



AUA

Association of University Anesthesiologists

Update

Spring 2011

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ASA President's Message to AUA: How Well Are We Preparing the Anesthesiologists Who Will Provide Our Care?

Mark A. Warner, M.D., President
American Society of Anesthesiologists

Why do we have an Association of University Anesthesiologists? It's worth a reminder since few of us have read the AUA bylaws since joining, if ever.

"The object of this Association shall be the advancement of the Art and Science of anesthesiology by: (1) the encouragement of its members to pursue original investigations in the clinic and in the laboratory; (2) the development of methods of teaching (anesthesia); and (3) (such) free and informal interchange of ideas."

Let's go another step. Why do we have an American Society of Anesthesiologists?

"It shall be the purpose . . . to raise the standards of the specialty by fostering and encouraging education, research and scientific progress in anesthesiology and by recommending standards of postgraduate education for qualifications as a specialist in anesthesiology and furthermore by recommending standards for approval of postgraduate training centers . . ."

These two important organizations serve complementary roles, with both interested in advancing scientific progress and improving the ways we teach and mentor future colleagues.

How Well Are We Advancing the Science of Our Specialty?

In the 44th Rovenstine Lecture (2006), Jerry Reves put us on notice that our academic programs were producing neither the volume of science nor the number of new scientists that are needed to advance the specialty. For me, his most memorable slide was a graph that showed the NIH funding per faculty member for all specialties in 2005. Anesthesiology was next to last, tied with orthopedic surgery and embarrassingly just

slightly ahead of family medicine. Sadly, data from 2009 show that our rank has not improved [Figure 1].

Thankfully, the specialty-specific rankings do not tell the whole story. An increasing number of anesthesiologists are obtaining significant federal and foundation funding in interdisciplinary fields, including grants such as Clinical and Translational Science Awards (CTSAs). We need to encourage expansion of research training in interdisciplinary fields and continue to seek opportunities to lead investigative efforts outside our presumed boundaries. Few things are as gratifying as seeing an anesthesiologist's research contribute to improvements in clinical practice outside our traditional intra-operative setting. Only by expanding the scope of our scientific inquiries will we make meaningful contributions that influence the most important anesthesiology, pain and perioperative issues of our time.



Mark A. Warner, M.D.

Advancing the Practice and Securing the Future

Our specialty has dramatically changed over the past decade. Nearly 50 percent of the clinical effort in a number of our academic anesthesiology departments is now spent outside of traditional operating rooms. With great gratification, I see a slow but consistent increase in the involvement of our colleagues in perioperative care.

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As advances in technology and pharmacology continue to allow us to improve the safety of intraoperative anesthesia care, new practice and business models will provide us with opportunities to expand the influence and impact we have on perioperative care. Expansion to all aspects of perioperative care will be crucial. It is how we will make our specialty *indispensable* in medicine. With health care reform, new practice models, a relentless drive to introduce non-physicians as substitutes for physicians, and legitimate concerns about the costs of health care in the U.S., our specialty needs to expedite its evolution.

Perioperative services represent approximately 65 percent of the expenses in most large hospitals. Only anesthesiologists understand the full scope of perioperative care. We are the natural leaders for the care of patients who undergo all sorts of procedures, with our involvement from the moment decisions are made to perform procedures until the patients are safely discharged to home or other facilities. Since we know the issues and complications of perioperative care, we need to lead it and be *indispensable* to our hospitals and health systems.

Let's take one example of the positive impact anesthesiologists can have on perioperative care. Several hundred surgical patients die annually from opioid-associated postoperative respiratory depression. More than a thousand suffer an anoxic brain injury each year. We know the cause. We can lead efforts to find non-opioid analgesics and pain-relieving techniques. We have technologies to monitor oxygen saturation and effective respiratory effort. What we don't have is a union of forces across multiple groups to reduce the frequency of this devastating problem. No one owns the entire perioperative experience in which this catastrophic complication occurs. It's a perfect role for anesthesiologists to lead, working with surgeons, nurses, administrators and others to reduce or eliminate this often-preventable complication.

How Well Are We Training Our Future Colleagues?

I suspect that few AUA members know how well their programs' graduates perform during their careers. Yes, we can all follow the advances of the small proportion of graduates who stay in academics. But what of the majority? Do we know how well we have prepared them to enter practice? Do we have any idea if our training today has prepared them for the future of the specialty in 10, 20 or 30 years?

Obviously, it would be much easier to appropriately train our residents and fellows if we had a crystal ball and could foresee the future of the specialty. Short of that, we have to guess at trends, project at least the short-term and perhaps intermediate future, and offer a sufficiently broad training program that exposes them to the breadth of perioperative care.

With the very real possibility of new payment models coming from the Patient Protection and Affordable Care Act of 2010, we may have opportunities to expand our influence and practices in the near future. With bundled payments, accountable care organizations, and other new or recycled payment models, it may make financial as well as practice sense to ensure that our specialty embraces the full scope of perioperative care.

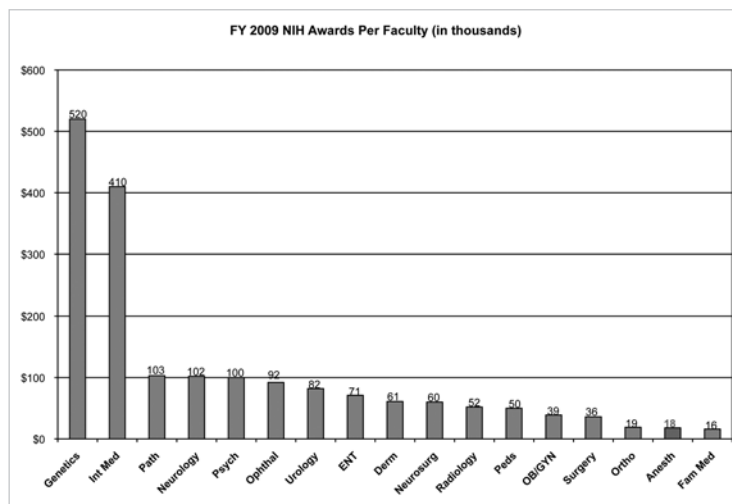
Therefore, are we prepared to provide the education and skills needed by our trainees today and in coming years? A recent survey reported that only a small percentage of our academic departments have really taken the challenge of providing significant preoperative assessment and management of patients. Instead, many appear to have done "enough" to meet the Anesthesiology Review Committee's program requirements. Is that sufficient for our residents? Will they be prepared to provide the preoperative management of their patients if new business models or good foresight push them to get far more involved in perioperative care? The same is true for postoperative management of patients, especially those who are critically ill. New data suggest that health systems find great value in anesthesiology departments that lead intensive care practices.

As financial models change and reward outcomes instead of specific episodes of care, practice groups that provide a full scope of perioperative services will benefit. These practice groups will seek new anesthesiologists who have the training to help them fulfill expanded perioperative roles. Is your department producing graduates who could lead a "surgical home" within a new practice model? If not, you might be shortchanging your trainees.

Summary

The members of AUA and the Society of Academic Anesthesiology Associations (SAAA) are the leaders who have the best potential to define our specialty of the future. In an absence of coordinated efforts to self-define our specialty, government regulatory agencies, payers, health system administrators, and physicians in other specialties will define it for us. We need to produce outstanding young graduates from our programs who have broad skill sets to adapt to the changing practice and financial models of the future. If your sons, daughters, nieces or nephews were entering anesthesiology today, how would you wish to train them so that they are best prepared to provide your care? Are we doing it as well for our current trainees as we would wish?

Figure 1



NIH research award dollars by specialty in American medical schools during 2009. FY=fiscal year; NIH=National Institutes of Health.

EAB Report: Conflict of Interest and the Academic Innovator

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Modified with permission from: James Szocik and Kirk Shelley, Ethics, CME, industry and anesthesia. *Curr Op Anaesthesiology*. 2009; 22(6):755-756.

After 20 years of work in the field of non-invasive monitoring, I (K.S.) am attempting to bring the results of my research to the clinical environment. For an academic physician, this is a non-trivial process, complicated by complex relationships between the university and industry. This is made even more difficult by the conflict of interest that is felt to taint the entire process. Unfortunately, as the importance of the innovation increases the taint only increases. On a personal level, the most disturbing aspects are the fundamental shifts that now must occur in my role as an educator and a researcher. For the first time, neither my peers, nor residents, can receive continuing medical education (CME) credit listening to me lecture on the topic of my life's work. In addition, my ability to do university-based research in my chosen field has been placed in jeopardy.

The fall 2009 issue of the *AUA Update* newsletter (pages 8-10) consists of a reprint of the recommendations from the National Academy of Sciences titled "Conflict of Interest in Medical Research, Education and Practice." As a researcher, recommendation 4.1 sent a chill down my back. It read:

Academic medical centers and other research institutions should establish a policy that individuals generally may not conduct research with human participants if they have a significant financial interest in an existing or potential product or a company that could be affected by the outcome of the research.

So does that mean I am done as an academic researcher just as my work is showing progress to the point it might actually be used in patient care? There is language regarding a possible exception if I am considered "essential," but it is not clear who makes that determination. It is clear, though, that this exception is strongly discouraged. This leaves inventors in a most unfortunate situation. They can either disavow any financial interest, which also subtly means they lose control over their invention, or they need to immediately stop their efforts to improve it. This is not an environment conducive to creative discovery.

From an educational perspective, ethical concerns have resulted in increasingly stringent rules prohibiting persons with potential conflict of interest from participating in CME. These prohibitions are leading to the exclusion of worthwhile activities. In the field of anesthesia, substantial variations in device performance, conceptual operations, and clinical failure modes exist. Medical device manufacturer (industry) expertise is essential to effectively educate clinicians and researchers in a CME setting.

The rationale for excluding medical device manufacturers (industry) from CME is based on the concept of a financial (commercial) conflict of interest leading to a bias. The assumption is that simple disclosure is insufficient to overcome this commercial bias despite the value of the CME activity. This assumption overlooks other forms of bias. Indeed, the Accreditation Council for Continuing Medical Education (ACCME) specifically allows both 501-C non-profits (although not those advocating for commercial interests) and governmental organizations to be eligible for accreditation and free to control the content of CME. Therefore a non-profit organization opposed to the use of plastics in medical devices could control the content of a medical device symposium, whereas the device manufacturer could not even present its case for the benefits of plastics. A recent *New York Times* publication authored by Gina Kolata (June 28, 2009) states that the grant system for cancer research leads researchers (i.e., biases them) to focus on small projects unlikely to take significant steps toward curing cancer.

The biases of governmental organizations extend back to the epidemiology of cholera wherein the "best minds" of England in the 1800s felt that the disease was spread by the contaminated atmosphere, not water supplies (the miasma theory). It was not until Dr. Snow, without funding, removed the Broad street pump handle that this bias was effectively challenged. Academics are assumed to be unbiased; however, no one ever received funding by minimizing the importance of their research area.

The ACCME, American Medical Association, the Institute of Medicine and other groups have to address one further issue with promulgating guidelines for conflict of interest - that is their own conflict of interest. They have set themselves up as guardians of the public interest and greater good, but *quis custodiet custodiet?* Who will mount guard over our guardians? To paraphrase Aldous Huxley from *Brave New World Revisited*: the answer is a bland denial that they need any supervision. There is a touching belief among academics that they will never be corrupted by power, because their hearts are pure — and their hearts are pure because they are scientists and are using the scientific method to find the truth.

If I were to attend a continuing education conference on building bridges, under the current CME-style rules I could hear from academics (who have never actually built a bridge) talking

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SAB Report: The Glycocalyx and Lung Mechano-transduction

Randal O. Dull, M.D., Ph.D.

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Lung Vascular Biology Laboratory

For over 100 years, the Starling Principle has dominated our understanding of vascular to tissue fluid balance. The Starling equation describes a linear relationship between net filtration forces and fluid flux and two permeability coefficients (hydraulic conductivity and the reflection coefficient) that have always been treated as constants. Clear evidence has emerged over the past decade demonstrating that endothelial permeability coefficients change in response to mechanical forces, thus requiring a re-evaluation of the clinical applicability of the Starling Principle in its basic form. The mechanism(s) by which vascular endothelium can sense changes in both pressure and flow, e.g. mechano-transduction, have remained elusive but represent an important therapeutic target as for diverse pathophysiological states as systemic and pulmonary hypertension, atherosclerosis, renal disease, stroke and, of course, pulmonary edema mediated by acute heart failure and ventilator-induced lung injury.

The endothelial surface is covered with a matrix composed of glycosaminoglycans, glycoproteins and glycolipids that collectively are referred to as the glycocalyx (“sugar-husk”). This matrix forms a scaffolding that adsorbs serum proteins and creates a gel-like layer (historically, referred to as the unstirred water layer or immobile plasma layer) adjacent to the endothelium that influences convection and diffusion across the vascular barrier. The biophysical characteristics and biomechanical properties of the glycocalyx that influence capillary permeability remain largely undescribed. To this end, my laboratory - in collaboration with Vladimir Hlady, Ph.D. (Bioengineering) - use a variety of biophysical techniques to study the glycocalyx. We have used fluorescence correlation spectroscopy (FCS), a laser-based optical system that can quantify tracer dynamics inside a femtoliter observation volume, to characterize albumin diffusion inside the glycocalyx;¹ this was the first use of FCS to probe an extracellular structure. By using highly specific enzymes to remove individual components, we were able to define the structural contributions of heparan sulfates and hyaluronan to the glycocalyx, and these studies provided insight into key structural features that may be altered during inflammation and lung injury.

“Work from our laboratory and others has contributed abundant evidence that mechano-transduction from shear stress, pressure and cyclic strain involve oxidative pathways that lead to cellular injury and barrier dysfunction.”

In 2003, we were the first to report that endothelial cell-surface glycoproteins, specifically the glycosaminoglycan heparan sulfates, are flow-sensors,² and subsequent work has demonstrated a conserved mechanism involving other glycoproteins³ and pressure-mediated mechano-transduction.⁴ Work from our laboratory and others has contributed abundant evidence that mechano-transduction from shear stress, pressure and cyclic strain involve oxidative pathways that lead to cellular injury and barrier dysfunction. My current NIH-funded work has reproduced these results using the isolated perfused rat lung model, where increasing lung capillary pressure results in a marked increase in vascular permeability; nitric oxide appears to be the cellular mediator of this increase in permeability. Removal of vascular heparan sulfates by heparanase or inhibition of nitric oxide synthase attenuates the pressure-induced changes in whole lung permeability. Thus, it appears that the endothelial glycocalyx functions as a mechano-transducing apparatus that can modulate barrier properties and edema development.

We have rapidly applied these insights regarding endothelial glycoprotein-mediated mechano-transduction to therapeutic strategies by developing novel, biomimetic polymers that bind to the glycocalyx; these polymers enhance passive barrier properties and inhibit pressure-induced mechano-transduction.^{5,6} Based on three-dimensional confocal imaging, our novel polymers intercalate into the glycocalyx and enhance the physical barrier, and we presume they change the biomechanical properties of the glycocalyx, accounting for their ability to inhibit mechano-transduction. Current studies using atomic force microscopy will allow us to directly measure the mechanical properties of glycoproteins and polymer-glycoprotein interactions on live endothelial cells. Ongoing polymer development, to enhance selective targeting to the endothelial surface, is a primary effort of my laboratory, and we hope to develop clinically useful polymers that could be used to treat ALI and, perhaps, be used in preventative ways prior to lung transplantation, cardiopulmonary bypass and other states associated with lung injury.

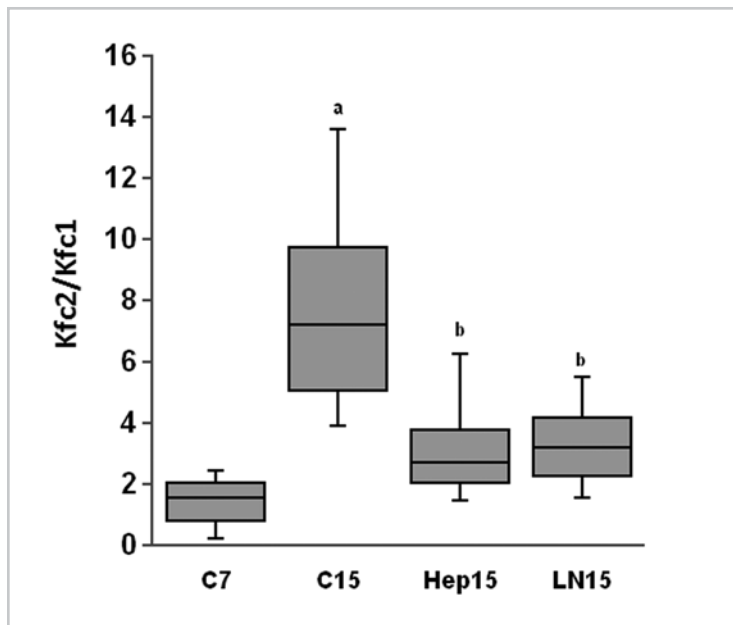


Randal O. Dull, M.D., Ph.D.

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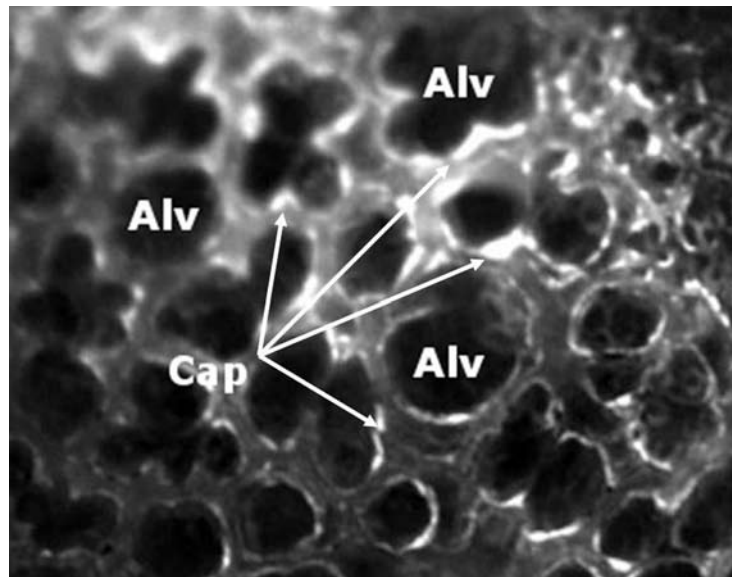
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Figure 1



Effect of increased left atrial pressure (P_{LA}) on the whole lung filtration coefficient (K_{fc}) during Control (C7, low pressure, $P_{LA}=7$ cm H_2O), Control (C15, high pressure, $P_{LA}=15$ cm H_2O), heparanase-treatment (Hep15, $P_{LA}=15$ cm H_2O) and L-NAME (LN15, $P_{LA}=15$ cm H_2O). The increase in K_{fc} at $P_{LA}=15$ cm H_2O is attenuated by removal of lung vascular heparan sulfates and by inhibition of eNOS with L-NAME. ($P < 0.05$; ^a vs. C7, ^b vs. C15) demonstrating that the glycocalyx mediates, in part, mechano-transduction and barrier regulation.

Figure 2



Real-time fluorescent lung imaging of subpleural capillaries and vascular glycocalyx using fluorescent polymers. Alveolar space, capillaries and fluorescent labeling on endothelial surface is clearly visible.

Future Meetings

May 17-19, 2012

AUA 59th Annual Meeting
Cleveland, Ohio

April 4-6, 2013

AUA 60th Annual Meeting
Miami, Florida

EAB Report Continued

Continued from page 3

about the strength of steel and other important minutia, the non-profit People for a Bridge Free America, the Environmental Protection Agency (on the negative impact of bridges on wetlands), etc. However, I could not hear from the actual experts who are building the bridges. Of whom would I be able to ask: Given this construction, what are the maintenance costs? How much paint will I need per foot of span? Which will cost more, a suspension or cantilever bridge? What are the specific failure points of your design versus the competitors? To build safe bridges effectively, we need the input of academics, trade-people and industry. The professional medical association relationship to industry, which was maligned in the April 1, 2009 issue of *JAMA*, needs expansion, not elimination. The Anesthesia Patient Safety Foundation and the Society for Technology in Anesthesia are but two examples of medicine and industry coming together to improve health care delivery. The expertise of medical device manufacturers needs to be presented despite the inherent bias, with an explicit knowledge of the bias, in order to improve the system. Excluding industry from CME serves no purpose except to illustrate that monetary bias is easy to demonstrate, and other forms of bias are more subtle but no less present, and perhaps no less potent.

I feel we need to address conflict of interest better by 1) broadening the disclosure statement and definition to include non-financial conflicts and 2) weighing the potential bias against the specialized knowledge base of the person presenting on an individual basis. Under these rules we could see more participation by knowledgeable members of the industry community (the device designers, pharmaceutical company researchers, etc.), less by the less knowledgeable (by the exclusion of sales force, promotional people), and an acknowledgement of non-financial biases in presentations.

We need to build bridges between industry, clinicians and academicians, being wary that the bridges require solid foundations, not shifting sands. Current opinions in medical education would have us demolish many sound bridges for unsound reasons. Most of us want our professors to leave their ivory towers and to make a serious attempt at bringing their work into the real world. This process is not helped by preventing them from doing what they have done their entire lives—lecture and teach.



58th Annual Meeting Program Schedule

May 12-14, 2011 • Loews Philadelphia Hotel • Philadelphia, Pennsylvania • Register online at aiahq.org

Thursday, May 12, 2011

10:00 a.m. - 6:00 p.m.	Registration
1:00 - 1:15 p.m.	Introduction and Welcome to the 58 th Annual Meeting Lee A. Fleisher, M.D., Host Chair
1:15 - 1:30 p.m.	SAB Program Introduction Marie E. Csete, M.D., Ph.D.
1:30 - 3:00 p.m.	SAB Oral Session (Part 1)
3:00 - 4:30 p.m.	Moderated Poster Discussion Session
5:30 - 6:00 p.m.	Resident and Junior Faculty Meet and Greet Reception
6:00 - 8:00 p.m.	Welcome Reception – Loews Philadelphia Hotel

Friday, May 13, 2011

6:30 a.m. - 5:30 p.m.	Registration
7:00 a.m. - 7:45 a.m.	Continental Breakfast
7:45 a.m. - 8:00 a.m.	Welcome Arthur H. Rubenstein, MBBCh Dean, University of Pennsylvania School of Medicine
8:00 - 8:15 a.m.	EAB Program Introduction Robert E. Shangraw, M.D., Ph.D.
8:15 - 9:45 a.m.	EAB Program (Part 1) Do Current “Innovative” Teaching Methods Improve Outcome in Anesthesiology Resident Education? <i>A Pro/Con Debate</i> <ul style="list-style-type: none">• <i>Overview of Innovations and Discussion of AUA Member Survey Results</i>• <i>Pro: Educational Innovations are Efficient and Effective, and Improve Upon Traditional Anesthesiology Resident Education</i>• <i>Con: Educational Innovations Do Not Improve Upon Traditional Anesthesiology Resident Education, and May Distract From Clinical Training Objectives</i> (This is an interactive session)
9:45 - 10:15 a.m.	Moderated Poster Discussion Session
10:15 - 11:45 a.m.	EAB Program (Part 2) Proficiency-Based Credentialing: Current Evidence for Performance Measure Benchmarks <ul style="list-style-type: none">• <i>Overview</i>• <i>The Rationale for MOCA Certification</i>• <i>Performance in Simulation: Analysis of the Evidence That Simulation and Task Training Reflect Skill in Practice</i>• <i>Peer - and “360” - Evaluations: Analysis of the Evidence That These Evaluations Reflect Skill in Practice</i>
11:45 a.m. - 1:00 p.m.	Luncheon
11:45 a.m. - 1:00 p.m.	EAB, SAB, and Presidents’ Luncheon
1:00 - 2:00 p.m.	NIDA Update
2:00 - 2:30 p.m.	ASA President’s Update
2:30 - 2:45 p.m.	FAER President’s Update
2:45 - 3:00 p.m.	Break/Poster Viewing and Discussion

3:00 - 4:30 p.m.	AUA President’s Panel Large Database Research Today and in the Future: AIMS and AQI Moderator: Kevin K. Tremper, Ph.D., M.D., FRCA <ul style="list-style-type: none">• <i>Large Administrative Database Research: Medicare and Beyond</i>• <i>Observational Research: Creating Synergy Through Complementary Data Sources</i>• <i>Nationwide Anesthesia Database Research: Is There Science Beyond Quality Management?</i>
4:30 - 5:30 p.m.	AUA Business Meeting Evening on Your Own to Explore Philadelphia! www.visitphilly.com

Saturday, May 14, 2011

6:30 a.m. - 5:00 p.m.	Registration
7:00 - 8:00 a.m.	Continental Breakfast
8:00 a.m. - Noon	Host Program Introductions Lee A. Fleisher, M.D. Host Program <ul style="list-style-type: none">• <i>From Dr. Kildare to House: Physicians on TV</i>• <i>Emerging from the Crisis?</i>• <i>World War II Military History</i>• <i>Concierge Medicine: A Horse Named Barbaro</i>
10:00 - 10:30 a.m.	Break/Poster Viewing and Discussion
Noon - 1:30 p.m.	Luncheon
Noon - 1:30 p.m.	Resident Luncheon
1:30 - 1:40 p.m.	SAB Session #2 Introduction Marie E. Csete, M.D., Ph.D.
1:40 - 3:00 p.m.	SAB Oral Session (Part 2)
3:00 - 4:00 p.m.	Break/Moderated Poster Session
4:00 - 5:00 p.m.	SAB Plenary Session: Sex, Steroids and The Injured Brain
6:15 - 10:00 p.m.	Reception and Dinner Independence Seaport Museum

Loews Philadelphia Hotel

1200 Market Street
Philadelphia, Pennsylvania
Phone: (215) 627-1200 Fax: (215) 231-7305

The Loews Philadelphia Hotel will be the site of the AUA 58th Annual Meeting. The daily room rate is \$225 single and \$250 double occupancy plus applicable taxes. This rate will also be offered three days prior and three days after the dates of the Annual Meeting, based on availability. **The cut-off date to make your hotel reservation is April 18, 2011.** Reservations received after the cut-off date are subject to space and rate availability.

Make your reservations online at:
<http://www.loewshotels.com/en/Philadelphia-Hotel/GroupPages/aua>

Reservations can also be made by calling the Loews Philadelphia Reservations Department at (215) 627-1200. All reservations require one night's deposit at the time of the reservation.



AUA

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