call for leadership is not limited to the OR. The entire healthcare system is in disarray. The United States spends more than 2 trillion dollars on health care; approximately $8,000 per person to buy care that is often of poor quality. We have an expensive health system that denies health insurance to 47 million people and too often harms rather than helps them. Mothers face the dilemma of taking their child to the doctor or paying the rent and the elderly of buying food or medicine. Rising health insurance premiums are forcing consumers, small business owners, and large corporations into bankruptcy.

We need leadership to increase research funding and expand the science of healthcare delivery. For too long, science has been obsessed with finding new genes and new drugs. It is not surprising that our understanding of patient outcomes is limited. We barely spend a penny on researching healthcare delivery for every dollar we spend on basic and clinical research.

Einstein said that the problems we face today cannot be solved with the same level of thinking we had when we created them. The science of medicine is expanding exponentially, and we need creative and courageous leaders to tackle complex, interconnected, and perilous problems born from this growth. It will take mass collaboration among clinicians and administrators, consumers and employers, policy makers and regulators with a common goal to solve the new healthcare problems that we face today.

Several years ago in my small corner of the universe, a group of doctors and nurses in the surgical intensive care unit (ICU) at the Johns Hopkins Hospital decided to be leaders. We chose one small problem that kills between 30,000 and 62,000 people each year (central line-associated bloodstream infections). For decades, medicine accepted these deaths as inevitable, as the cost of being in a hospital, as the norm rather than the exception.

We questioned that mindset. We knew that most patients were not receiving the interventions recommended to prevent these infections. We had a hunch that most were preventable. Hence, we set out to prove it and used the Johns Hopkins Hospital as our learning laboratory. We did three things: summarized the evidence into checklists, measured infections, and perhaps our greatest challenge and most significant accomplishment was to change the deeply engrained culture of medicine.

The checklist idea, although novel in health care, is not new. My mother uses checklists when she goes shopping, pilots use checklists while flying planes, and my 12-yr-old son Ethan uses checklists to keep track of his homework assignments. For some reason, most likely because of the long-held erroneous belief that doctors and nurses do not make mistakes, we did not use them in health care.

The checklist we created for central-line insertions was simple.

- Wash your hands.
- Clean your skin with chlorhexidine soap.
- Cover yourself and the patient when placing the catheter.
- Avoid placing catheters in the groin.
- Take out the catheter when it is not needed.

We asked doctors and nurses to make patient rounds together, agree on a patient-specific plan, and work together to get the patient well. We also asked the nurses to supervise the doctors placing these catheters and use the checklist. If the doctors did not comply with any behaviors, nurses should "stop takeoff" and make the clinician go back and fix the problem. As you can imagine, I almost caused World War III. The nurses said, "It is not my job to police the doctors and if I do I will get my head bit off." The doctors said, "You cannot have a nurse question me in public. It makes me looks like I do not know something." I said, "I do not expect you to be perfect. You have permission to make a mistake. But, I expect you to ensure patients always get evidence-based interventions, and nurses and patients can help." I pulled the doctors and nurses together and asked, "Is it tenable that we harm patients at the Johns Hopkins Hospital? Then nurses, how can you sit silent? We need you to advocate for your patients. And doctors, no one is perfect; you are allowed to forget, but you are not allowed to expose patients to needless risks. So doctors, let me be clear, unless there is an emergency, you will correct the defect. We have an obligation to our patients." What was striking was that no one debated the evidence. The problem was a toxic culture of competition and independence, and patients suffered because of it.

We also provided clinicians with valid measurement and continuous feedback regarding results. My passion for valid measurement developed rather tragically. An adorable 18-month-old girl, named Josie King, who was hauntingly similar to my daughter Emma, died of preventable mistakes; principal among them was a catheter infection leading to sepsis and dehydration.

On the fourth year anniversary of her death, her mother asked whether Josie was less likely to die today. I started reciting all the work we were doing at Hopkins. She abruptly and appropriately cut me off. She was not interested in what we were doing; she wanted to know whether Josie and other patients were safer. She wanted results. At the time, neither I nor Hopkins or likely any hospital in the U.S. health system could give her an answer. I believe that she deserves one.

The results of our work in the surgical ICU were breathtaking; central-line infections virtually disappeared.[10] Hence, we packaged our program and implemented it across Michigan ICUs.[11] Many thought that we were bold and doomed to fail. Others thought that we were naive or downright nuts, with too many obstacles and insufficient resources to succeed. It was difficult work. We toiled long hours and absorbed critics' blows. To be honest, I wondered whether we would succeed. I had never led a large effort and did not know if it was possible. I did know that patients were dying needlessly, and I had to do something about it.

Ultimately, we virtually eliminated central-line infections in many ICUs in Michigan and sustained those results for 4 yr. Moreover, the culture of safety improved by approximately 50%.[11,12] The project likely saved an estimated 2,000 lives and more than 200 million dollars a year. The mortality of all Medicare patients admitted to an ICU in Michigan, compared with similar patients in 11 surrounding states, was reduced to approximately 20%. As you may imagine, these results grabbed the attention of consumers and the Congress. A survey by Congressman Waxman revealed that all states said they were using the checklist, but only 11 measured infection rates, and few were anywhere near as low as Michigan. The Secretary of Health and Human Services subsequently called for a 75% reduction in these infections within 3 yr after implementing this program throughout the United States. This will not be easy. It will require unprecedented collaboration in health care. With funding from the Agency for Healthcare Research and Quality and Philanthropy, my team is working with doctors, nurses, intensivists, infection preventionists, state hospital associations, and health departments, The Joint Commission, the Leapfrog Group, consumers, insurers, the Centers for Disease Control and Prevention, and Centers for Medicare and Medicaid Services to replicate the Michigan project state by state. We are also working with the World Health Organization, ministers of health, and professional societies to implement the program in Spain, the United Kingdom, and Peru. If we can replicate the Michigan results elsewhere, this intervention will save more lives than any other medical intervention in the past half century. It could be the Polio Campaign of our genera-

tion. We need one. The progress we have made to improve patient safety in the past decade is unacceptable.

Our work has taught us some important lessons. We learned that the world is small and interconnected, and we are more alike than different. No one group can succeed alone. We learned that science must be applied to every aspect of our work. Without evidence-based practice, solid measurement of results, and strong culture and teamwork, we will never reach our goal of making health care safer. We learned that culture is local, that ICUs and ORs have different cultures, and patient safety must be owned by those who deliver care. Researchers should be flexible when implementing interventions but unwavering when measuring results. We also need wise regulations to standardize measures and make performance transparent: regulations that encourage rather than stifle innovation, so that we can continuously improve performance.

We learned that we must find a balance between simplicity and scientific soundness, between regulation and innovation. The Netherlands offers a good example. The Netherlands was having a problem with men missing urinals in public restrooms. Cleanup was expensive. Hence, they did a randomized trial and found that if they painted a fly on the urinals, the accuracy of men increased by 80%; the study had a significant *P* value. They made a public policy to paint flies on all the urinals. I have to say, when I was there presenting, I felt compelled to aim at the fly—my wife wants to order one. We need this kind of simple yet scientifically sound intervention. It is now 8 yr since Josie died, and her mother is still waiting for an answer about whether care is safer.

We have learned a lot since those early days in the Hopkins surgical ICU and we continue to learn. The most important lesson we have learned is that without strong leadership, none of this work would happen. I am not talking about my leadership. I am talking about the anesthesiologist who spreads this work throughout the academic medical center in Ann Arbor, the anesthesiologist who implemented the program in the ICU and ORs in a 100-bed community hospital in Troy, and the nurse in a small rural hospital with 2 ICU beds in the Upper Peninsula who stopped a surgeon placing a central line because he did not comply with the checklist. She simply said, "I'm going to page Dr. Peter from Johns Hopkins." I doubt he knew who Dr. Peter was, yet her leadership made him comply from that day forward. These leaders are just like you, clinicians who heal patients every day, who are often overworked and underappreciated, who had the courage to make the world better. Without each of these courageous people, patients would still be dying needlessly.

As proud as we are of the work we are doing, there are many challenges that await us. It will take leadership and unprecedented collaboration. It will require seeing our differences as strengths rather than liabilities, accepting responsibility, and learning rather than judging and blaming others.

I learned about the value of collaboration and wise decision making from an unusual source, honey bees. Swarms of honey bees have an uncanny ability to select the best location for a new hive. When a swarm needs a new home, hundreds of bees explore potential locations. On returning, these scouts perform a "waggle" dance to indicate their rate of a site's quality. As the dancing builds, other scouts go test these sites and bring back their own reports. Eventually, a consensus emerges. The location that collectively has the longest waggle wins.

Although scientists have long known about the bees' decision-making acumen, a recent article explains why their process works so well.[13] It demands both independence, the scouts' objective assessments of locations—and interdependence, advertising their findings and having others test it for themselves and sharing (waggling) what they think. The researchers discovered after computer simulation that poor performance in either behavior undermined the swarm's success. Blindly heeding others' recommendations without independently evaluating these sites led to hasty decisions that were often wrong and frequently missed the best choice. Conversely, investigating sites without advertising and sharing their perceptions with others slowed the selection process, leaving the bees homeless.

The bees have taught us a lot about improving quality. Traditionally, safety recommendations are made by a small group of well-intentioned people, most of whom do not practice medicine. Few, if any, of these recommendations have been pilot tested. Similarly, the medical community lacks a mechanism to efficiently share which interventions work, in which patients, and in what care settings.

Practice guidelines can be hundreds of pages and offer 100 recommendations. Busy clinicians cannot perform 100 things. Moreover, the infrastructure to pilot test recommendations, prioritize what is most important, and determine what really works is nonexistent. It is no wonder that widespread adoption of guidelines takes decades, if it occurs at all.

This is what makes our work different. Like bees, we communicate and share our ideas, and we test these ideas before recommending them. It was this level of teamwork and collaboration that made Michigan work. Like bees, we need to be both independent and interdependent and collaborate and share to achieve a common goal. The future of health care and the safety of our patients depend on our waggle dance.

Hence, let us continue anesthesiology's journey into the future. Let us eliminate preventable harm and waste, reduce perioperative mortality, morbidity, and costs of care, and improve functional outcomes after surgery. Let us regain our leadership in patient safety, not just in the OR but throughout the hospital. We can restore joy and improve the health and well-being in our profession. With your leadership, vision, commitment, and a whole lot of waggling, we will get there. Let us continue our journey with some specific actions (table 1).

Now is the time to create valid and transparent measures of quality and safety[9]; measures that evaluate how we perform and also the results we achieve: our outcomes. To do this, the American Society of Anesthesiologists should work

Table 1. Moving Forward: Now Is the Time

Specific actions
Work with surgical and nursing professional societies to develop valid and transparent measures of performance and outcomes for quality and safety
Obtain National Institutes of Health funding to research the risks, long-term morbidity, and outcomes of surgery and regional
Build teamwork competencies into training and certification programs
Hold clinicians accountable for adhering to safety standards
Develop a new and robust peer-to-peer review process
Implement perioperative medicine programs
Double the number of grants obtained from federal agencies to reduce mortality and improve outcomes
Produce more basic, clinical, and outcomes researchers to ensure patients benefit from new discoveries
Develop efficient and high-quality operating room staffing models
Seek leadership roles in the hospital
Improve anesthesia care around the world
Reduce disposable waste operating rooms

with surgical and nursing societies to create measures and a database to monitor performance. No doubt the politics will be delicate, control may be lost, and the credit may be diffuse. However, without working together, we will all fail, and we will have measures dictated to us that may be neither meaningful nor valid. Anesthesiology has come a long way with creating the Anesthesia Quality Institute. However, we need to think beyond just anesthesia mortality, complications, and quality. We must focus on patient outcomes. This is within our grasp. I have informally spoken to the leaders of these societies; they recognize the need to collaborate. We need leaders.

Now is the time to obtain National Institutes of Health funding for large cohort studies to find the true risks of surgery and regional anesthesia[8] and the long-term morbidity and outcomes of our patients. We should look at patient characteristics, including genotypes, evaluate what we do, and obtain robust long-term outcome and complication data. We have a model that works with patients with acute lung injury. We need leaders.

Now is the time to build teamwork competencies into training and certification. Teamwork is important; some have started to focus on it, but we have not standardized it. Teamwork problems are a major cause of preventable patient harm. We should be the first medical specialty to require teamwork certification. Teamwork is every bit as important as technical work. Once we have established this certification in anesthesiology, we should partner with surgery to develop joint certification. This will eventually happen, but history will remember the leader. We need leaders.

Now is the time to hold clinicians accountable for adhering to standards, as most high-reliability industries do. Yes, a focus on systems is important, but so is personal responsibility. It is not acceptable to place central lines without washing hands; full-barrier precautions should be used, and the nurses' request to comply with the checklist should be heeded. We hold physicians accountable for writing discharge summaries because hospitals need them to submit bills. We should hold them accountable for not adhering to safety standards and mete out consequences for those who chose not to comply. We need leaders.

Now is the time to develop a robust peer-to-peer review process. Peer review and incident investigation are broken; the public and policy makers have little faith in the ability of medicine to police itself. The World Association of Nuclear Operators has a confidential peer-to-peer review process with validated assessment tools that create a culture of learning rather than a culture of judging. Anesthesiology could be the first to adopt this process. We just pilot tested these methods. We need leaders.

Now is the time to implement rather than just discuss perioperative medicine programs. We need leaders to blaze the trail and define the training required, how to implement it, and how to measure its results. Perioperative medicine should link preoperative risk assessment, OR care, ICU and floor care, and long-term follow-up. Currently, we perform surgeries that do not benefit some patients, order unnecessary tests and treatments, and add superfluous costs from postoperative complications. Informatics will have to support these efforts, and I know there are many hospitals already working together. We need leaders.

Now is the time for anesthesiologists to double the number of grants obtained from federal agencies. We must seek new knowledge to reduce mortality and improve outcomes. Without new knowledge, our specialty will wither and die. It is time to invest in producing basic, clinical, and outcomes researchers to ensure that patients actually benefit from these discoveries. We need department chairs to find the resources to train junior faculty in robust research methods. Similarly, physicians need to recognize that life is less about driving a bigger car, buying a bigger house, or getting a bigger paycheck, and more about making the world a better place. The latter is far more rewarding. I was fortunate; my department at Johns Hopkins supported my Ph.D. in outcomes research. I was the first. It was this training and the subsequent training of seven other Hopkins faculty that helped us transform quality improvement work into real science. We need leaders.

Now is the time to develop efficient and high-quality models of OR staffing. Models that help control costs without compromising outcomes. Models in which we reflect deeply on the role of the anesthesiologist and all members of the anesthesia care team. The differences among the types of anesthesia providers are real and no doubt will continue. Yet we must find common ground if we want to improve quality and reduce costs of care. This will require shared learning and collaboration among hospitals, especially in information systems. It is inefficient to develop and program our informa-

tion technology systems and databases in isolation. We need to work with other anesthesiology teams, like some of you are doing, to agree on common elements, measures, and goals. We need leaders.

Now is the time for anesthesiologists to take on leadership roles within their hospitals. Anesthesiologists should strive to be perioperative directors, chief medical officers, chief quality officers, chief executive officers, and deans. We must apply our leadership roles to improve OR safety in the entire hospital. We need leaders.

Now is the time to improve anesthesia care around the world. Approximately 234 million people have surgery annually in the world. However, anesthesia services are poor to nonexistent in much of the developing world and many patients needlessly die or suffer harm. Some of you have created programs to help train clinicians in the developing world. However, these efforts are few and far between. We should work with the United States Agency for International Development and others in developed and developing countries to create a global Web-based curriculum. We should pull the dusty books off our shelves and hand them to clinicians in developing countries who thirst for knowledge. We need leaders.

Now is the time to reduce disposable waste in the OR. Waste that costs money, pollutes our land, and warms our global climate. Now is the time for you to accept responsibility, reach your full potential, and commit to making the world a better place; to be a leader.

These are not my ideas but our ideas[14–16]; no doubt, you will make them better. Without action, we cannot make the world better. This will not be easy, nothing worthwhile ever is, but I am confident it is possible. If you want to think of the power of interdependence and collaboration think back 20 yr ago to November 9th. Everyone remembers the destruction of September 11th, yet few remember that cold November day when East German soldiers opened the gates, the wall came tumbling down, and the world learned that anything is possible when people unite to reach a common goal. Fear changed to hope, despair to dreams, and the world is now a better place.

Some of this work has already begun. For example, the Society of Cardiovascular Anesthesia launched a program, the Flawless Operative Cardiovascular Unified Systems, which partnered anesthesiologists, surgeons, nurses, perfusionists, and researchers to eliminate preventable harm, improve teamwork, and implement peer-to-peer review in cardiac ORs. Much of the work will replicate the Michigan project but focus on surgical site infections in the cardiac OR rather than bloodstream infections in the ICU. We are early in this journey, and I am lucky to be part of it. The response from hospitals has been overwhelming. They sense hope for a better tomorrow, they feel energized by the collaboration, and they want deeply to make the world better. However, the efforts thus far have been too narrow, superficial, and slow.

These goals are ambitious. Some may say the problems are not ours, or they are too large, and others will gladly collaborate. However, if we choose independence over interdependence, conflict over collaboration, and serve ourselves over others, we will surely fail. It is inefficient and ineffective to work alone. The tasks are too large, the work too great, and the hills too high. You will have to be unwavering in the hills you climb but flexible in how you reach the top. You will have to build consensus, inspire others, and broaden your role in health care.

We will build on those who have gone before us and construct our future, and 10 yr from now at the 58th Rovenstine Lecture, let it be said that you were leaders with a vision that did not follow those against health reform, for increased reimbursement, and the status quo. Let it be said that you worked together, learned together, and made the world a better place together. Yes, health reform needs to be wise and our compensation must be just. Nonetheless, you have so much more to offer. I look forward to the day you are on this podium telling us what great work you have inspired and contributed to, great work that has moved anesthesiology into the future, our collective future.

In my office hangs a quote from Margaret Mead: "Never doubt that a small group of thoughtful committed citizens can change the world. Indeed, it is the only thing that ever has." You are that group and may you go change the world. Thank you and start waggling!

The author thanks the following individuals for their thoughtful comments on this manuscript: Edward D. Miller, Jr., M.D., Dean and CEO, The Johns Hopkins University School of Medicine, Johns Hopkins Medicine, Baltimore, Maryland; John A. Ulatowski, M.D., Ph.D., Professor and Chairman, Department of Anesthesiology and Critical Care Medicine, The Johns Hopkins University, Baltimore, Maryland; Roger A. Johns, M.D., Professor, Department of Anesthesiology and Critical Care Medicine, The Johns Hopkins University; Adam Sapirstein, M.D., Associate Professor, Department of Anesthesiology and Critical Care Medicine, The Johns Hopkins University; Todd Dorman M.D., Associate Dean and Director, Continuing Medical Education, The Johns Hopkins University School of Medicine; and Daniel Nyhan, M.B.B.C.H., Professor, Department of Anesthesiology and Critical Care Medicine, The Johns Hopkins University; and Christine G. Holzmueller, B.L.A., Medical Writer/Editor, Department of Anesthesiology and Critical Care Medicine, Johns Hopkins University, for her assistance in editing this manuscript.

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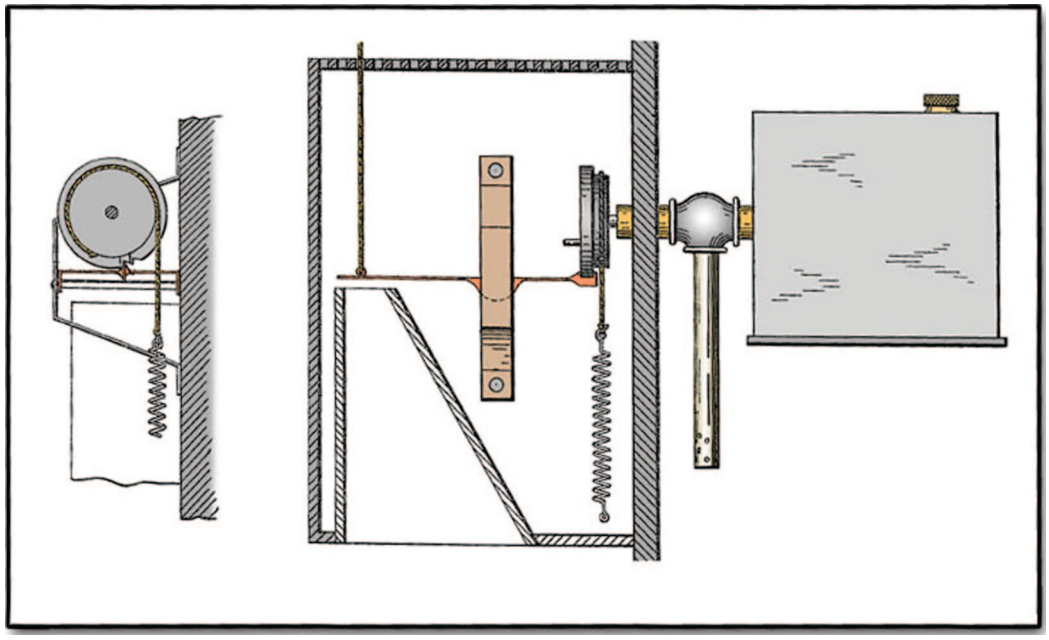
ANESTHESIOLOGY REFLECTIONS

Stewart's Burglary-preventing Apparatus



In January of 1907, David Stewart of Chehalis, Washington filed a patent for a "Burglary-Preventing Apparatus" designed to use volatile anesthetics to thwart thieves. As granted 15 months later, his U.S. Patent No. 885,200 (*see above,* courtesy of the Wood Library-Museum) provides for a "receptacle lined with porcelain, glass, or other non-corrosive material and adapted to contain a fuming fluid . . . such as chloroform [or] ether. . . ." Besides its "fuming fluid containing chamber," his patent claims include "the valve controlling discharge from said chamber, a spring acting to open the valve, and a lever to hold the valve closed, said lever being constructed to move by vibrations produced by an explosion." Stewart also provided a means for manually operating release of the chloroform or ether, say, from a bank "cashier's desk, thus adapting the apparatus to foil burglars when the use of explosives is unnecessary to gain access. . . ." (Copyright © the American Society of Anesthesiologists, Inc. This image appears in color in the *Anesthesiology Reflections* online collection available at www.anesthesiology.org.)

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