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The Evolution of the Anesthesia Patient Safety Movement in America: Lessons Learned and Considerations to Promote Further Improvement in Patient Safety

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ABSTRACT

Ellison C. Pierce, Jr., M.D., and a small number of specialty leaders and scientists formed a remarkable, diverse team in the mid-1980s to address a dual crisis: a safety crisis for anesthetized patients and a medical malpractice insurance crisis for anesthesiologists. This cohesive team's efforts led to the formation of the Anesthesia Patient Safety Foundation, the American Society of Anesthesiologists's Committees on Standards of Care and on Patient Safety and Risk Management, and the society's Closed Claims Project. The commonality of leaders and members of the Anesthesia Patient Safety Foundation and American Society of Anesthesiologists initiatives provided the strong coordination needed for their efforts to effect change, introduce standards of care and practice parameters, obtain financial support needed to grow patient safety–oriented new knowledge, integrate industry and other relevant leaders outside of anesthesiology, and involve all anesthesia professions. By implementing successful patient safety initiatives, they promoted the recognition that anesthesiology and patient safety are inextricably linked.

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The anesthesia patient safety movement in the United States, heralded by the development and implementation of the American Society of Anesthesiologists' (ASA; Shaumburg, Illinois) *Ad Hoc* Committee on Patient Safety and Risk Management in 1984 and Committee on Standards in 1985 and the Anesthesia Patient Safety Foundation (APSF) in 1985, has been lauded as a landmark of successful collaboration between a national professional society and a related foundation.[1] The impact of the movement has been recognized as one of the most influential medical advances of the past century. By any account, the ASA and APSF have formed a remarkable team during the past 36 yr and have stimulated changes that improved the safety of patients who undergo anesthesia.

As with any collaboration in a dynamic, changing environment, the strength of the relationship between partners may fluctuate over time and require periodic reassessment and adjustment to maintain or improve outcomes. The ASA, specifically its Committee on Patient Safety and Education (formerly the Committee on Patient Safety and Risk Management), its Committee on Standards and Practice Parameters (formerly the Committee on Standards), its Committee on Professional Liability, and the APSF have recently or currently are making adjustments to their missions and charges. Therefore, this period in 2021 provides an excellent opportunity to review the historical links between the two entities, understand the dynamics and shared goals that produced such a positive impact on anesthesia patient safety, and contemplate opportunities to promote additional collaboration into the future.

For the purposes of this paper, the years 1982 to 2000 are considered the era of the origin of the anesthesia patient safety movement. Born out of an increasing awareness of anesthetic-related injuries to patients and a growing malpractice insurance crisis, the nascent anesthesia patient safety movement during this period generated highly successful and innovative patient safety initiatives. A remarkable group of dedicated ASA and APSF leaders led these initiatives during a time of a dramatic reduction in patient harm associated with anesthesia.

The Origins of the Anesthesia Patient Safety Movement

The 1970s and early 1980s in the United States saw a rapid increase in innovative procedural practices in medicine and surgery. Technological advances boomed concomitant with the acceleration of the space programs, computerization, and other disruptive innovations. These advances were supported by increased governmental funding, an expansion of academic programs in science and mathematic fields, and an influx of both men and women into the biologic sciences and medicine. Surgical, nonsurgical procedural, and anesthetic disciplines were transformed by the resulting evolution of biomedical equipment, biologic monitoring, and medications and adjuvant agents. The advances also increased pressure to offer these procedural services to a greater breadth of the population, particularly reaching out to patients of advanced ages and a growing level of medical and surgical conditions and general dysfunction or disability.

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Anesthesiology adapted to these rapid changes, but not always in synchrony with the pace of the growing complexity of the procedural practice and surgical patient population. As a result, the risk of patient harm increased during this period, and medicolegal actions against anesthesiologists grew rapidly.[2] Medical malpractice insurers quickly responded to the increase in anesthesia-related lawsuits, and rates for malpractice insurance coverage jumped dramatically. Malpractice insurance coverage became difficult to obtain in certain geographic locations of the United States. An insurance crisis was looming. In addition, the public was becoming increasingly aware of patient harm associated with anesthesia care. This awareness peaked on Thursday evening, April 22, 1982, when the ABC television network aired its *20/20* production "The Deep Sleep: 6,000 Will Die or Suffer Brain Damage."[3] Public concern spiked, as did the desire of ASA members for actions that would address both the malpractice insurance crisis and the public's concerns. The stage was set for leaders to step forward and improve anesthesia patient safety.

Fortunately, anesthesiology had leaders in place who advocated for the resources and changes needed in the specialty to significantly address these issues. The key leaders who participated in the anesthesia patient safety movement are shown in figure 1. Figure 2 provides a timeline of the historical developments that are described in this paper.

Development of Anesthesia Monitoring Standards

The Controlled Risk Insurance Company in Boston, Massachusetts, provider of malpractice insurance for the Harvard University hospitals, noted in 1983 that 11% of its payments to patients for harm were associated with malpractice claims against its insured anesthesiologists despite these anesthesiologists representing only 3% of their insured physicians.[4] James F. Holzer, J.D., a director at the Controlled Risk Insurance Company and leader of Harvard's Risk Management Foundation, asked the nine chiefs of the Harvard-affiliated hospitals to determine how to solve this (Jeffrey B. Cooper, Ph.D., Department of Anesthesia, Critical Care, and Pain Medicine, Massachusetts General Hospital, Boston, Massachusetts, April 20, 2021, verbal communication; John H. Eichhorn, M.D., emeritus Anesthesia Patient Safety Foundation Newsletter Editor-in-Chief, April 21, 2021, San Jose, California, verbal communication). The chiefs subsequently formed a Risk Management Committee to review this issue. The committee had representatives from six Boston-area hospitals and was led by Eichhorn, then of Beth Israel Hospital. In addition to Eichhorn, the department chiefs and members of the Risk Management Committee consisted of several individuals who would become key leaders in the anesthesia patient safety movement. These included Ellison C. ("Jeep") Pierce, Jr., M.D.; Richard J. Kirtz, M.D.; and Cooper.

The Risk Management Committee determined during its efforts in 1984 and 1985 that the major anesthesia-related malpractice payouts by the Controlled Risk Insurance Company were associated with a handful of patients who suffered severe injuries, and that most of these injuries may have been preventable with continuous monitoring of patients. They subsequently recommended that the Harvard-affiliated hospitals adopt monitoring standards, a recommendation accepted by each anesthesiology department chair.[5] The standards faced initial resistance in the Harvard-affiliated hospitals, but their implementation in 1985 was supported by strongly aligned anesthesia chiefs and bolstered by a promise from Holzer and his insurance company to reduce anesthesia malpractice expenses by 15% or greater, a reduction that occurred by 1986.

Pierce was particularly influenced by this attention given to anesthesia patient safety. He had been interested in the issue for several years (Cooper, verbal communication; Eichhorn, verbal communication).[6] In 1982, as First Vice-President of the ASA, he was hearing often from ASA members and malpractice attorneys about catastrophic anesthetic-related harm to patients. He vowed to use his ASA leadership position to address this issue, a promise that would have a remarkable impact on not only the acceptance of anesthesia monitoring standards in the United States but also anesthesia patient safety in general around the world in the coming decades.

Development of the ASA Committee on Patient Safety and Risk Management

In July 1983, the ASA's Section on College recommended the production of a videotape program entitled "Patient Safety and Risk Management" by the Subcommittee on Resources and the Section on College. A sum "not to exceed $100,000" was budgeted "to plan and produce this program."[7] Subsequently, President-elect Pierce affirmed the recommendation in his annual report to the ASA House of Delegates.[8] In his report, Pierce noted, "The broadcast in 1982 of the ABC 20/20 program concerning anesthesia accidents caused many of us to reflect anew on the problem. Over 135 yr, numerous studies and commissions have examined morbidity and mortality in our field but produced little progress in modifying them. Most have suggested that the majority of anesthesia deaths are preventable… It is indeed possible that there may be some 5,000 anesthetic deaths each year in the United States out of some 20 million administrations of anesthesia… Leadership must come from the world's anesthesia societies, however, not from insurance companies and federal regulatory agencies… ASA and component educational programs will be costly but are essential to provide understandings of why mishaps occur. It is my belief that significant relief from ever-increasing premiums for medical liability insurance will come only when the number of mishaps is significantly reduced."

In that same report, Pierce further proposed the formation of an *Ad Hoc* Committee on Patient Safety and Risk Management.[8] Since it was an *ad hoc* committee, he did not require ASA Board of Directors or House of Delegates approval. He appointed Howard L. Zauder, M.D., Ph.D., as

Fig. 1. Photographs of anesthesiology leaders who advocated for the resources and changes needed in the specialty to significantly improve anesthesia patient safety and reduce patient harm during the years 1982 to 2000 during the evolution of the anesthesia patient safety movement.

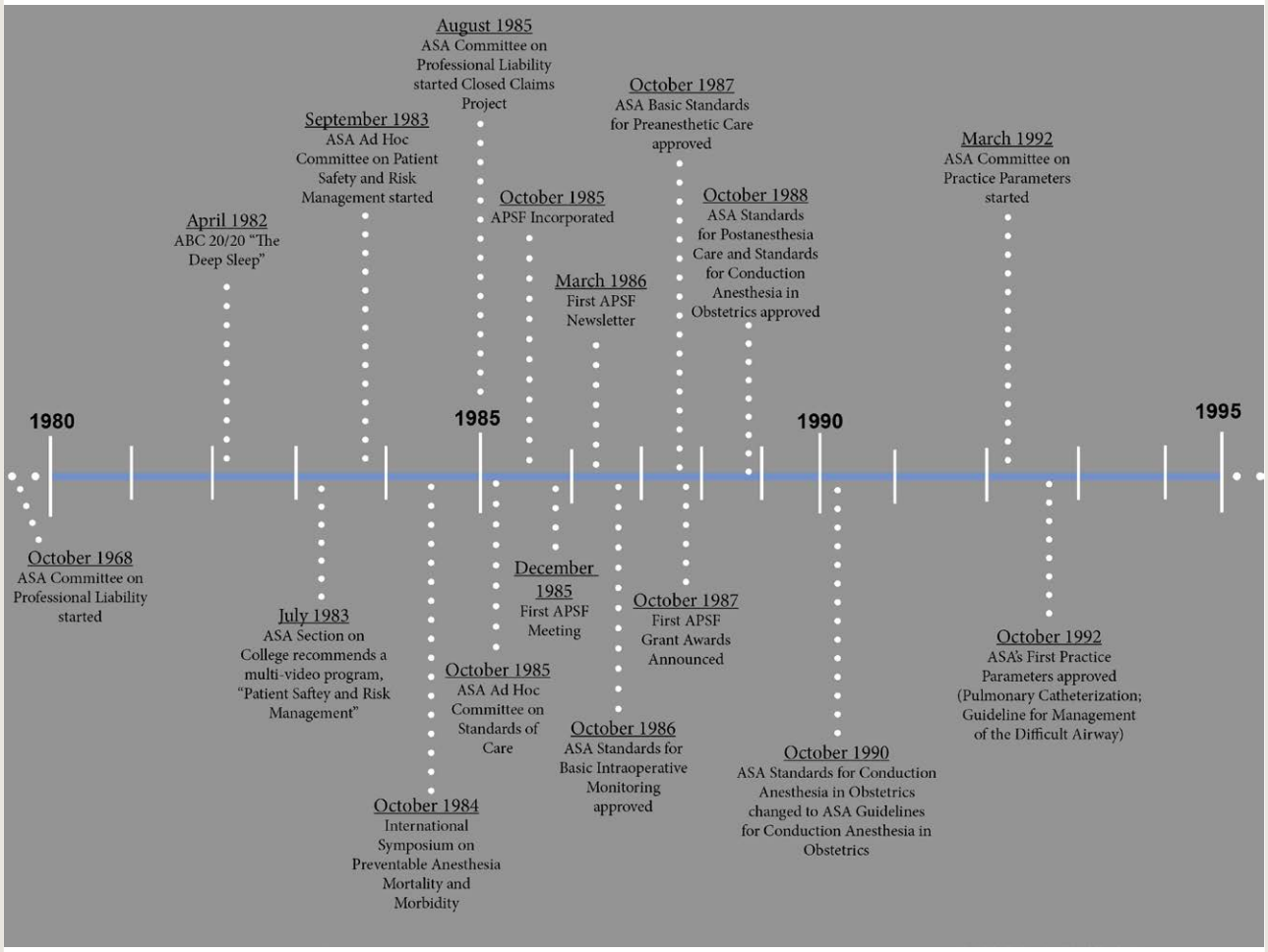

Fig. 2. This timeline depicts major events that contributed to anesthesiology's lead role in improving patient safety during the years 1968 to 1992. ABC, American Broadcasting Corporation; APSF, Anesthesia Patient Safety Foundation; ASA, American Society of Anesthesiologists.

the *ad hoc* committee's chair. Future APSF directors on that *ad hoc* committee included Cooper; William K. Hamilton, M.D.; Arthur S. Keats, M.D.; and Holzer. Zauder reported in July 1984 that the *ad hoc* committee's primary functions included education and the acquisition of data related to adverse events in anesthesia.[9] In his March 1984 report, Zauder noted that the ASA Board of Directors had directed the responsibility for production of videotapes related to patient safety to be shared by the ASA Committee on Resources of the Section on College and the *ad hoc* committee.[10] The first two tapes were "Introduction/Index" and "Anatomy of an Anesthesia Machine." The third was "Disconnection in Breathing Circuits."[9] This initial anesthesia patient safety videotape production initiative continued for 16 yr, ending in 2000 with its 24th videotape.[11] The *ad hoc* committee became the Committee on Patient Safety and Risk Management in 1985 upon a recommendation of then ASA President Pierce in 1984.[12] It first met in 1986 with Pierce as its inaugural chair.

Development of the ASA Committee on Standards (Subsequently the Committee on Standards and Practice Parameters)

Encouraged by Pierce, his predecessor as ASA president, H. Ketcham Morrell, M.D., promoted the development of standards of care, stating in his August 1985 Board of Directors Report, "There have, in the past, been discussions centered around the subject of 'standards of care' and whether or not ASA could or should publish what it believes is a standard of care in anesthesiology. I believe we owe it to our membership as well as the American public for ASA to set down guidelines concerning standards of care…"[13] In his subsequent September 1985 report to the Board of Directors, he commented further, "The time has come to 'get off the dime' and promulgate standards of care satisfactory not only to the House of Delegates, but to the entire membership. When this element of patient care is attended to, quality of care must improve. The conduct of an anesthetic will be even safer than it is currently. We will

eventually have a significant drop in morbidity and mortality and the people in the professional liability industry will have to take notice."[14] He appointed an *Ad Hoc* Committee on Standards of Care, and Burton S. Epstein, M.D., was made the committee's first chair. The initial committee included Pierce as a member and first met on October 14, 1985.

By July 1986, the *ad hoc* committee had met twice and decided to first tackle the issue of minimal monitoring for anesthetized patients. After a review of existing, relevant recommendations and standards and hearing from Eichhorn of the 1985 implementation of the Harvard monitoring standards,[15] the committee members agreed with all of them and recommended their approval in the *ad hoc* committee's first annual report to the ASA Board of Directors.[16] The board approved the recommendation with a minor adjustment, and the ASA House of Delegates approved the "Standards for Basic Intra-Operative Monitoring" in final form on October 18, 1986.[17] This approval established ASA as a national leader in standards of care and accelerated the specialty's anesthesia patient safety movement.

Development of the ASA Committee on Professional Liability

The ASA *Ad Hoc* Committee on Professional Liability Insurance was established in 1968 with a goal of implementing professional liability resolutions passed by the 1968 House of Delegates.[18] In its 1969 annual report, the *ad hoc* committee suggested that the group continue with a main function to act as a clearinghouse for information about professional liability insurance and to assist with educational programs pointed toward the prevention of malpractice claims.[19] Harold L. Engel, M.D., chair of the *ad hoc* committee, sagely noted in that report, "Satisfied patients do not sue."

The *ad hoc* committee had a temporary setback in late 1970 after a series of recommendations, including one that promoted the transition of the *ad hoc* committee into a standing Committee on Medical-Legal Affairs, were disapproved by the Board of Directors.[20] The disapprovals, at least in part, led to the abrupt resignation of William H. L. Dornette, M.D., J.D., the *ad hoc* committee chair. Into his place stepped J. Gerald Converse, M.D.[21]

The malpractice insurance crisis continued over the next decade. Both the costs of insurance and the financial awards to plaintiffs in anesthesia-related legal actions escalated. In 1984, Frederick W. Cheney, Jr., M.D., was the committee's chair and contemplated the nascent concept of using closed malpractice claims to gain information on anesthesia patient harm. It was clear to Cheney and other anesthesia patient safety leaders that the single most effective way to reduce malpractice insurance expenses and plaintiff awards was to reduce patient harm.[8,22] While attending the inaugural International Symposium on Preventable Anesthesia Mortality and Morbidity (October 8 to 10, 1984) organized by Pierce, Cooper, Kitz, and T. Cecil Gray, M.D., of the United Kingdom, he watched as Richard W. Solazzi, M.D., and Richard J. Ward, M.D., presented their analysis of anesthesia mishaps gleaned from medical liability cases.[23] Encouraged by ASA Immediate Past President Pierce, Cheney asked Ward to help the ASA start a closed claims project and recruited Karen B. Domino, M.D., and Karen L. Posner, Ph.D., to assist. The Closed Claims Project, now one of the world's most successful and sustained studies of anesthesia patient harm, benefited from Cheney's prolonged leadership as he served as chair of the Committee on Professional Liability through 1995. Starting with the Closed Claims Project's first peer-reviewed article by Robert A. Caplan, M.D., in 1998,[24] investigators associated with the project produced 67 novel peer-reviewed papers through the end of 2020. These papers have informed many patient safety changes and helped the ASA committees and APSF prioritize the issues that they have addressed over the years.

Development of the APSF

The initial International Symposium on Preventable Anesthesia Mortality and Morbidity meeting in 1984 proved to be a pivotal point in the rise of the anesthesia patient safety movement. It was held October 8 to 10 in Boston and was attended by approximately 50 anesthesiologists from the United States, Australia, the United Kingdom, South Africa, France, and Belgium with the goal of holding a candid discussion of anesthesia morbidity and mortality.[6] After that meeting, a small subgroup consisting of Pierce, Cooper, Kitz, Gray, and Eichhorn met and decided that a patient safety foundation was needed to advance the ideas expressed at the (Cooper, verbal communication; Eichhorn, verbal commmunication). These included the concept that a separate foundation was needed to promote input from all anesthesia professionals (in this case, specifically nurse anesthetists), the industry, the legal profession, the American Medical Association (Chicago, Illinois), and the Joint Commission on Accreditation of Healthcare Organizations (now The Joint Commission, Oakbrook Terrace, Illinois). In addition, the subgroup was convinced that it was important for patient safety initiatives to be supported financially by industry and foundations. The ASA, designated by the U.S. Internal Revenue Service as a 501(c)(6) organization, could not accept foundation funding at that time and had to be very specific in intent when receiving industry support. On the other hand, a new foundation, crafted to achieve designation by the Internal Revenue Service as a 501(c)(3) organization, could accept funds from these sources as long as conflict of interest issues were addressed appropriately. The APSF was granted 501(c)(3) status on December 5, 1986.[25]

Several other crucial decisions and initiatives related to the anesthesia patient safety movement arose from the initial International Symposium on Preventable Anesthesia Mortality and Morbidity meeting. It was clear to the subgroup that the foundation should be U.S.-centric. Attaching it to entities such as other anesthesiology societies and the World Health Organization (Geneva, Switzerland) would most likely be controversial, impeding the pace of change needed to improve patient safety in the United States (Cooper, verbal communication; Eichhorn, verbal communication).[6] On

the other hand, the group didn't wish to place restrictions on itself that would limit its ability to reach out internationally. At the subgroup meeting, Cooper proposed naming the foundation "The Anesthesia Patient Safety Foundation,"[26] avoiding any mention of country of origin that might hinder one of the APSF's initial missions, "[the] international exchange of information and ideas on patient safety."

As he did with other key ASA initiatives on patient safety, Pierce led the development of the APSF. He arranged the organizing meeting on July 10, 1985, in Washington, D.C. He was joined by Cooper; Kitz; Michael Scott, J.D.; and Zauder.[27] After subsequent consultation with Pierce, ASA President Morrell recommended the formation of the foundation in his August 1985 President report to the ASA Board of Directors.[28] Pierce, as the first chair of the Committee on Patient Safety and Risk Management, asked at that same meeting that the ASA approve APSF funding of $100,000 annually, using a voluntary "checkoff" on the ASA dues form to add a contribution of $25 per member to offset the $100,000 commitment.[29] The ASA Board of Directors initially disapproved his recommendation and expressed a desire to see the draft bylaws of the foundation in order to better understand the proposed relation between the ASA and the APSF. Pierce and Scott produced the draft bylaws and on October 12, 1985, the ASA House of Delegates agreed to the $100,000 annual funding support and elected Pierce and Scott as the APSF's first two directors.[30]

As there were 30 APSF director positions approved in the bylaws, it fell to Pierce and Scott to arrange the election of the remaining directors.[31] They met on November 22 and December 13 that year, both times in New York City, to select a slate of nominees. Twenty-seven additional directors were recommended and elected on December 14, 1985.[32] Their election was followed immediately by the APSF's first Board of Directors meeting.[33] A 30th director position was held open for a potential, unrealized nominee. The new board consisted of 16 anesthesiologists; 5 anesthesia and monitoring equipment representatives; 3 insurance company leaders; a single nurse anesthetist; and one director each from the Food and Drug Administration (Silver Spring, Maryland), the American Hospital Association (Chicago, Illinois), the pharmaceutical industry, and the legal profession.

The addition of a nurse anesthetist to the APSF as a board member was controversial at the time. Key leaders within the ASA were initially against the nomination of a nurse anesthetist, but Pierce believed strongly that the nurse anesthesia profession must be represented (Cooper, verbal communication; Eichhorn, verbal communication). In a compromise, it was agreed that a nurse anesthetist should be an APSF director, but the nominee could not be a leader within the American Association of Nurse Anesthetists (AANA; Park Ridge, Illinois). Pierce nominated Beverly Nichols, C.R.N.A., and she was subsequently elected unanimously. Ironically, two additional nurse anesthetists, including Jeffery M. Beutler, Deputy Executive Director of the AANA, had been elected by 1991. This act of compromise by Pierce has arguably driven the overall success of the APSF for its first 35 yr. He used this compromise to demonstrate his extraordinary belief in the importance of including all relevant people in the anesthesia patient safety movement. The culture of inclusivity that he sought through compromise continues to this day as the APSF Board of Directors and others on its committees consist of individuals from various anesthesia-related industries, the insurance and medicolegal fields, nurse anesthesia and anesthesiologist assistant professions, surgeons, perianesthetic nurses, operating room nurses, regulatory agency representatives, and others.

Industry, in a broad definition that includes manufacturers (*e.g.*, those producing anesthesia-related equipment, physiologic monitors, and pharmaceuticals) and medicolegal insurance companies, was well represented on the initial APSF Board of Directors and played a vital role in improving the safety of anesthesia care.[32] Industry leaders such as Burton A. Dole, Jr. (Puritan-Bennett Corporation, Overland Park, Kansas), William New, M.D. (Nellcor Corporation, Hayward, California), George Griffiths (Janssen Pharmaceuticals, Beerse, Belgium), James F. Holzer (Risk Management Foundation, Boston, Massachusetts), Mark D. Wood (St. Paul Fire and Marine Insurance Company, St. Paul, Minnesota), and W. Dekle Roundtree, Jr. (Ohmeda, Atlanta, Georgia) added credibility to the APSF within their fields of industry. They were major contributors to the APSF missions personally. Equally important, they were able to use their considerable collective influence to assist APSF and the specialty pursue changes within their industries and address major patient safety issues. For example, Wood collaborated with Cheney and the ASA Committee on Professional Liability to open the St. Paul Companies' (St. Paul, Minnesota) closed claims files on anesthesia-related lawsuits and persuaded additional malpractice insurers to do the same, all of which made the ASA Closed Claims Project possible.[34] These leaders also raised money to support the initial activities of the APSF, getting their own companies to support the foundation but also helping obtain funding from other corporations and foundations. Perhaps the most important example in the first several years of the APSF's existence was Dole's influence in obtaining a grant of $450,000 over 3 yr (1986 to 1988) from the Parker B. Francis Foundation (Kansas City, Missouri).[35] Francis was founder of Dole's Puritan-Bennett Corporation. Puritan-Bennett also provided in-house publishing support for the first years of the *APSF Newsletter* (Eichhorn, verbal communication). The newsletter was particularly important for the dissemination of patient safety information and was distributed to all members of the ASA and AANA in its first year, 1986.

Historical Links between Key ASA Committees and the APSF

The APSF and these three ASA committees were very strong partners during the crucial development of the anesthesia patient safety movement from 1985 through 1995. Pierce played a very significant role in building these partnerships, either directly appointing overlapping membership between the APSF directors and the committees or arranging it

through his influence on receptive and supportive ASA leaders such as ASA Presidents Morrell, Franklin B. McKechnie, Zauder, and Arens (Cooper, verbal communication).[6,36] The interdigitation of members of the APSF Board and the ASA committees was crucial to coordinating an evolving, broad anesthesia patient safety movement. For example, during the first decade of its existence, 29 to 60% of the members of the ASA Committee on Patient Safety and Risk Management were APSF directors.[37] Pierce took this concept a step further by influencing the selection of the chairs of these ASA committees, many of whom were either APSF directors or ASA leaders who strongly supported the anesthesia patient safety vision that Pierce promoted (Cooper, verbal communication; George A. Schapiro, M.S.I.A., emeritus Anesthesia Patient Safety Foundation Executive Vice-President, April 22, 2021, Hillsborough, California, verbal communication). APSF director Cheney was notified in mid-1984 that he would be appointed to chair the 1985 ASA Committee on Professional Liability and its Closed Claims Project. He remained in that position for the entire first decade of the anesthesia patient safety movement (1985 to 1995). Epstein was appointed in 1985 to become the inaugural chair the Committee on Standards of Care. He led that committee for its first 9 yr. Pierce himself chaired the ASA Committee on Patient Safety and Risk Management from 1984 through 1990 and was followed by Caplan, also an APSF director. This interdigitation of APSF directors onto these key ASA committees as members and chairs led to a strong union of forces and coordination of efforts to reduce patient harm from anesthesia.

During that time, the ASA Committee on Patient Safety and Risk Management was the primary resource for the ASA initiative to produce a series of videotapes on anesthesia patient safety issues. The APSF served as a conduit for industry funding to support the initiative. APSF directors also provided insights and guidance. The ASA Committee on Professional Liability, especially with its leadership role with the ASA Closed Claims Project, provided crucial information to guide APSF patient safety initiatives and promote anesthesia patient safety in general within anesthesiology. The ASA Committee on Standards was tightly linked to the APSF during that same period. The committee recommended the ASA's adoption of clinical standards.[16] The adoption of clinical standards was novel for a medical entity at the time, propelling anesthesiology and ASA to the forefront of patient safety in general worldwide.[38] The APSF and the three ASA committees shared their minutes or ASA reports starting in 1986, and a significant number of their members and leaders overlapped. This interdigitation of members and leaders led to a coordinated, collaborative effort to improve anesthesia patient safety. In many ways, it is reasonable to suggest that this coordination between these four groups markedly accelerated interest in and actions toward anesthesia patient safety, in essence starting the exponential rise of the anesthesia patient safety movement and patient safety across the broad spectrum of medical care. Pierce was the common link and was primarily responsible for this coordination.

From 1986 through 2000, the ASA Committee on Patient Safety and Risk Management augmented the education and training component of the APSF. The committee produced the ASA patient safety videotape series. The last of the initial series of 24 videotapes was finalized in 2000.[11] Of course, the committee also had ASA-specific roles. These included serving the society as a resource for patient safety–related questions and requests, assisting the annual meeting and other education leaders in selecting speakers for specific patient safety-oriented topics, identifying potential patient safety–oriented authors for *ASA Newsletter* articles and other educational enduring materials, and generally advising the society and its members on methods to enhance the safety of anesthesia care.[39]

The relationship between the APSF and the ASA Committee on Patient Safety and Risk Management was very effective during the initial 14-year period of 1986 to 2000. During these years, the percentage of APSF directors who served on the committee ranged from 29 to 60%.[37] With completion of the videotape series, a major component of the committee's role fell away, and the committee went through a period of transition. In 2000, committee chair Casey D. Blitt, M.D., also an APSF officer, noted, "The direction and charge of the committee continues to be somewhat nebulous."[11] Successive committee chairs made similar comments in their reports to the ASA House of Delegates and asked for a closer, official relationship with APSF.[39,40] By 2009, the percentage of APSF directors serving on the committee as members had decreased to less than 20%, and that downward trend has continued. From 2014 through 2020, less than 5% of the committee members were APSF directors, and the interchange in ideas between the committee and APSF faltered. However, the committee has continued to fulfill its ASA charge and assists the Committee on Annual Meeting Oversight and other ASA committees by suggesting topics and speakers for patient safety courses and lectures. It provides input to ASA patient-directed materials and other patient safety publications (*e.g.*, a recent *International Anesthesiology Clinics* text), supported and maintained a now-inactive ASA Frequently Asked Questions webpage that primarily dealt with issues that impact patient safety, and has been asked by ASA leaders to serve as a resource for patients and members who have questions related to patient safety–oriented issues.

The ASA Committee on Professional Liability and Committee on Standards of Care never had a significant percentage of their members who were APSF directors.[37] However, the chairs of these committees from 1986 through 1999 were primary either APSF directors or ASA leaders who were strong supporters of the anesthesia patient safety movement. For the Committee on Professional Liability, the chairs were Cheney (10 yr) and Caplan (4 yr). For the Committee on Standards of Care, the chairs were Epstein (9 yr), Ronald A. Gabel, M.D. (1 yr), and Eichhorn (4 yr). The sustained leadership of these committees by individuals who believed strongly in the anesthesia patient safety movement influenced the many contributions of the committees

to advances that resulted in a dramatic reduction in patient harm during this remarkable 14-year period. For example, the Committee on Standards of Care recommended and supported the ASA's adoption of minimal standards for the monitoring of anesthetized patients. The Committee on Professional Liability oversaw the implementation of the Closed Claims Project and the many influential publications produced by it that led to patient safety improvements.

The APSF and AANA have intermittently pursued similar links. Three of the AANA's chief operating officers have been APSF directors. These include Beutler; Wanda O. Wilson, C.R.N.A., Ph.D.; and Randall Moore, II, C.R.N.A., D.N.P.[41] The APSF Board of Directors has included at least one nurse anesthetist representative of the AANA since 1991 and has had as many as four at any one time. Although APSF is apolitical and inclusive, the relationship between the APSF and the AANA has fluctuated over the foundation's 36-year history. The relationship has been impacted, at times, by disagreements on a variety of issues but especially scope-of-practice differences between anesthesiologists and nurse anesthetists. In general, however, the relationship has provided very valuable collaborative interactions and exchanges of perspectives that have helped to advance anesthesia patient safety.

Reflections

This history of the evolution of the anesthesia patient safety movement expands on the development of each major contributing component (*i.e.*, APSF and the three relevant ASA committees) and reveals how Pierce and his colleagues deliberately built a diverse but like-minded, highly regarded leadership team across the spectrum of anesthesia professionals and industry leaders. Pierce also recruited key governmental and healthcare leaders such as Marlene E. Hoffner, M.D., Director of the Office of Health Affairs for the Food and Drug Administration; Martin J. Hatlie, Esq., General Counsel for the Joint Commission on Accreditation of Healthcare Organizations; and Mary Ann Kelly, Clinical Services, American Hospital Association, to the APSF Board of Directors.[41] He courted liaisons with our surgical colleagues, and C. Rollins Hanlon, M.D., was appointed as the APSF's first representative from the American College of Surgeons (Chicago, Illinois).[41] Colleagues from surgical fields have been continuously represented on APSF's Board of Directors or committees since the organization's inception and have provided unique perspectives that have contributed to patient safety initiatives that have expanded into the entire perioperative period.

Importantly, Pierce and his team provided sustained leadership as they all contributed in their roles for the first decade of the evolution of the movement. During that period, the anesthesiologist leaders on the team also each contributed to the mentoring of the next generation of patient safety advocates and leaders. These future leaders of the movement included, but were not limited to, Robert K. Stoelting, M.D. (President, APSF); Caplan and Blitt (Committee on Patient Safety and Risk Management); Domino, Eichhorn, and Caplan (Committee on Professional Liability); and Eichhorn (Committee on Standards of Care). The movement's industry leaders mentored future key supporters such as George A. Shapiro (Andros Analyzers, Berkeley, California) and David Swedlow, M.D. (Nellcor Puritan-Bennett, Pleasanton, California). Together, Pierce's diverse leadership team shaped an expansive, sustained anesthesia patient safety movement.

Missing in the movement's first decade, however, was any specific attempt to add the perspective of patients and patient advocates. No public members or patient advocates outside of the anesthesia professions were added to the APSF Board of Directors or integrated into its committees.[41] This apparently was not for lack of trying to recruit patient advocates or public members to the ASPF Board (Eichhorn, verbal communication). Patient advocates and public members were not prevalent on medical boards and foundations in the mid-1980s. The only public member of the APSF Board of Directors has been Harry Schwartz, Ph.D., in 1993.[41] He remained only until 1995. His contributions to the APSF Board discussions were minimal during his time as a director (Eichhorn, verbal communication).

The pace of progress in reducing patient harm during the evolution of the anesthesia patient safety movement was rapid at first and then appears to have slowed and fluctuated. Initial reports of 10-fold and higher reductions in anesthesia-related mortality in the early 1990s were greeted with exuberance.[42–44] These results even triggered comments that anesthesiology had made patient care so safe that the need to continue supporting patient safety initiatives had dwindled. Factions within ASA sought to reduce or even eliminate further financial support for APSF and unique ASA patient safety initiatives. Pierce recognized this growing undercurrent by 1989. He and his patient safety leadership team sought the support of influential ASA members and the leaders of the ASA's other foundations, the Foundation for Anesthesia Education and Research and the Wood Library-Museum of Anesthesiology. They encouraged them to become advocates for expanded ASA funding of all three foundations, and in October 1990, the ASA House of Delegates approved a dues increase of $60 annually, with the increase specifically targeted to greater financial support of the foundations, including APSF.[45] To further remind ASA members of the continued need for support of anesthesia patient safety, Pierce noted in his 1995 Rovenstine Lecture at the ASA Annual Meeting, "Patient safety is not a fad. It is not a preoccupation of the past. It is not an objective that has been fulfilled or a reflection of a problem that has been solved. It must be sustained by research, training, and daily application in the workplace."[6]

The Importance of Coordinated Efforts

Pierce built a strong team of like-minded leaders to initiate the anesthesia patient safety movement. They did not all agree on every issue and initiative, and they were dissimilar in many

ways. Yet they worked as a team and established a tradition of working respectfully together, a culture that carried through the first several decades of the movement. As the rapid improvements in patient safety peaked by the mid-1990s, the general sense of excitement about these improvements within the specialty started to wane. The malpractice insurance crisis relented, and expenses for insurance dropped dramatically. The motivation and urgency to improve patient safety fell.

The anesthesia patient safety movement was entering a phase of slower progress by the early 1990s. The ASA House of Delegates became increasingly wary of adding more standards of care. Members expressed concern that the scientific evidence to support expanded standards of care was lacking. To compensate and still provide practice guidance, House of Delegates members suggested that the society develop practice parameters (*i.e.*, guidelines and practice advisories). These practice parameters would not require the same level of adherence as standards of care but would provide recommendations and insights to guide clinical practices. In a report to the ASA Board of Directors in August 1990, Immediate Past President Arens recommended the appointment of a task force to develop a proposal on the issue of producing practice parameters in anesthesiology.[46] The task force met over the winter of 1991 and recommended a standing Committee on Practice Parameters to the ASA Board of Directors in March 1991.[47] Still wary of adding restrictions on the independence of the clinical practices of its members, the board disapproved of the recommendation. However, ASA President Betty P. Stephenson, M.D., a close colleague of Arens and a strong supporter of the movement, did not let the idea die. Instead, she appointed Arens as chair of an *Ad Hoc* Committee on Practice Parameters. After a year of concerted effort by Pierce, Arens, Stephenson, and other patient safety leaders to influence reluctant ASA directors,[6] the ASA Board of Directors approved the standing committee in March 1992.[48] Arens remained as chair of the new standing committee, and the committee developed a number of important patient safety–oriented practice parameters over the next decade. By 2005 it was becoming clear that the ASA House of Delegates was unlikely to add more standards of care. In March 2005, Alexander A. Hannenberg, M.D., Chair of the ASA's Division on Professional Affairs, recommitted that the Committee on Standards of Care be merged with the Committee on Practice Parameters.[49] This was approved, and the Committee on Standards and Practice Parameters was implemented in 2006 with Arens as chair. In essence, practice parameters had become the method by which patient care changes to improve safety would be advanced within the ASA.

By the late 2000s, many of the initial leaders of the anesthesia patient safety movement had retired or died. Specifically, key leaders such as Pierce, Eichhorn, Arens, Caplan, Epstein, and Cheney were no longer serving as chairs of the ASA Committee on Professional Liability, Committee on Standards (and Practice Parameters), and Committee on Patient Safety and Risk Management (renamed as the Committee on Patient Safety and Education in 2008). By 2009, the overlap of APSF directors and memberships of these committees had dwindled. For example, the overlap of committee members and APSF directors on the Committee on Patient Safety and Education dropped from a typical 40 to 60% to less than 20% in 2009, and this decrease continued during the past decade, reaching the point of no overlap in 2018.[37] Successive committee chairs after 2009 recommended that ASA approve an APSF liaison member position for the committee, recommendations that were disapproved by the ASA Board of Directors in 2011 and 2014.[39,40] Similarly, APSF directors were included infrequently as members of the ASA Committee on Standards and Practice Parameters. After Arens stepped down from his committee chair position at the end of 2008, linkage back to the APSF was diminished. Since then, APSF requests for practice guidelines or practice advisories for several of its priority issues (*e.g.*, monitoring for residual neuromuscular blockade) have been declined, deferred, or delayed. Pierce's grand vision of coordinated efforts between APSF and the ASA committees had tumbled.

Despite the transition of anesthesia patient safety leaders by 2000, the APSF and ASA have continued to make advances in reducing perioperative patient harm. The APSF continues to fund important anesthesia patient safety research. Through its annual consensus conferences, it develops recommendations and then uses its extensive international outreach to advocate for them. APSF has strongly encouraged the inclusion of patient safety education and simulation in certification requirements of the American Board of Anesthesiology (Raleigh, North Carolina) and accreditation requirements of the Accreditation Council for Graduate Medical Education (Chicago, Illinois). It's been a leading advocate for the development and use of adjuncts such as crisis manuals and the integration of these adjuncts into electronic medical records. The ASA has funded and staffed the Anesthesia Quality Institute and its Anesthesia Incident Reporting System registry, developed many patient safety–oriented educational programs, and promoted patient safety though its publications and support of APSF. There is more progress to be made, and APSF and ASA are linked in tandem to further reduce perioperative patient harm.

Future Considerations

Based on this research and close, firsthand observations of the anesthesia patient safety movement, the authors suggest the following four considerations to the APSF and the ASA.

First, the APSF and ASA should increase cross-membership, and leadership, between APSF and the ASA Committee on Professional Liability, Committee on Standards and Practice Parameters, and Committee on Patient Safety and Education. This recommendation could be readily achieved with either the addition of *ad hoc* or *ex officio* members of each, or encouragement for each to accept guests from the others. This interdigitation of APSF directors and committee members would promote shared ideas and collaborations.

Second, leaders of the APSF and these committees should meet regularly and share information about their patient safety priorities and initiatives. This union of leaders could promote coordinated efforts to reduce patient harm and, when appropriate, shared resources. For example, the ASA Committee on Patient Safety and Education and the APSF's Committee on Education and Training might share a number of their responsibilities as both have common charges. A similar partnership is already present between the Foundation for Anesthesia Education and Research and the ASA. In 1988, the ASA Committee on Research was appointed as the *de facto* study section for Foundation for Anesthesia Education and Research.[50] It continues in this role today while retaining its unique ASA-related roles. Overall, a common APSF and ASA patient safety leadership group could share the outcomes of its discussions with APSF and ASA leaders, increasing awareness of potential patient safety issues and opportunities for improvement.

Third, to paraphrase an oft-used statement, anesthesia patient safety is a team sport. The anesthesia patient safety movement achieved much of its success from a union of forces. No single group "owns" anesthesia patient safety. In the United States, approximately half of anesthesia professionals involved in the day-to-day, in-room provision of anesthesia care are not anesthesiologists. It is crucial for nurse anesthetists and anesthesiologist assistants to be involved in discussions about patient safety and the development and implementation of patient safety initiatives. The enthusiastic involvement of anesthesia and monitoring equipment and pharmaceutical manufacturers is vital for enhancing anesthesia patient safety. To achieve perioperative care improvements, operating room nurses, perianesthetic nurses, and other postoperative nurses must be engaged and contribute their ideas on patient safety. Our surgical and other procedural colleagues need to be tightly linked to perioperative patient safety efforts. Experts from the medicolegal fields, insurance industry, and governmental and regulatory agencies also must be actively engaged. For this reason, it is imperative for the APSF to continue to be a wide-open tent, including directors and committee members who have all of these backgrounds.

Fourth, the APSF should remain an affiliated foundation of the ASA but continue to function independently. Harkening to its origin, it is imperative to have an independent foundation that includes representation from the many entities that impact anesthesia patient safety. An independent foundation, unencumbered by a large membership, has the ability to rapidly address new, potentially time-sensitive patient safety issues and shift resources quickly to support targeted initiatives and meet its missions and its vision, "that no one shall be harmed by anesthesia care."

Potential Biases

The authors readily acknowledge their potential biases in this report. One (M.A.W.) is a past President of the APSF, ASA, and American Board of Anesthesiology and past executive committee member of Foundation for Anesthesia Education and Research. The other (M.E.W.) is a past, long-serving ASA House of Delegate member, past President of the Wood Library-Museum of Anesthesiology, and current Vice President of the Anesthesia Foundation. Together, they have been longtime supporters of all of the ASA-affiliated foundations. Both have received grant funding from the APSF and have written multiple articles on anesthesia patient safety–related topics.

In most instances, they have referenced publications, archival sources such as ASA and APSF reports and minutes, and videotaped interviews to support their conclusions. However, these references do not always provide context or the sense and/or sensibilities of specific issues. In those instances, they have relied on and referred to personal communications from individuals who were present at unique meetings to provide their perspectives. As authors who have been fairly involved in the ASA, American Board of Anesthesiology, and APSF during most of the 36 yr of the anesthesia patient safety movement and who have personally known most of the individuals discussed in this report, their own perspectives have undoubtedly influenced the presentation of this history. Every effort has been made to reference source materials.

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Competing Interests

The authors declare no competing interests.

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