



**AUA**

Association of University Anesthesiologists

# Update

Fall 2016

## Scientific Advisory Board Report: Hypoxia Signaling During Perioperative Organ Injury



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**Editor note:** The three scientists performing the work described here have been awarded the 2016 Lasker award: *For the discovery of the pathway by which cells from humans and most animals sense and adapt to changes in oxygen availability – a process essential for survival.* <https://goo.gl/umGmuh>

During the past 30 years, research has made remarkable progress in our understanding of how hypoxia signaling can alter the expression of many genes. Hypoxia is considered among the strongest stimuli to alter protein expression in the mammalian systems. More recent advancements in the field of hypoxia signaling were kicked off by the identification of the

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transcription factor hypoxia-inducible factor HIF in the early 1990s by the research team of Gregg Semenza.<sup>1</sup> But even decades prior to the discovery of HIF, it had already been appreciated that hypoxia is associated with profound alterations in the expression of different genes, most famously erythropoietin. Hypoxia-driven increases in the expression of erythropoietin was considered to have important adaptive roles relevant to perioperative physiology. For example, blood loss during the perioperative period can be compensated by increased expression of erythropoietin, and subsequent increases of erythropoiesis, which would counterbalance surgical blood loss. Similarly, exposure to hypoxic conditions during high altitude training has been known to increase circulating levels of erythropoietin and lead to increases in hematocrit, a concept that had been widely applied to competitive sports physiology and training. However, it was not until the identification of the hypoxia-dependent transcription factor HIF that the field of hypoxia-elicited adaptation became a direct target for pharmacological interventions.

About 25 years ago, a research team led by Semenza performed studies of the erythropoietin promoter. They were able to identify a novel protein that attaches to the erythropoietin promoter during hypoxic conditions and conveys transcriptional activity.<sup>2</sup> Subsequent studies provided evidence for the mechanism by which the transcriptional activity of HIF is regulated. During normoxia, the alpha-subunit of HIF (HIF1A) is immediately targeted for proteasomal degradation. This process involves the hydroxylation of conserved proline residues within HIF1A by a set of oxygen-dependent prolyl hydroxylases (PHDs).<sup>3</sup> These PHDs require oxygen as a co-factor for hydroxylation. Therefore, decreased levels of oxygen lead to a functional inhibition of PHDs, and concomitant stabilization of HIF1A. Subsequent binding of HIF to the promoter region of

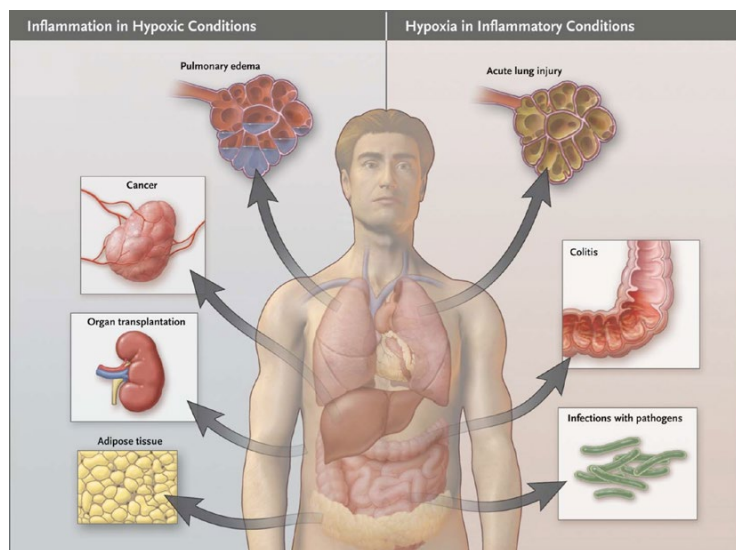
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hypoxia-responsive genes – such as the erythropoietin promoter – functions as a transcriptional activator of these genes, and enhances their transcription.<sup>4</sup> Importantly, this pathway can be targeted pharmacologically. There are several small molecule inhibitors available that effectively inhibit the activity of PHDs, thereby leading to stabilization of HIF under normoxic conditions.<sup>5</sup>

Initial studies on the role of HIF and hypoxia adaptation where predominantly focused on adaptation to global hypoxic conditions, such as the role of HIF in pulmonary hypertension or in cancer. However, during the past two decades, this field has vastly expanded. Indeed, it has become apparent that HIF stabilization also occurs at the interface between hypoxia and inflammation. As such, it is now appreciated that hypoxia and inflammation share an interdependent relationship.<sup>6</sup> On the one hand, hypoxic conditions are frequently associated with inflammation. For example, during orthotopic organ transplantation, prolonged ischemia time of the graft will lead to increased graft inflammation, which is associated with graft failure.<sup>4</sup> On the other hand, inflammatory diseases such as inflammatory bowel disease<sup>7</sup> or acute lung injury<sup>8</sup> are frequently associated with hypoxic conditions, and the stabilization of hypoxia-dependent transcription factors, such as HIF (Figure).<sup>4</sup> Importantly, HIF stabilization during acute inflammation has been shown to dampen hypoxia-driven inflammation, and thereby lends itself as a potential therapeutic target. As such, the concept has evolved that enhancing HIF stabilization during acute organ injury could be a therapeutic target to prevent inflammation or ischemia driven organ dysfunction.<sup>5</sup>



Links between Hypoxia and Inflammation. Shown is an overview of clinical conditions characterized primarily by tissue hypoxia that causes inflammatory changes (left) and inflammatory diseases leading to tissue hypoxia (right). From Eltzschig et al., NEJM 2011 (used with permission).<sup>4</sup>

Numerous studies have implicated HIF activators in organ protection. For example, in the context of myocardial injury, HIF has been implicated in mediating the protection conveyed by ischemic preconditioning, an experimental approach where short durations of non-fatal ischemia are applied prior to a subsequent myocardial infarction event.<sup>9</sup> Ischemic preconditioning is associated with profound attenuation of myocardial infarct sizes, and the search for pharmacologic approaches to “imitate” the increased ischemia tolerance mediated by ischemic preconditioning became one of the most intense scientific quests during the past 30 years. Several studies have provided experimental evidence that HIF plays a central role in mediating cardio-protection due to ischemic preconditioning. For example, studies show that HIF is stabilized by ischemic preconditioning,<sup>10</sup> and mice with partial deletion of HIF are not protected by ischemic preconditioning.<sup>11</sup> Moreover, pharmacologic stabilization of HIF prior to myocardial injury is associated with a similar degree of cardio-protection as ischemic preconditioning.<sup>10</sup> Interestingly, the cardio-protection mediated by “remote” ischemic preconditioning has also been attributed to HIF, where HIF-driven increases in circulating IL-10 levels were found to mediate cardio-protection by remote ischemic preconditioning.<sup>12</sup> Other studies of HIF-elicited cardio-protection implicate HIF-driven increases in glycolytic capacity<sup>13</sup> or purinergic signaling events in mediating increased ischemia tolerance conveyed by HIF activation in the heart.<sup>14</sup> Together these studies highlight that myocardial injury could be attenuated by HIF stabilization prior to an insult, a concept that could have wide implications for surgical patients. For example, patients scheduled for elective cardiac surgery could receive a pharmacologic HIF activator prior to their surgical procedure to help promote cardio-protection from ischemia expected to occur during cardiopulmonary bypass. This is an emerging and important area of translational and clinical research in our field.

Many other disease conditions relevant to the perioperative period also exist at the above described interface between inflammation and hypoxia. Perioperative organ injury is one of the leading causes of morbidity and mortality for surgical patients. Indeed, if perioperative death would constitute its own disease category in the annual mortality tables from the Center for Disease Control and Prevention, it would represent the third leading cause of death in the United States.<sup>15</sup> Perioperative organ injury also represents a very unique opportunity for perioperative physicians to have an impact on surgical outcomes. Most animal studies of organ injury demonstrate quite unequivocally that treatment of an established disease (such as acute kidney injury or myocardial injury) is far more challenging than its prevention, when using the same treatment approach. In addition, the largest percentage of surgical interventions occurs in an elective setting. As such it is conceivable, that pharmacologic interventions to stabilize HIF could be utilized in elective surgical patients prior to their surgery in order to prevent organ injury, such as acute kidney

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injury, acute respiratory distress syndrome or myocardial injury. HIF activators in the form of orally available PHD inhibitors are currently being tested in clinical trials. Many of these trials test the effectiveness of HIF activators to treat or prevent renal anemia.<sup>16</sup> While one of the earlier PHD inhibitors was discontinued by the FDA due to a case of fatal liver disease, there are several small molecule PHD inhibitors currently in clinical trials that show favorable safety profiles without major side effects.<sup>5</sup> Conceptually, it is important to appreciate that HIF activators will need some time to be pharmacologically efficient. For example, a HIF activator first needs to cause stabilization of HIF, and subsequently HIF-driven alterations in gene expression need to be given the required time to be effective. As such, prophylactic treatment for example over a ten day time interval prior to a surgical intervention could be ideal. There are many different gene products that could potentially be involved in mediating the HIF-dependent organ protection during the perioperative period, including HIF-driven alterations in purinergic signaling events,<sup>17,18</sup> or changes in HIF-driven expression of microRNAs,<sup>19</sup> to give just a few examples. The question of whether HIF-driven increases in erythropoietin levels are a direct means of providing organ protection is somewhat controversial. Clinical trials have shown that oral HIF activators are effective in increasing hemoglobin levels in patients with renal anemia and end-stage renal disease.<sup>16</sup> In the setting of surgical patients, such increases in hemoglobin levels prior to a surgical intervention would certainly be welcome, as it could potentially decrease the requirements for perioperative transfusion of blood products.

In summary, many experimental studies have implicated HIF in mediating organ protection. This may be a molecular observation that could be harnessed for improving outcomes in surgical patients. It is conceivable that HIF activators could provide the benefit of organ protection in major elective surgical populations. While clinical trials with HIF activators in surgical patients are ongoing,<sup>5</sup> this is still an area that will require many more clinical trials before its routine implementation. Similarly, it will be important to identify high-risk surgical patients that could particularly benefit from utilizing preoperative HIF activators to increase hemoglobin levels and to dampen perioperative organ injury. As such, bench-to-bedside trials as well as randomized clinical trials will be necessary to further our understanding if in fact the use of orally available HIF activators could be used to improve outcomes and prevent organ injury in surgical patients.

## Acknowledgement:

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# Education Advisory Board Report: Teaching Quality Assurance (QA) and Quality Improvement (QI)



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care. Changes brought about by QA/QI systems should be rapid, evidence-based, and data-driven.

## Quality Assurance and Quality Improvement

Quality Assurance (QA) is traditionally a method to measure compliance with standards and is often, reactive, retrospective, may be associated with punitive measures, and individual focused. Quality Improvement (QI) is aimed at improving care by measuring the current status of a process and then refining it in a repetitive stepwise process that focuses on the system rather than individuals. QA/QI programs were developed to meet regulatory mandates and to improve patient care by bridging the gap between medical evidence and clinical practice. These programs review outcomes and processes and through an iterative process work to improve delivered health care quality.

Quality Assurance programs within hospitals are typically designed to evaluate medical complications and poor patient outcomes. Medical errors, equipment malfunctions, near misses, and deviations from standard treatment protocols are reviewed. The focus is improvement in areas where problems most commonly occur. Quality Improvement programs within hospitals focus on evidence based practices, complying with regulatory guidelines, developing standards of practice, and benchmarking performance against outside criteria. In order to address the needs of Quality Improvement, an institution must comprehend its current evidence based practice, analyze its practice to ascertain areas of need, utilize the Model for Improvement (Figure 1) to improve within areas, and constantly reassess each area of need. QI programs are about continuously monitoring delivery of care, proactively reducing patient risks, and improving patient care. This will typically lead to developing and implementing guidelines while improving care provider education and training. The goal of the QI process is to identify the problems within processes, not people. The QI practice then involves learning the process in which an issue arose, decreasing care variation, ending errors, and enhancing communication with the goal of improving outcomes. Quality improvement relies on constantly assessing, measuring, recording, and analyzing data; then using that data to continuously improve care provider performance and patient

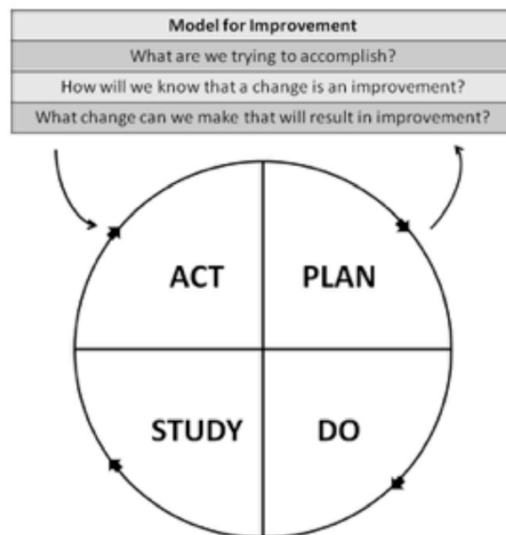


Figure 1. Model for Improvement.<sup>1</sup>

## Background

In 1954, Henry K. Beecher et al., from the Massachusetts General Hospital, published "A Study of the Deaths Associated with Anesthesia and Surgery Based on a Study of 599,548 anesthesia in Ten Institutions 1948-1952, Inclusive" in the *Annals of Surgery*.<sup>2</sup> The study examined the deaths which occurred on all surgical services over a five year period at ten university hospitals within the United States. The cause of death was designated at each institution by a team consisting of an anesthetist, a surgeon, and a secretary. The goal of the study was to determine the mortality rate directly attributable to anesthesia and specifically the anesthesia factors or agents contributing to the deaths. The overall anesthesia death rate was determined to be 1 per 1,560 patients. This article highlighted the need for improved anesthetics and monitoring equipment and called for anesthesia research to improve anesthesia safety. This publication galvanized improvements in patient safety and is the cornerstone for many future anesthesia safety achievements.

In 1978, Jeffrey B. Cooper et al., also from the Massachusetts General Hospital, published "Preventable Anesthesia Mishaps: A Study of Human Factors" in *Anesthesiology*.<sup>3</sup> This watershed paper described the use of a modified critical incident analysis technique to retrospectively review anesthesia complications attributable to human error and equipment failure. Most preventable anesthesia incidents were found to involve human error, and equipment failure constituted only a small percentage of these incidents. The novelty of this publication was not only in its publicizing of hospital errors but also in its analysis of factors associated with human errors. These factors included equipment

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design, inadequate experience and familiarity with equipment or procedures, inadequate communication, inadequate time spent on a task, and distraction. The results of the study were used to evaluate a protocol for collecting information about, and prospectively studying, anesthesia-related incidents in order to determine the best solutions. This publication is widely believed to have laid the groundwork for Quality and Safety Improvement efforts within the field of anesthesia.

In 1999, the U.S. Institute of Medicine published “To Err is Human: Building a Safer Health System,” resulting in increased awareness of preventable medical errors.<sup>4</sup> This report stated that “Health care in the United States is not as safe as it should be—and can be,” and asserted that 44,000 to 98,000 people die in U.S. hospitals annually from preventable errors. This report is attributed with raising awareness of patient safety, specifically of preventable medical errors, and led to President Bill Clinton signing the Healthcare Research and Quality Act of 1999. The Act directed the Agency for Healthcare Research and Quality to prioritize four tasks: 1) “Improve the quality of healthcare.....;” 2) “Promote patient safety and reduce medical errors.....;” 3) “Advance the use of information technology for coordinating patient care and conducting quality and outcomes research.....;” and 4) “Expand the Agency’s existing commitment to research on the cost and use of healthcare services and access to services.....”<sup>5</sup> Thus, this publication and the subsequent Healthcare Act led to the current QA/QI requirements for healthcare entities.

## Institutional Requirements

Today, quality assurance and improvement (QA/QI) activities are crucial tasks within hospitals as they are mandated by the Centers for Medicare and Medicaid Services (CMS) and The Joint Commission. Thus, hospitals meet the stringent QA/QI requirements in various ways, often starting with adverse event reporting and root cause analysis (RCA). The individual departments within larger institutions may have separate QA/QI committees linked to a larger central panel. Smaller institutions may rely on a single central committee to undertake QA/QI tasks.

The Centers for Medicare and Medicaid Services (CMS) is dedicated to healthcare quality improvement and considers QI crucial to improving patient safety and reducing the risk of harm during patient care.<sup>6</sup> CMS further believes that improving healthcare quality is important for improving outcomes while lowering costs. Thus, its requirement that healthcare institutions have a QI process including reporting of QI program goals and benchmarks, interventions, and outcomes. CMS further necessitates organizations establish short- and long-term performance measures and outcomes and milestones as part of its National Quality Strategy. CMS will evaluate the implementation of QI projects as well as their effectiveness. An increasing percentage of Medicare payments are tied to quality- or value-based alternative payment models.

Additionally, the U.S. Department of Health and Human Services requires ongoing QA/QI programs for U.S. healthcare institutions.<sup>7</sup> In order to select areas for improvement, each institution’s QA/QI program must include intermittent appraisal of patient records and direct physician oversight or execution. Changes must be carried out based on the data collected and targeted projects for improvement. The QA/QI program for each institution is re-evaluated and must be approved every three years.

## Accreditation Council for Graduate Medical Education (ACGME) Program Requirements in Anesthesiology

The 2016 ACGME Program Requirements for Graduate Medical Education in Anesthesiology include several objectives to ensure that anesthesia residency graduates have a working knowledge of quality improvement. These program objectives are:<sup>9</sup>

- 1) Definition and Scope of the Specialty  
“Finally, the anesthesiologist is skilled in the leadership of health services delivery, prudent fiscal resource stewardship, and **quality improvement**, as well as the supervision, education, and evaluation of the performance of personnel, both medical and paramedical, involved in peri-operative and peri-procedural care.”
- 2) Practice-based Learning and Improvement  
“Residents are expected to develop skills and habits to be able to meet the following goals: systematically analyze practice using **quality improvement** methods, and implement changes with the goal of practice improvement;” (Outcome)
- 3) Resident Duty Hours in the Learning and Working Environment: Professionalism, Personal Responsibility, and Patient Safety  
“The program director must ensure that residents are integrated and actively participate in interdisciplinary clinical **quality improvement** and patient safety programs.” (Core)

There is increasing evidence that quality improvement activities impact patient outcomes.<sup>10,11</sup> In addition, given the importance placed on QA/QI programs by healthcare regulatory agencies and the expansion of physician financial incentives tied to quality improvement projects and outcomes, it is important for physician trainees to become knowledgeable about the conduction of QA/QI programs. The results of the 2015-2016 ACGME Resident Survey indicate that 80% of U.S. ACGME accredited anesthesia residency programs and 86% of all U.S. ACGME accredited residency programs are compliant with resident participation in quality improvement.<sup>12</sup>

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## Anesthesia Residency Program QA/QI Education

The Society of Academic Anesthesiology Associations graciously published the link to an online anonymous residency program QA/QI survey in their newsletter June 2016. The survey asked questions regarding details of anesthesia residents QA/QI education. Leadership from seven anesthesia residency programs (out of 136 ACGME accredited programs in the U.S.<sup>13</sup>) responded and their answers are summarized below.

Six programs responded that they have either a formal or informal process for introducing concepts and teaching residents within their anesthesia training program about quality assurance and quality improvement in healthcare. One program described this education in more detail:

- Two hours are dedicated each month to QA/QI learning as part of an educational day. Additionally, the residents receive an introductory lecture and discussion as well as must complete Institute for Healthcare Improvement education modules during residency orientation.

All seven programs responded that anesthesia residents participate in Quality Improvement. Two programs described this participation in more detail:

- Each resident leads at least one root cause analysis during their residency, and residents participate in the RCAs their peers are leading.
- Residents work in groups to create a Plan-Do-Study-Act cycle (Figure 1) from an adverse event analyzed by RCA.

Six programs explained how they fulfill the ACGME program requirements for: “Residents are expected to develop skills and habits to be able to ... systematically analyze practice using quality improvement methods, and implement changes with the goal of practice improvement.” Three programs wrote that they have developed QI curriculums, and residents may participate in a QI project. Three programs provided more detail about each anesthesia resident’s involvement in QI projects:

- Each resident will act as the team leader for an RCA. They are expected to not only identify root causes, but to also develop system based fixes for implementation. Additionally, each resident receives a quarterly statement of their metrics compared with the department (postoperative nausea and vomiting, antibiotic administration compliance, temperature upon arrival to the post-anesthesia care unit, etc). The residents are expected to write up an improvement plan if they fall outside of the mean.
- Residents have a yearly quality incentive project; each resident comes up with the incentive, which has to be approved by a central, non-anesthesia department committee. The hospital provides money to each resident if the incentive is met. Also, residents take turns attending the department of anesthesia QI committee and present cases at the departmental Morbidity and Mortality conference.

- All residents during their residency receive formal training in the concepts of patient safety and quality improvement. Each resident performs a quality improvement project; which they design, implement, and analyze the results of. They disseminate the results of their projects both at the local and national level

Six programs explained how they fulfill the ACGME program requirements for: “The program director must ensure that residents are integrated and actively participate in interdisciplinary clinical quality improvement and patient safety programs.” Programs detailed this education as follows:

- The RCAs that residents are involved in are expected to incorporate other departments including nursing and surgery.
- Residents participate in the creation of a Plan-Do-Study-Act cycle analyzing an adverse event, and perform a RCA which is multidisciplinary as well as participate in a systems based morbidity and mortality conference.
- Every CA-2 and CA-3 resident formulates, executes, and reports on a patient safety/quality improvement project. Residents are allocated protected time to work on their projects, and are mentored by faculty who are experts in the field. Each project is multi-professional in nature, ensuing that residents become familiar with the process of quality improvement and patient safety institution-wide.
- Two anesthesia residents participate on a resident quality improvement council.
- Residents serve on a hospital patient safety committee.

## Summary

Within healthcare, QA programs are designed to measure services against standard and correct deficiencies while QI programs collect data and analyze performance and then work systematically to improve it. The goals of QA/QI programs include improving outcomes and patient care. One group defined QI “as systematic, data-guided activities designed to bring about immediate improvements in health care delivery in particular settings. Quality improvement uses an array of methods and can look like practical problem solving, an evidence-based management style, or an application of a theory-driven science of system change.”<sup>14</sup> Evidence supports improved patient outcomes with institution of QI programs and regulatory agencies require QA/QI programs within healthcare institutions. Thus, the ACGME requires anesthesia resident QI education. It appears that most anesthesia residency programs are in compliance and furthermore appear to be actively working to create meaningful QI educational programs for their residents through active participation in anesthesia department and hospital-wide QI projects and committees.

## Acknowledgements:

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Massachusetts General Hospital, Department of Anesthesia, Critical Care and Pain Medicine), Theresa Morris, R.N., M.S. (Senior Quality Assurance Coordinator, Massachusetts General Hospital, Department of Anesthesia, Critical Care and Pain Medicine), and the Society of Academic Anesthesiology Associations for assistance with this article.

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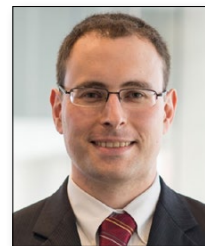
## Introducing the Early Stage Anesthesia Scholars



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*Elizabeth Whitlock, MD, MSc, Resident Physician, Department of Anesthesia, University of California, San Francisco*



*Miles Berger, MD, PhD, Assistant Professor of Anesthesiology, Duke University*

We are very excited to introduce you to the Early-Stage Anesthesia Scholars (eSAS), an international interest group that has gradually developed over the last year after a tremendously successful 2016 IARS Scholars’ Program kick-started the group. eSAS is a nascent group of early-career anesthesiologist/scientists formed out of the recognition that greater community and support may help facilitate the scientific and professional development of these Scholars. The group is composed of Scholars at many levels of training: from junior faculty (e.g. at the mentored training grant level), through medical students with a strong interest in academic anesthesiology who wish to develop their experience and potential in research.

We are now reaching out to senior colleagues and leaders in anesthesiology for help identifying Scholars who are interested in becoming members. Membership in eSAS is free and is collected through our new website, <http://www.esashq.org>.

Since we now have a centralized method to collect contact information, interested Scholars who have previously “signed up” to be a part of this group should also visit the website & join anew. eSAS membership is open to any junior faculty, fellows, residents or medical students who feel they would benefit from our growing community.

To join, please have interested Scholars visit <http://www.esashq.org> and click on “Membership” in the header bar, then “Join eSAS.” eSAS leaders may be reached directly at [anes.scholars@gmail.com](mailto:anes.scholars@gmail.com).

Please share this announcement widely with those who may wish to join the group: we anticipate the website will become a platform for sharing advice, ideas, support, and information about upcoming Scholar-focused programming at meetings in the United States and internationally.

Thank you for your support of this exciting new initiative!

# Subspecialty Update: Anesthesia and Sleep Medicine



Ralph Lydic, PhD  
Robert H. Cole Endowed  
Professor of Neuroscience  
Co-Director Anesthesiology Research  
Professor of Anesthesiology and  
Psychology  
Joint Faculty, Oak Ridge National  
Laboratory  
University of Tennessee

I thank Drs. Kofke and Kaye for the invitation to comment on sleep medicine as an emerging opportunity for anesthesiology. I write from the perspectives of someone who has had the privilege of working for many years on sleep and anesthesia, and as a long-time AUA member. My comments selectively highlight the potential for anesthesiology and sleep medicine to enhance patient care and to advance anesthesia research.

Anesthesia and sleep are different states of consciousness that share a number of similar traits. Both states are products of the brain, yet the mechanisms by which these states are generated remain incompletely understood. Anesthesiology and sleep medicine are both recent additions to medical practice, and as such provide novel opportunities. Developments in anesthesia by Crawford Long (1842) and William Morton (1846) long-preceded the 1953 paper by Aserinsky and Kleitman (1953) that first described rapid eye movement sleep in humans as a unique state of consciousness. An Ovid Medline search for number of publications (n) with key words “sleep and anesthesia” in 10 year intervals from 1953 to the present reveals an increasing exponential function. Examples include n = 18 from 1953-1963, n = 354 from 1983-1993, and 1510 publications extrapolated for the ongoing 2013-2023 interval. Recognition of anesthesia and

sleep as altered states of consciousness sharing homologous physiological traits is evidenced by the formation of the Society for Anesthesia and Sleep Medicine (SASM) in October 2010. The SASM objectives have been published: <https://goo.gl/HbslM6>. In March 2011, the American Board of Medical Specialties approved an application from the American Board of Anesthesiology to sponsor subspecialty certification in sleep medicine <https://goo.gl/IYKKHV>. Another metric of progress is Principles and Practice of Sleep Medicine (PPSM), the first comprehensive textbook consisting of 739 pages in 1989, and 1730 pages in 2016. The most recent edition of PPSM includes chapters on pain and on sleep disruption caused by opiates.

Anesthesiology research is uniquely empowered to help understand depressed autonomic control during the loss of wakefulness. Success of the Multicenter Perioperative Outcomes Group (MPOG) <https://www.mpogresearch.org> illustrates how human data on state-dependent autonomic control can be collected while engaging in anesthesia care. Research on anesthesia-induced changes in autonomic control is likely to be relevant for branches of sleep medicine focused on disorders characterized by state-dependent autonomic dysfunction. Potent agents and opiates exert their desired effects via the nervous system, and anesthesiology also can be viewed as a branch of clinical neuroscience. Anesthesiologists who are so inclined can be part of one of the most exciting intellectual quests of all time, known in Europe as the Human Brain Project <https://www.humanbrainproject.eu> and in the U.S. as the Brain Initiative <https://goo.gl/obn2Fo>. Finally, research on the effects of sleep fragmentation and deprivation is directly relevant to medical education, performance, and sustainability. More than 50 books have been published in the past 10 years on the topic of physician burnout. An appreciation of data from sleep medicine, applied to anesthesia care providers, is a logical corollary of the leadership role that anesthesiology has established for patient safety.

**SAVE THE DATE! May 4-5, 2017**  
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# Introducing the 2016-2017 AUA Scientific Advisory Board



**Y.S. Prakash, MD, PhD**  
Chair, AUA Scientific Advisory Board  
Mayo Clinic

## Welcome to the new members of the Scientific Advisory Board of the AUA:

Jae Woo Lee, MD, PhD (University of California, San Francisco)

Lucy Chen, MD (Massachusetts General Hospital)

Edward Sherwood, MD, PhD (Vanderbilt University)

George Gallos, MD (Columbia University)

Holger Eltzschig, MD, PhD (University of Texas Health Sciences Center)

Tomoki Hashimoto, MD, PhD (University of California, San Francisco)

## Jae, Lucy, Ed, George, Holger and Tom joined the current SAB members:

Y.S. Prakash, MD, PhD; Chair (Mayo Clinic)

Matthias Riess, MD, PhD (Vanderbilt)

Wei Chao, MD, PhD (Massachusetts General Hospital)

Peter Goldstein, MD (Cornell)

Jianguo Cheng, MD, PhD (Cleveland Clinic)

Thomas Floyd, MD (Stony Brook)

## The SAB is responsible for planning the scientific program of the AUA Annual Meeting. We sincerely thank the outgoing members of SAB for their outstanding service and contributions:

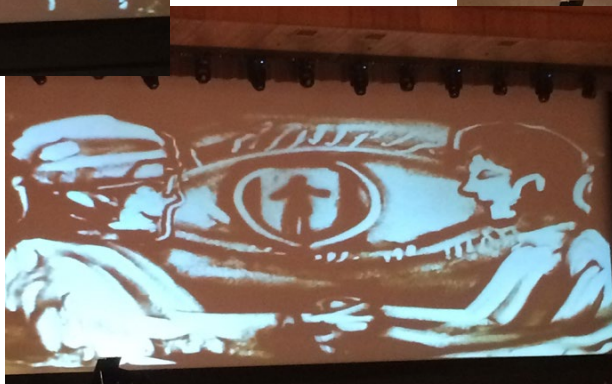
Charles Emala, MD; Outgoing Chair (Columbia University)

Roy Levitt, MD (University of Miami)

Nabil Alkayed, MD, PhD (Oregon Health & Science University)

Zhongcong Xie, MD, PhD (Massachusetts General Hospital)

## Sand Drawing at the Opening ceremony of the World Congress of Anesthesiologists held this past summer in Hong Kong



# Candidates Invited: Communications and Website Committee Chair



Newsletter Editor  
W. Andrew Kofke, MD, MBA  
AUA Update Editor  
University of Pennsylvania

My term ends in May 2017. Fifteen years seems to have been long enough, during which I had two terms as treasurer and oversaw production of 60 newsletters.

The AUA is thus seeking candidates to become chair of the Communications and Website Committee. The position includes responsibility as editor of the AUA newsletter, oversight of the website and other communications issues, and voting membership of AUA council. It is a five year term.

Current members are listed on page 13 of this Newsletter.

This position presents an opportunity to be an important contributor to and supporter of academic anesthesiology and academic medicine. Although the chair's activities are under oversight of the president with council, there is ample room for creativity in developing and supporting new ideas for stories in the newsletter, website improvements, and applications of advances in information technology and social media to improve communications related to the AUA.

## From the Bylaws:

### 6.202 Communications and Website Committee Composition

- a. The Communications and Website Committee Chair and Newsletter Editor and members shall be nominated by Council and appointed by the President. The Chairs of the EAB and SAB will also be members of the Communications and Website Committee. The Communications and Website Committee Chair shall serve for a period of five years subject to one renewal upon appointment by the President with approval by Council. The regular member of the Communications and Website Committee shall serve for a period of three years each with appointment staggered with new appointments made each year.
- b. The Chair of the Communications and Website committee will be a voting member of Council.
- c. The President (after consultation with the Communications and Website Committee Chair) shall appoint members to the Communications and Website Committee.

## Duties

- a. The Communications and Website Committee shall be responsible for production of the Society Newsletter and production and maintenance of the Society website and other technological communications.

If interested please send an expression of your interest to me ([kofkea@uphs.upenn.edu](mailto:kofkea@uphs.upenn.edu)) or the AUA president Jeanine Wiener-Kronish ([jwiener-kronish@mgh.harvard.edu](mailto:jwiener-kronish@mgh.harvard.edu)). Include your CV and any particular skills or aptitudes that will help you do a good job with this position.



## Seeking Feedback for Research Grant Ideas

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*Jeanine P. Wiener-Kronish, MD  
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Communications & Website  
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**2017 Host Program  
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# AUA Communications and Website Committee

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*W. Andrew Kofke, MD,  
MBA, FCCM  
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