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Mr. and Mrs. Jonathan Smith are pictured adjacent to Juan F. Gutierrez-Mazorra, MD, FAAP, AAP's 2010 Robert M. Smith Award winner. Mr. Smith is the son of Robert M. Smith. At far right is Alvin Hackel, MD.

Going Green in the OR

In Chicago

By Catherine Bachman, MD

University of Chicago

A few of us whose lives revolve around the OR at the University of Chicago saw a solution to “a ton of problems”. Surgery preparations create a huge amount of plastic waste. Because biohazardous contamination concerns prevented material separation after surgery, a process was created in 2008 to capture clean plastic packaging of surgical and anesthesia equipment, surgical wraps, and other plastic materials before surgery. Blue bag liners for recycling are now present in each operating room – one for nursing and one for anesthesia personnel. As a multitude of equipment is unwrapped, the clean plastic wrapping is

disposed of into the blue liners. The contributions from anesthesia alone are significant and include wrapping from syringes, circuits, masks, endotracheal tubes, and many other packaged materials. Care is taken not to add any items which are considered biocontaminated by patient contact, such as gloves, airway circuits, airway items, and intravenous tubing. Very recently, cardboard packaging has been added to the list of acceptable material, because the recycling company will now separate plastics and cardboard at their site. Plastic and cardboard now go into the same blue liner, making the process simpler.

Blue bag liners placed in the operating rooms now capture more than 500 pounds of recyclable

Continued on page 4

PRESIDENT'S MESSAGE

The SPA has enjoyed a busy and productive spring. We held our Winter/Spring meeting in San Antonio with a record breaking attendance of 730, surpassing our previous record of 679! This was a great educational venue with plenary sessions, workshops, PBLDs and very active committee meetings. We are well underway in final preparation of the 24th Annual Meeting in San Diego this year in conjunction with the Society for Paediatric Anaesthesia in New Zealand and Australia (SPANZA). We expect this meeting to continue our success in developing international educational venues.

Over the nearly two years as President of SPA, I have been gratified by the contributions of talented and gifted colleagues who continue to make our organization strong. We have seen the development of new committees and special interest groups forming. The American Board of Anesthesiology (ABA) announced its intention to accredit advanced subspecialty training in pediatric anesthesia, and the joint announcement of combined training in pediatrics and anesthesiology supported by the ABA and the American Board of Pediatrics.

I have been very time-challenged during my term as President. I became the chair of an academic department in April 2008 and this has been a real learning curve! Surviving and building in academics is quite demanding, but I've been pleased with my department's growth, along with continuing to lead growing developments with SPA. I have not been able to fulfill every demand on the president, but we have an extraordinary leadership succession to continue to build our organization. The Executive committee or the full Board of Directors has a teleconference monthly and we continue to make progress in our support of the Wake Up Safe initiative, continued sponsorship of research

through the Foundation for Anesthesia Education and Research (FAER).

Although economic issues surround us, SPA continues to remain financially healthy. Our reserves are growing, and expenses have been carefully budgeted. Our Patient Safety, Education and Research Fund continues to grow with your contributions. This fund will be vital to our future support of new safety initiatives and as a funding



Joseph R. Tobin, MD, FAAP, FCCM
Wake Forest University
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Over the nearly two years as President of SPA, I have been gratified by the contributions of talented and gifted colleagues who continue to make your organization strong.

source as we reach out to increase our research support and international education efforts. Please consider our fund as you consider your charitable giving this year. We are a professional organization dedicated to the improvement of perioperative services to children and their families. We are strong not only because of your philanthropy, but also because of your active involvement in SPA and your willingness to offer your

time and talents to keep moving us forward. Dr. Lynn Martin is spearheading our committees for the 2012 International Assembly of Pediatric Anesthesia in Washington, D.C. just prior to the annual ASA meeting in October. Please contact either Lynn or myself if you have ideas or interest in assisting the planning of this meeting. Have a great summer and early autumn!

FROM THE EDITOR

By Allison Kinder-Ross, MD

Hello, fellow SPA members.

Please allow me to point out a timely contribution in this Newsletter, the Fellow's Corner, that focuses on a one-year versus two-year fellowship. This concept is now under great review and scrutiny as we move forward with the goal of separate subspecialty certification and try to determine how we can mirror our pediatric counterparts by perhaps improving the fellowship process.

The ability to create an excellent clinician in pediatric anesthesia exists in the current form of the one-year fellowship, but is this what we are trying to accomplish? Do we not want to develop individuals not only into excellent pediatric anesthesia clinicians but also guide them to be clinicians with additional special expertise, wonderful educators, researchers or leaders? These questions will need to be addressed and the fellowship curriculum reassessed as we determine what is best for our field and our patients.

Perhaps easier to grasp are the feature articles in this edition. I hope all of you enjoy the focus on practice improvement displayed

in the articles that are either going lean, or going green. We are fortunate to have people on our Communications Committee who could share their experience with us to improve all of our work environments.

As always, I appreciate the contributions that are made to this Newsletter, particularly the meeting reviews to share with those who could not attend. However, I am now soliciting any author to contribute in their area of expertise for the upcoming newsletter. This is an excellent opportunity, particularly for fellows or junior faculty, to publish and get your name out there among our Society.

If you would like to contribute, drop me an e-mail at allison.ross@duke.edu. It can be medical, social, political (to a degree), or personal. Anything that is of interest to you is probably of interest to others.

I hope everyone has had a successful, active summer with the increased pediatric population that it typically brings to the ORs. September will be a nice reprieve.

The Use of Lean Principles in the Operating Room

By Paul Reynolds MD

University of Michigan Health System, Ann Arbor

Inefficiencies in the operating room adversely affect patients and their families and operating room personnel, and increase utilization of resources.

As a way of minimizing these inefficiencies, several hospitals, including our own, have begun to use “lean principles”. Lean manufacturing is not a new phenomenon. Although known for inventing the cotton gin in the late 18th century, Eli Whitney was responsible for the concept of interchangeable parts. By the late 19th century, Fredric Taylor began to look at standardized work. Henry Ford developed the assembly line, and is considered by many to be the developer of “Just in time” and Lean Manufacturing. After World War II, Taichi Ohno began to incorporate Ford production principles and other techniques into an approach called “The Toyota Production System”, which became the basis for Lean Manufacturing.

Key concepts to this system include creating continuous process flow, using a “pull system” to avoid overproduction, leveling workload, building a culture of fixing problems during production with first time quality, standardization of tasks and processes, making decisions by consensus, and working on continuous improvement.

Lean tools used in solving problems and eliminating waste include; value stream mapping, PDCA (Plan, Do, Check, Act), and 5S (Sort, Straighten, Systematic cleaning, Standardizing, and Sustaining) to name a few.

In January, 2007, the operating rooms in the CS Mott Children’s Hospital at the University of Michigan began implementing lean processes. Education in lean principles was provided to 256 anesthesiologists, surgeons, nurses and other OR staff. Value stream maps were created of the entire pre, intra, and post operative process, and specific problems were identified. Teams consisting of multidisciplinary members were formed and met weekly to work on these problems (and do so today). Those doing the work were empowered to identify problems and submit solutions.

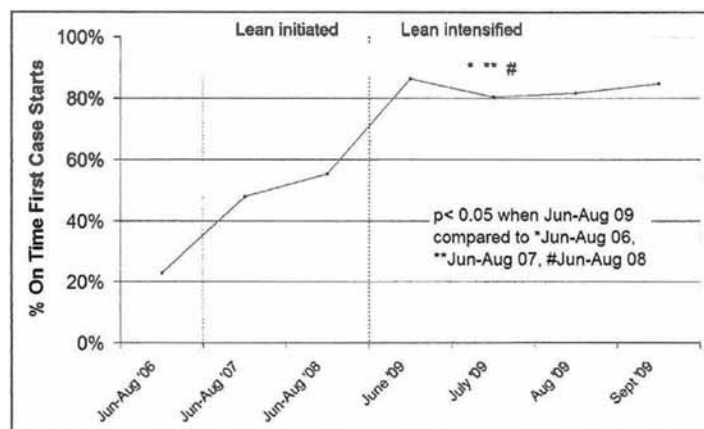
One example of the many projects completed since lean implementation is the problem of delays in first case starts that was an area targeted for improvement. A standard work flow process for preoperative nursing, anesthesiology, surgical and operating room staff was developed.

Additionally, data of first case start time by OR room, faculty surgeon and anesthesiologist and reasons for late starts were post-

ed each day, and a system for feedback and real time problem solving was instituted. The table demonstrates the frequency of delays in first case start times over three different time periods, before, during and after process change implementation:

	Surgeon/Anes Nurse-Related	Family Related
June-Aug, 07	258	69
June-Aug, 08	228	51
June-Aug, 09	72	30

As depicted in the figure, first case on time starts increased significantly over all three summer periods ($p < 0.05$). There was a 72% reduction in delays caused by surgeons, anesthesiologists and nursing, as well as a 56% reduction in delays that were family related. The following graph depicts the frequency of on-time starts over the same time period:



In summary, implementation of a Lean process favorably affected on time first case starts in our operating rooms. This sustained increase in on time starts translates to an additional 50.5 hours per month of operating time. We have found that the cost savings realized by this and several other projects (decrease in waiting time for a PACU bed, decrease in case turn over time, improvement in patient satisfaction, compliance with CMS temperature and antibiotic administration to name a few) are far greater than the cost of training the operating room staff and physicians in the Lean process. Less tangible benefits of empowerment of the operating room team toward working for change and improving efficiency include improved employee morale.

References:

Application of lean principles enhances efficiency in the operating room; Hirschl RB, Reynolds PI, Wilson JK, Lam K, Lanzetta S, Billi J, Submitted for presentation at the AAP, October, 2010

The Toyota Way Field Book; Liker JK, Meier D, McGraw-Hill, 2006



DID WE CATCH YOU?

Check out the photo galleries from Pediatric Anesthesiology 2010 at www.pedsanesthesia.org

Going Green, from page 1

material each day! Ease of use and education of everyone in the OR environment has contributed to the success of this program. For anesthesia personnel, a blue liner is positioned near the regular trash liner of the anesthesia side cart in every OR. The OR nurses have large blue liners in the OR right next to where they are opening items for their surgical tables. The anesthesia techs have blue liners set up in the anesthesia workroom where a large part of their materials are unwrapped. It has now become the expected culture in our OR's to put all clean plastic wrappings and cardboard in the blue liners. The Anesthesia department has recently changed the sharps containers to a brand that can be reprocessed 500 times, further reducing landfill.

Anesthesiologists and other members of our department have spread this initiative to other locations in the hospital. We noticed the absence of recycling when providing anesthesia in off-site locations, such as the interventional radiology suite, the GI suite, and the PICU. These sites now have recycling programs as well, and the initiative continues to spread throughout our institution. Our Anesthesia department has taken leadership roles in the institution for recycling and reducing waste, raising our profile within the institution. A representative from our department attends an institutional sustainability Council meeting every month. Anesthesia and OR personnel host an annual Recycling Fair outside the OR's, and participate in Earth Day presentations throughout the Medical Center.

The benefit of this recycling program is both altruistic and economic, and has public relations benefits as well. Recycling and reducing the amount of trash generated is beneficial for the environment and reduces landfill. There are also real economic benefits to the institution. Trash disposal is an expensive process. Recycling reduces the amount of trash, thereby reducing institutional costs. In our specific situation the recycled material is removed from the institution without charge. The recycling company does not pay us for our recycled plastic, but has started to pay for our recycled cardboard, which helps offset our costs. Over the past couple of years our institution has gone from recycling 1% of its waste to 30% of its waste. Finally, this year the University of Chicago has received national recognition and awards for its recycling efforts, including awards from the Environmental Protection Agency and Cleanmed. This contributes to the positive reputation of our institution. The benefits of recycling are many.

In Seattle

By Nicole Petty, MD

Seattle Children's Hospital

At Seattle Children's Hospital, a comprehensive recycling and composting program was started two years ago.

The University of Chicago has won awards from the EPA and Cleanmed for its recycling efforts.



A recycling bin next to the anesthesia cart at Seattle Children's.

The initiative was a grassroots movement in the operating rooms involving representatives from sourcing, nursing, anesthesia, surgery and the recovery room. Our waste reduction started with sourcing differently. We recycle our pulse oximeters, resulting in a \$200,000 annual savings, and we have trialed a filter to allow reusing of patient circuits. We eliminated unnecessary items (betadine trays) from our surgical packs.

In the OR, recycling bins were added next to the anesthesia carts and a large recycling bin placed next to the scrub tech's garbage bin to facilitate appropriate separating of waste when opening for cases.

Partnering with our recycling facility, we are able to place all paper, plastic, glass together in one bin. Much medical plastic is not labeled with recycling symbols, but through staff education we have identified many items which are actually recyclable.

The garbage liners on the anesthesia carts were changed from red biohazard bags to clear plastic liners which resulted in a \$60,000 annual savings. In addition, we added compost stations in all staff lounges, patient refreshment stations and in restrooms (for paper towels).

The OR Go Green Team has partnered with a larger green committee within the hospital and has won awards at CleanMed as well as being featured in OR magazines focusing on the greening of the operating rooms.

One Lump or Two? Perspectives on a Two-Year Fellowship

By Ben Walker, MD

Acting Instructor/Senior Fellow

Dept. of Anesthesiology and Pain Medicine

University of Washington School of Medicine

Seattle Children's Hospital

Seattle, WA

Additional training beyond the four years of anesthesiology residency is becoming increasingly popular, especially in our current economic times and tightened job market. I had decided relatively early to do a fellowship as I had always considered a career in academia. My pediatric rotation reignited my enthusiasm for taking care of children, which was one of my initial reasons for pursuing a career in medicine.

When I began the fellowship interview process, even more options arose. The traditional one-year pediatric anesthesiology fellowship is, rightly so, very clinically oriented. Twelve months goes by fast, and it is imperative that we gain as much hands-on experience as possible before we set out in the world to care for difficult pediatric patients on our own. However, the emphasis on clinical skills leaves relatively little time for research, much the same as in residency. Enter the two-year fellowship.

At my institution, fellows are given the option to stay on for an extra year that focuses primarily on research training. It is a self-directed year that one can tailor to one's interests. Past fellows have focused on everything from resident education to basic science training. As an example, this year I have 80% (!) dedicated research time, with the other 20% spent as an attending supervising trainees. After years of clinical work, I began this year wondering to myself what I would do with four days per week of research time, and now realize that it is not nearly enough time to finish everything.

My area of interest is clinical research in regional anesthesia, so I have spent the majority of this year designing and implementing a prospective clinical trial. This has proven to be an immersive education in the workings of the IRB, grant applications, detailed study design and collaborating with multiple co-investigators. As those with research experience will attest, twelve months is a very short window of time in which to accomplish all of this. The IRB approval process took about four months, with another couple of months beyond that to secure some funding, so that we finally enrolled our first patient about eight months after this all began. In the process, I've made quite a few rookie mistakes, navigated many small hurdles and been rejected for a few grants. My experience on the dating scene, including that with my now-wife, has prepared me well. This year has been an illuminating introduction into the world of research, and is a story familiar to many as they start out. It has gone much like I expected – the requisite early difficulties in what is hopefully a successful career.

So what else have I been doing for those eight months in clinical

trial purgatory, one might ask? Sitting on the beach? Not exactly. I have also been able to participate as a co-investigator in an ongoing clinical trial. This has given me the “front line” experience of recruiting patients, coordinating research support staff and supervising follow-up. It has kept me busy while awaiting approval for my trial, and served as an example for how to conduct research on my own. I've taken a course in graduate biostatistics because all of those t-tests and correlations were truly “Greek to me”. I can now do relatively straightforward statistical analyses, although I have also realized that I will almost always need assistance (or even just a little reassurance) from the biostatisticians. At least now I can speak their language. Throw in a few posters, meeting presentations, and manuscripts, and you find yourself quite busy. And did I mention oral boards? Glad that's over.

My transition to an attending anesthesiologist has been more gradual, not the trial-by-fire that others go through. I cannot emphasize enough how fortunate I am to take this step in a familiar place, surrounded by empathetic mentors who are always available to help. It is far easier to overcome the early jitters in this type of environment. I truly enjoy working with residents and fellows in what can only be described as experiential education, much like the wilderness education I taught before medical school. My work as an attending also provides a considerable increase in pay, so I'm not living on a resident/fellow budget anymore. In my case, it has eased the financial burden of childcare and allowed me to start paying off a few loans.

Not all of the benefits of this year have been professional. I became a father in the latter half of fellowship, so the significant amount of flexibility in my daily schedule was welcome. On my non-clinical days, without the constraints of an early OR start, I can enjoy the glorified food fight we call “breakfast” with my little one. I've been there to hold her hand for every vaccination and can get home in time for a trip to the park if the sun is shining (we live in Seattle). I couldn't ask for a better work/life balance, even if it's only for a year.

In short, this year has worked out extremely well for me. My knowledge of clinical research, and the hard work it takes to become an independent investigator, has grown exponentially. I've



Dr. Walker

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Anesthetic Considerations for the Pediatric Oncology Patient – Reviews Available

By Gregory Latham, MD
Seattle Children's Hospital

Children with a new diagnosis of cancer or undergoing treatment for cancer are complex medical patients, and they come to the operating room with great frequency.

What does the anesthesiologist really need to know about the medical histories of these children prior to anesthesia? Does the type of cancer in the child undergoing initial diagnosis pose different risks for anesthetic management? Do the chemotherapy protocols they are receiving or time since hematopoietic stem cell transplantation matter? Do we need to order an echocardiogram prior to anesthesia in children in remission who were treated with doxorubicin?

In a recent and uniquely comprehensive three-part review series in Pediatric Anesthesia, the authors have sought to answer these and other questions.

Anesthetic Considerations for the Pediatric Oncology Patient – Part 1: A Review of Cancer Therapy (cite 1) reviews current principles of cancer therapy and the general mechanisms of toxicity to the child. Novel tables consolidated from multiple pediatric sources display toxicities and maximum tolerable doses of chemotherapeutics and radiation therapy.

Anesthetic Considerations for the Pediatric Oncology Patient - Part 2: Systems-Based Approach to Anesthesia (cite 2) presents a systems-based approach of the impact from both tumor and its treatment in children, followed by a discussion of the relevant anesthetic considerations.

Lastly, Anesthetic Considerations for the Pediatric Oncology Patient - Part 3: Pain, Cognitive Dysfunction, and Preoperative Evaluation (cite 3) discusses neurocognitive, psychosocial, and pain issues in the child with cancer, followed by an in-depth discussion of preanesthetic testing and evaluation in this patient population.

These articles represent a current and definitive review of anesthetic care of children with cancer.



Dr. Latham

1. Latham GJ, Greenberg RS. Anesthetic considerations for the pediatric oncology patient - part 1: a review of antitumor therapy. *Paediatr.Anaesth.* 2010; 20: 295-304.
2. Latham GJ, Greenberg RS. Anesthetic considerations for the pediatric oncology patient - part 2: systems-based approach to anesthesia. *Paediatr.Anaesth.* 2010; 20: 396-420.
3. Latham GJ, Greenberg RS. Anesthetic considerations for the pediatric oncology patient - Part 3: pain, cognitive dysfunction, and preoperative evaluation. *Paediatr.Anaesth.* 2010; 20: pending.

Fellow's Corner, from page 5

been able to ease into the role of attending. It has certainly separated me from other pediatric fellows and made my academic job prospects much more favorable. In many ways, it is the ideal fellowship, with an early emphasis on clinical skills and a gradual increase in autonomy as an attending, complemented by a considerable amount of dedicated research time. It more closely resembles the subspecialty fellowships in pediatrics and internal medicine. The obvious disadvantage is that

it is yet another year of training, and relatively less income than that of a clinical attending or private practice anesthesiologist. It may not be necessary for the fellow who is looking only for focused clinical training to take into private practice. Therefore, I cannot advocate for it as a needed change to our current fellowship standards. However, I would implore all fellowship directors to search for ways to make this opportunity available to those with a desire for further training.

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Review of Congenital Cardiac Anesthesia Society Meeting

The Congenital Cardiac Anesthesia Society (CCAS) Program was held the Thursday before the start of the SPA program and continues to be a popular draw for members. CCAS President Dr. Chandra Ramamoorthy, and Drs. Anshuman Sharma and Emad Mossad began the program with welcoming remarks to the audience and providing an outline of the Educational Program.

Morning Session

By Robert D. Valley, MD

University of North Carolina Hospitals

Session I, "Brainstorm! Recent Advances in Neurologic Monitoring and Protection" moderated by Dr. Duncan De Souza (University of Virginia), began with a presentation on the role of MRI for assessing neurologic status in pediatric cardiac surgery. Dr. Dean Andropoulos (Texas Children's) gave a fast-paced talk about his work and that of others on this topic. Fetal MRI's suggest that the mere presence of some congenital heart lesions may result in delayed brain development, a good example being fetuses with HLHS anatomy. Other data presented suggests that the immature brain may be more susceptible to injury. MRI is a useful tool in assessing both preexisting and post surgical CNS abnormalities and will help with our efforts to minimize the neurologic consequences of congenital heart disease and interventions to correct it.



Dr. Valley

Next Dr. Kenneth Brady (Johns Hopkins) discussed the use of NIRS monitoring as a means to study cerebral autoregulation. He began by reviewing the physiology of traumatic brain injury (TBI). He described the Cambridge hypothesis and how cerebral blood vessel size and hence total blood content decreased as CPP increased during the autoregulation (flat) portion of the CBF-CPP curve. The correlation of ICP changes with arterial BP changes (ABP) is called the pressure reactivity index (PRx). In children with TBI, a positive PRx is associated with death and reflects a loss of normal CBF autoregulation. He then went on to describe the use of NIRS monitoring as a surrogate measure of CBF and the use of the Cerebral Oximetry Index (COx) to determine the lower limit of autoregulation when CBF becomes pressure passive. NIRS can also be used to trend CBV by estimating changes in total Hgb. Dr. Brady demonstrated that the lower limits of autoregulation varies between individuals and this may have implications for blood pressure management during CPB.

Dr. Jeffrey Heinle (Texas Children's) then gave an excellent update on advances in ACP (antegrade cerebral perfusion), originally referred to as low flow cerebral perfusion (LFCP), its indications and how it is accomplished. He reviewed the literature comparing

LFCP/ACP with deep hypothermic circulatory arrest (DHTCA) and explained that many of the studies failing to show a benefit of antegrade cerebral perfusion may not have been providing adequate substrate to the brain. He cited data suggesting the need for a minimum flow of 50 ml/kg/min to get adequate cerebral perfusion. He then reviewed their approach to cerebral protection at Texas Children's Hospital which includes attention to NIRS, transcranial doppler (TCD) measurements, pH stat ABG management and adherence to adequate levels for hct and MAP. All of which are used to titrate ACP.

Session II, "Safe Sweets! Glucose Management in Pediatric Cardiac Surgery" was moderated by Dr. Nina Guzzetta (Emory) and began with a review of glucose management by Dr. Ian James (Great Ormond Street). Dr. James reviewed the physiology of glucose control and the causes of perioperative hyperglycemia including the type of anesthesia, choice of fluid for pump prime and the use of stored blood with high glucose content. The use of non-pulsatile perfusion, alterations in body temperature, administration of steroids and exogenous catecholamines all play a role in perioperative hyperglycemia.

This was followed by a Pro-Con Session. Dr. Barry Kussman (Boston Children's) presented arguments for tight glycemic control in the preoperative period and Dr. James Steven (Children's of Philadelphia) the opposing opinion. Dr. Kussman began the "Pro" session by reviewing the detrimental effects of excessive blood glucose on fluid balance, inflammation, endothelial function and the coagulation system. The uptake of excessive amounts of glucose independent of insulin mediated uptake may be especially toxic to mitochondria in the cells of tissues throughout the body. Dr. Kussman then reviewed the inception to Intensive Insulin Therapy (IIT). Although results have been mixed, data does support a decrease in mortality in postsurgical patients managed with IIT. Studies suggesting an association between hyperglycemia and poor outcome in children undergoing open heart surgery were contrasted with other studies that failed to show evidence of such an association. Dr. Kussman reviewed the first prospective study of IIT in pediatric critical care, 75% of which were postoperative cardiac surgery patients. In general the IIT patients fared better with shorter ICU stays and a lower mortality rate in the ICU. Another study was able to demonstrate a significant modulation of the intraoperative systemic inflammatory response in pediatric cardiac surgery patients managed with insulin therapy.

Dr. Kussman discussed the major risk of IIT, which is hypoglycemia. A retrospective study suggests a greater index of morbidity and mortality in children with intraoperative blood sugars below 75 mg/dl. A prospective study was noted to report a 25% incidence of hypoglycemia in children managed with IIT. The need for close glucose monitoring was emphasized. Dr. Kussman concluded by stressing the need for further studies to determine the real benefits and risks of tight glycemic control in critically ill children and how to avoid the toxicity of excessive intracellular glucose.

Continued on page 8

Dr. James Steven then presented the “Con” session, citing many of the retrospective studies that failed to show an association between hyperglycemia and poor neurological outcome. He also noted a Cochrane review that concluded there was insufficient evidence to support tight glycemic control. He also noted that some of the retrospective data on children suggests that lower intraoperative blood sugars may be associated with an increased risk for morbidity. He emphasized the need for better blood sugar monitoring technology in order to avoid the potentially devastating effects of hypoglycemia.

The consensus during the question and answer period was “avoid hypoglycemia!”

Session III, “Pulmonary Hypertension: An Update”, moderated by Dr. Anshuman Sharma, started off with a review of the pathophysiology of pulmonary hypertension (PHTN) by Dr. Jeffery Fineman (UCSF). Dr. Fineman noted 2 primary types of PHTN, that associated with increased pulmonary blood flow and the other associated with veno-occlusive disease. He reviewed two common grading systems for PHTN, those by Heath Edwards and Rabinovitch. He then focused on endothelial causes of PHTN and reviewed the history of endothelial derived relaxant factor (EDRF) and the eventual discovery of nitric oxide (NO) as a regulator of vascular smooth muscle. Three endogenous mechanisms for regulation of pulmonary vascular tone were discussed; NO, Prostacyclin and Endothelin. Dr. Fineman discussed each of these in detail, especially as they pertained to abnormal increases in pulmonary vascular tone and the implications for therapeutic interventions. It was an excellent review of pulmonary vascular pathophysiology.

Dr. Robert Friesen (The Children’s Hospital, Denver) then provided a concise review of the perioperative care of children with pulmonary hypertension. He discussed management of a pulmonary hypertensive crisis and reviewed the medications available for treatment of PHTN, focusing on those that can be used in an acute care setting. These included inhaled NO, prostacyclin analogs (IV and inhaled) and phosphodiesterase inhibitors (IV and inhaled). Dr. Friesen also provided his approach to the anesthetic care of children with PHTN, emphasizing a cautious, balanced anesthetic technique.

Dr. David Vener (Texas Children’s) concluded this session with a lunch-time introduction to the Society of Thoracic Surgery Congenital Heart Surgery Database. The database is an exciting repository for detailed information of patients’ cardiac and non-cardiac pathology and history, preoperative events/conditions, surgery performed and cooling and myocardial preservation techniques. The database now also includes detailed information on anesthetic techniques, intraoperative cardiovascular medications, physiologic monitoring, blood product usage and medications on arrival to the ICU/PACU. All patients have unique identifiers that will allow their data to be tracked anonymously even if they go to multiple different providers for their surgical care. The opportunity for research and establishing best practice recommendations is staggering. This would all be done in a way that would allow each institution to maintain anonymity. Dr. Vener emphasized the need for quality data and centers should support local resources to assure that properly trained personnel are in place to complete the data entry forms.

Afternoon Session

By Barry Kussman, MD, BCh
Boston Children’s Hospital

Session IV, “Study of a Lesion: CAVC” was moderated by Dr. Wanda Miller-Hance (Texas Children’s) and was an excellent session of an in-depth review of atrioventricular canal (AVC) defects (approximately 4% of congenital heart disease). Dr. Deborah Kearney (Texas Children’s) presented a pathologist’s perspective, discussing the embryology of the AVC, the classification of AVC defects (complete, partial, transitional), unique anatomic features (bal-



Dr. Kussman

anced versus unbalanced, gooseneck deformity and left ventricular outflow tract obstruction, Rastelli classification), common associated anomalies (trisomy 21, tetralogy of Fallot, single ventricle), and the abnormal location of the atrioventricular node and bundle of his predisposing to conduction defects with surgical repair. Dr. Isobel Russell (UCSF) reviewed the transesophageal echocardiographic evaluation of AVC defects, emphasizing the views of interest, the goals of the pre- and post-bypass examinations, and the importance of communicating residual defects (shunt, atrioventricular valve regurgitation or stenosis, left ventricular outflow tract obstruction, associated anomalies) and ventricular function to the surgeon. Dr. Jeffrey Heinle (Texas Children’s) a cardiac surgeon, reviewed the types of surgical repair for complete AVC defects (single patch, two-patch, modified single patch), demonstrating the complexity of some of the lesions and the associated difficulty of repair by showing great video of the surgeon’s view. He stressed the abnormal location of the conduction system, and that although trisomy 21 is present in about 60% of children with AVC defects, some of whom also have tetralogy of Fallot, associated cardiac anomalies are generally more common in the non-Downs canal defects. Following questions and discussion, anatomic specimens were available for examination and discussion with Deborah Kearney.

Session V, “Pacemakers and Defibrillators-An Interactive Workshop” was moderated by Dr. Steve Auden (Kosair Children’s). Dr. Naomi Kertesz (Texas Children’s) a cardiac electrophysiologist with a great sense of humor, discussed the salient points for pacemakers (PM) and defibrillators. Two important points were: (1) Although placing a magnet over a PM will most often produce asynchronous pacing at the magnet rate (varies by brand of PM), it can cause cessation of pacing if the device is at the end of its service life; and (2) with cardioversion or defibrillation, it is essential not to place the paddles/pads over the generator as the current will not only damage the generator but has the potential to travel along the leads and burn a hole in the heart. Naomi then went through

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Reviews of SPA/AAP sessions

This year's Society of Pediatric Anesthesia (SPA)/American Academy of Pediatrics (AAP) 2010 winter meeting was held in San Antonio, Texas. Attendance was at a record high this year of over 700 registered attendees. Program Chair Dr. Linda J. Mason (Loma Linda University) SPA President Dr. Joseph Tobin (Wake Forest University) and Chair, Section on Anesthesiology & Pain Medicine, American Academy of Pediatrics Dr. Constance S. Houck (Boston Children's Hospital) provided welcoming remarks.

First Session

Submitted by Helen V. Lauro, MD, MPH, FAAP

*SUNY-Downstate Medical Center
The Long Island College Hospital*

In the first morning session "Anesthesia Outside the Operating Room" moderated by Dr. Joseph P. Cravero (Dartmouth Hitchcock), Dr. Lynne G. Maxwell (CHOP) discussed New Challenges in MRI.

She opened with important recent advances in MRI technology which pediatric anesthesiologists need to know about that directly impact patient care. More powerful magnets such as 3 Tesla (T) provide improved resolution, higher signal: noise ratio (SNR), and reduced scan time compared to their 1.5T predecessors and these result in previously unattainable scans such as "propeller blade sequence" which facilitates good images with reduced motion artifact even without breath holding, and "blood oxygen level-dependent contrast functional imaging" (BOLD Fmri) which improves imaging of white matter (deoxygenated hemoglobin is actually contrasted with neural structures!)

She advised we must be mindful of the downsides of stronger magnets such as the 3 T over 1.5 T including higher radiofrequency energy and specific absorption rate (SAR), higher acoustic noise, increased artifact, and greater safety risks. She delved into the safety issues of surprising ferromagnetic objects such as pilot balloons on laryngeal mask airways, intravenous injection ports, and metal springs. The need to always remove the patient from the scanner in case of emergency was reinforced.

The obsolescence of the terms "MRI Safe" and "MRI Unsafe" was underscored in comparison to "MRI Conditional" which communicates that some objects such as Medfusion® 3500 pump may be safe in 1.5 T MRI environment but not in another with >3.0 T. She concluded that technology will continue to advance and as pediatric anesthesiologists we must anticipate even more powerful magnets up to 8 T.

Pertinent to our daily practice, Dr. Maxwell recommended a summary of MRI device and implant safety information available at <http://www.MRIsafety.com/list.asp> and free MRI safety videos at <http://www.imrser.org>.

Dr. Jeana E. Havidich (Medical University South Carolina) discussed Pediatric Sedation-Who Does or Should Provide This Service? She opened with the conundrum of who should be pro-

viding pediatric sedation services and offered advantages and disadvantages of six pediatric sedation models including traditional anesthesiologist provider, pediatric emergency medicine provider, hospitalists, pediatricians, advance practice nurses, and specialist and sedation nurses.

Issues of approved medications for sedation and credentialing were analyzed in real world pediatric sedation practice examples against the backdrop of sedation failure rates and adverse events. She concluded that the role of the anesthesiologist must shift from provider to leader – becoming active, defining safety and acceptable adverse events, providing standards and policymaking on credentialing, and taking responsibility in education.

Second Session

Submitted by Cheryl K. Gooden, MD, FAAP

Mount Sinai Medical Center, NY

The second session on Friday morning, "The Pediatric Patient with Chronic Pain", was moderated by Dr. Santhanam Suresh (Children's Memorial Hospital) who provided an overview of recent advances and research in the care of the pediatric patient with chronic pain.

The first speaker, Dr. K.J.S. "Sunny" Anand (Le Bonheur Children's Medical Center) presented Prolonged Opioids, Pediatric Patients, and Problems. Dr. Anand elaborated on this topic through the case presentation of a 4-month-old (6 kg), ex-preterm infant on a prolonged fentanyl infusion. The problem encountered was weaning this infant from postoperative analgesia. He discussed the early as well as current data on the topic of opioid withdrawal in PICUs. Of particular note was the 16.6% incidence of opioid tolerance in U.S. PICUs. The mechanisms of opioid tolerance and factors affecting opioid tolerance



Dr. Gooden



Dr. Lauro

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CCAS Meeting, from page 8

the process and provided important tips for programming the Medtronic temporary PM. She then discussed her technique for interpreting an ECG trace with a PM, which is to ask 3 questions: Are there PM spikes? Is there capture? Is there non-capture? Using this approach, the workshop involved interpretation (followed by Naomi's review) by the audience of ECG tracings with associated clinical scenarios (always a learning experience, even for 'expert' cardiac anesthesiologists!).

The final session, Session VI, was a lively Cardiac Jeopardy with questions and answers moderated by Dr. Anthony Clapich (Children's Hospital of New York).

were highlighted. Several clinical evaluation methods and a withdrawal assessment tool were discussed. In addition, Dr. Anand emphasized the management of opioid withdrawal. Both short-term therapy (7-14 days) and long-term therapy (> 14 days) protocols were addressed. He concluded with the need for further research in pediatric patients.

The final speaker in this session was Dr. Steven Weisman (Children's Hospital of Wisconsin) who presented Anesthetic Considerations for Patients with Chronic Pain. Dr. Weisman reviewed common medications used in chronic pain patients. He noted the challenges and considerations encountered by the anesthesia provider in the care of the chronic pain patient. He emphasized pharmacogenetic considerations involved with post-operative pain management. In addition, Dr. Weisman outlined differences between the chronic pain patient and the opioid-abusing patient.

Final Morning Session

Submitted by Constance Monitto, MD

Johns Hopkins Children's Center

The final session of the morning, "An Update on New Monitoring Devices for the Pediatric Patient – Do They Make a Difference in Outcomes?" was moderated by Dr. C. Dean Kurth (Cincinnati Children's). The first topic was presented by Dr. Chandra Ramamoorthy (Stanford), Near infrared cerebral oximetry – Is it ready for prime time yet? The goals of Dr. Ramamoorthy's presentation were to provide an understanding of cerebral oximetry in terms of its technology, impact on outcomes, and clinical applications. Interestingly, in polling the audience at the beginning of the presentation it was determined that 50% of respondents were already employing NIRS in their practice.

NIRS monitors are optical spectrometers. Near-infrared light is generated, travels through tissue, is differentially absorbed by chromophores depending on their oxygen-binding state, and is then emitted. A light detector measures the intensity of the emitted light, and a computer algorithm translates this value into information, such as HgbO₂. Presently, monitoring devices are most frequently placed on the forehead and provide information regarding oxygenation in deeper parts of the brain. In contrast to pulse oximeters which differentiate pulsatile arterial blood from nonpulsatile blood, NIRS measurements are predominantly venous weighted. This difference allows the devices to provide information on pulseless patients, and makes the technology particularly useful during cardiopulmonary bypass, hypothermic circulatory arrest, and shock.

There are presently four commercial devices on the market, the InVivoS 5100, Niro 500, Nonin, and Foresight monitors. While each device uses a proprietary algorithm and reports results differently, the InVivoS and the Nonin monitors utilize a LED light source. In contrast, the Foresight device uses a laser light source and is marketed as providing an absolute, as opposed to a trend, measurement of tissue oxygen saturation. However, it is unclear if the laser devices will be sturdy enough for the operating room environment. Neither the Niro 500 nor the Nonin device are currently approved by the FDA for use in children.

Human and animal studies both suggest that NIRS values correlate well with jugular venous O₂ saturation, and that duration and extent of ischemia (in general, when ScO₂ values are <45%) correlate with neurological outcome. A recent review of the use of NIRS in cardiac surgery concluded that judicious use of the moni-

tor reduced major organ morbidity and mortality. Beyond cardiac surgery the indications for use may expand in the near future. Use of the InVivoS 5100 probe has been approved to study enteral perfusion, and use of the monitor may become more prevalent in caring for critically ill neonates. One limitation to this expansion of use is price as each probe costs over \$100.

Dr. Peter N. Cox (Hospital for Sick Children, Toronto) reviewed the history of blood oxygen identification and measurement in his presentation, Non-Invasive Multimodal Monitoring. He noted that initial measurements were obtained with arterial blood, however, this technique provides only intermittent information. Non-invasive oximetry became clinically available in the 1980's, but its utility was originally limited by the occurrence of many false alarms, and monitoring difficulties in patients with low perfusion. Newer monitors are designed to minimize the impact of electrical noise and ambient light interference. The development of signal extraction technology, as well as improved sensors, have helped to diminish the impact of movement artifact and to provide more accurate information in cyanotic patients. In addition, the FDA has recently approved the Rad-57, a new device that employs co-oximetry and measures multiple wavelengths of light in order to determine total Hgb, oxygen saturation, and carboxy- and methemoglobin levels. While this information is not obtainable with our current monitors, the need and importance of this new device in the OR setting is still not certain.

Next, Dr. Monica S. Vavilala (Harborview Medical Center) spoke on the topic Continuous Glucose Monitoring and Outcomes. This talk focused on the impact of impaired homeostasis in critical illness and perioperative outcome, and evaluation of glucose monitoring technologies. It is known that general anesthesia and surgery impair glycemic control, and resultant hyperglycemia can produce a proinflammatory, immunosuppressive, procoagulant condition. Over 80% of critically ill children have glucose dyshomeostasis, while 20% of pediatric patients with traumatic brain injury (TBI) have persistent hyperglycemia which is associated with increased mortality. However, hypoglycemia has also been associated with increased morbidity and mortality. Thus, it is unknown whether tight control of glucose will improve pediatric outcomes or just increase the incidence and complications of hypoglycemia.

These uncertainties led to a retrospective cohort study of the incidence and risk factors for perioperative hyperglycemia in children with TBI at Harborview Medical Center. In this study it was determined that among patients with TBI who died, the most common pattern was persistent hyperglycemia (pre-, intra-, and post-operative), with predictors of hyperglycemia including young age, severity of TBI, and multiple lesions with subdural hematoma. However, they also noted that hypoglycemia was not a rare finding in these patients. These results have led to their advocacy of more frequent glucose sampling during the perioperative period.

Options to monitor serum glucose include intermittent blood sampling in which samples are sent to a central lab. This testing is inexpensive and accurate, but has a turnaround time of about 30 minutes. A second option is point of care testing. While this technique is used, problems include variable accuracy, as well as a lack of validation in the OR setting. Therefore, current recommendations are that point of care devices should not be used in the perioperative setting or in trials. A third technique is the use of continuous subcutaneous monitors. These devices utilize enzymatic sensors that are inserted subcutaneously into the abdomen. Microdialysis fluid is extracted and blood glucose is estimated by measurement of interstitial fluid glucose concentration. These monitors have been studied in patients with IDDM, and seem to

*Greater than 20% of the US population
over the age of 12 years admits to
drug misuse in their lifetime.*

provide better HgA1C control in adults, but no difference was noted in children. They have also been employed to monitor blood glucose in preterm and term neonates, and did allow for the detection of asymptomatic hypoglycemia. However, it is unknown presently whether this technique will be suitable in the perioperative period as perfusion can be variable with surgery and this may impact results. Finally, the newest technology that is being employed is intravenous microdialysis catheters which will require further study.

The final topic of the morning was Echocardiography for Everyday Anesthesia presented by Dr. Lauren J. Cornella (Brigham and Women's Hospital). Dr. Cornella began her discussion by detailing the different classes of indications for the use of echocardiography in the perioperative setting. Class I indications include conditions for which there is good evidence that the procedure is useful and effective. These include utilization during complex, at times congenital, heart surgery. Class II denotes conditions for which there is conflicting evidence/opinion regarding the efficacy of a procedure. These include patients at increased risk for myocardial ischemia or in whom cardiac trauma is suspected. Of particular importance to non-cardiac anesthesiologists and patients undergoing non-cardiac surgery are Class IE indications, which include the use of TEE as a "rescue" diagnostic tool in patients who suffer intraoperative cardiac arrest. In studies of this indication, TEE has been shown to frequently provide additional diagnostic information and guide changes in treatment. However, there are no studies for this indication in children. Because of the importance of TEE in the rescue situation, Dr. Cornella reviewed the three important images related to performing a Class IE examination - the midesophageal four chamber view, the midesophageal long axis view, and the transgastric mid-papillary short axis view. These views were demonstrated to provide a rapid assessment of ventricular and valvular function and volume status, and allow assessment of important causes of hemodynamic instability.

In terms of safety, intraoperative echocardiography is generally safe, but not without complications. A retrospective study of 7200 adult cardiac surgical patients at the Brigham and Women's Hospital reported no mortality, but a morbidity of 0.2%, while a study of 1650 children having cardiac surgery at the University of Washington reported a 3.2% incidence of TEE associated complications, with complications more prevalent in smaller and younger patients.

Finally, Dr. Cornella focused on extending basic TEE certification to practitioners in the OR. While certification in transesophageal echocardiography for anesthesiologists began in 1998, with the increased use of TEE in noncardiac surgery, the National Board of Echocardiography has just introduced a formal basic TEE certification program this year. The goal focus is to allow providers to become proficient on intraoperative monitoring of non-cardiac surgical patients, and may most easily be achieved by incorporating TEE training into residency programs.

Prior to lunch, the AAP Robert M. Smith Award Presentation was held (see page 17). Under the moderation of Dr. Constance Houck and after an introduction by Dr. Mark Rockoff, Dr. Theodore Striker presented the coveted award to Dr. Juan F. Gutierrez-Mazorra.

AAP Advocacy Lecture

Submitted by Linda Georges, MD
University of North Carolina



Dr. Georges

During lunch, the AAP Advocacy Lecture "For Pain and Gain: Prescription Drug Abuse by Adolescents" was presented by Dr. Janet Williams (University of Texas), Chairman, AAP Committee on Substance Abuse. Dr. Williams' goals for the lecture included a review of trends in prescription drug use in adolescents and young adults, the relationship between prescription drug use and other substance abuse behaviors, the challenges of effective pain management with respect to addiction risks, and the introduction of practice techniques that can identify risks and facilitate substance abuse treatment.

When discussing substance abuse, Dr. Williams emphasized that there is no universal agreement on terms, therefore the topic is often confusing. She uses the term misuse to mean "not medically indicated", while substance abuse may include dependence, addition, and diversion. The problem in the United States at the current time is huge. Greater than 20% of the US population over the age of 12 years admit to drug misuse in their lifetime. 6.2 million people are currently misusing drugs with 44% of these individuals under 18. One out of eight high school seniors has tried opioids. The addiction rate in chronic pain patients ranges from 3-19%.

Adolescents are at particular risk for a number of reasons. Their brains, including the frontal and pre-frontal areas, which control impulsive behavior, continue to mature well into the third decade. Their goals are to form their own identity, no longer be dependent on their parents, and to seek autonomy and emancipation. Adolescent drug abuse has been tracked since 1975 by the Monitoring the Future Study at the University of Michigan (monitoringthefuture.org). Their goal is to follow the behavior, attitudes and values of high school students, college students and young adults into their 40's. Originally reporting only high school seniors, since 1991 the data have included 8th and 10th graders as well.

The data have shown that alcohol is involved in one third of teen deaths, including accidents, homicides and suicides. More than 50% of twelfth graders have used illicit drugs, and 25% are still using. The top three drugs used are alcohol, marijuana and tobacco. The fourth most commonly used are prescription and OTC drugs, particularly dextromethorphan. Those at highest risk are Whites, Hispanics, African Americans, males, females, teens out of school and students in school.

Why are prescription drugs considered "safe" by adolescents? They are "prescribed" by doctors, so they are not illegal. They are made in clean, controlled facilities, so that the contents are pure and not contaminated with unknown substances. They come in unit doses, so overdose is less of a problem. There is no shame, since they are legal drugs. They are also "free", since the most common source is the family medicine cabinet, relatives or friends. Elderly grandparents are commonly on multiple medications, so it is difficult for them to track their quantities. So, lock your medicine cabinet! Other sources include the family doctor and, less frequently, the internet. Current favorite prescription drugs include the opioids Vicodine and Oxycontin (10% of high school seniors report daily use), the stimulants Ritalin 2%, Adderall 5%, Provigil 2%, and the CNS depressant barbiturates and tranquilizers 5-10%.

Safe prescribing techniques for pediatricians in office and emer-

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gency department practices include the SBIRT screening tool: Screening, Brief Intervention, and Referral for Treatment. You must evaluate whether the pain is acute or chronic, know your resources, refer complex cases, and closely follow up and monitor the patient.

The treatment of chronic pain can be very challenging: Beneficence (relieve the pain) vs. Non-maleficence (first, do no harm). All patients deserve close follow-up, monitoring and realistic expectations. Avoid over or under treatment. An action-oriented short time frame is most successful.

When assessing a teen's risk for drug use/abuse, the AAP's Behavioral Health Screening Tool for Patients under 21 Years Old: CRAFFT, can be employed. You must also assess family problems, any risk of abuse, and mental health issues. The office environment must be absolutely confidential and the examiner should encourage honest answers (tight and safe). Post your policies and educate your staff.

The CRAFFT questionnaire includes:

- C: Car - Have you ridden in a car driven by someone, including you, who is high on alcohol or drugs?
- R: Relax - Do you use alcohol or drugs to relax, feel better, fit in socially?
- A: Alone - Do you ever use alcohol or drugs while alone?
- F: Forget - Do you forget things that you did while using alcohol or drugs?
- F: Family/friends - Do family members or friends tell you to stop drinking or using drugs?
- T: Trouble - Have you gotten in trouble while using alcohol or drugs?

If the patient answers "no" to the first three questions, congratulate him or her on good behavior. If the responses are positive, complete the survey and take action. Triage the patient's risk. If it is low, you may follow the patient yourself. If the risk is moderate, you may ask for assistance from a colleague and co-treat the patient. If the risk is high, refer the patient to a specialist.

For those physicians prescribing opioids for pain, the difference between tolerance and abuse must be understood. Tolerance, or the increasing amount of medication needed to relieve pain with continued use, is almost always present with opioid medications. It does not equal addiction. These patients have a stable pattern of use. Withdrawal occurs with all opioid use, both long and short term, even when used correctly. Abuse occurs when opioids are used for non-medical reasons. Dependence and addiction are synonymous terms. Such behaviors include craving, compulsive use, loss of control over use, use despite harm to self, and maladaptive behavior associated with use. These patients are preoccupied with obtaining the drug. Also be aware of maladaptive 'street' behavior, such as selling and sharing.

Make a contract to avoid drug abuse by your patients: Limit the patient to one physician and one pharmacy (no missed appointments, no doctor shopping, no lost prescriptions, no early refills). Follow up closely (monitor use, pill counts, ED visits, urine screens). Educate the patient and family concerning drug use and side effects (get parents/adults to administer medications). Maximize non-opioid, non-prescription medications. Rotate drugs. Have realistic expectations. Enforce disciplinary action if the contract is broken.

Avoid pseudo-addiction, a condition which occurs when pain is under-treated by the physician. The patient's need for the appro-

priate amount of drug to treat his or her pain leads to aberrant behavior such as hoarding, drug seeking, requesting specific drugs, and requesting more drugs. There is a large anxiety component. There is some crossover with addiction, so consider this diagnosis and determine if the patient is being appropriately treated.

In summary, when prescribing opioids to patients, first, do no harm. Provide maximum pain relief with minimal side effects. Help with patient concerns. Refer for needed expertise or advice. Remember that recovering addicts can have pain, too. Their pain medications can be managed safely by the "right" people.

Friday afternoon provided wonderful Refresher Courses on The Pediatric Jehovah's Witness and Other Dilemmas presented by Dr. Samuel Wald (UCLA) and Pediatric Airway Management: Current Modalities presented by Dr. Paul Stricker (CHOP). Workshops were then available to attendees along with an exciting round of Jeopardy with Drs. Myron Yaster (Johns Hopkins) and Frank McGowan (Boston Children's) which concluded the day's session.

Saturday Morning Session

Submitted by Elizabeth Yun, MD
University of Wisconsin



Dr. Yun

Saturday brought another excellent Core Lecture session with the topic of "The Pediatric Patient with Neurologic Disease" moderated by Dr. Randall Flick (Mayo Clinic). Cerebral Palsy: An Update on Perioperative Management was presented by Dr. Mary Theroux (A.I. duPont Hospital for Children). This lecture provided an overview of the perioperative issues unique to cerebral palsy patients.

The current incidence of cerebral palsy is 2 out of 1000 live births. Many of these patients have spastic quadriplegia and seizures. While most anticonvulsants are relatively benign, some newer ones have serious side effects that the anesthesiologist needs to be aware of preoperatively. One relatively new anticonvulsant used is Topiramate, a drug also used to treat migraines. There have been several case reports of this drug causing closed angle glaucoma. The onset usually occurs weeks after starting the drug. However after a case with prolonged prone position and fluctuations of venous blood pressure, there was an onset acute onset of glaucoma. Patients on this medication should have a postoperative ophthalmologic exam to monitor and treat closed angle glaucoma. In general, anticonvulsant medication levels can fall after surgery, leading to seizures and status epilepticus. A medical care team should follow these patients postoperatively to ensure that all medications are properly managed. Cerebral palsy patients have temperature instability with a tendency towards hypothermia. During line placement prior to large surgeries, these patients acutely drop their body temperature. As a preventive measure, these children can have a Bair Hugger placed on them to warm them preoperatively. Their temperature should be monitored at all times because they have a tendency to overheat as well with the Bair Hugger.

Cerebral palsy patients also have an abnormal response to succinylcholine. Succinylcholine has a significantly lower ED 50 in cerebral palsy patients compared to normal children. Meanwhile

nondepolarizing muscle relaxants have a prolonged ED50. This phenomenon may be due to an abnormal neuromuscular junction and increased acetylcholine receptors. Recent studies that directly exam the neuromuscular junction from muscle biopsies show that 30% of cerebral palsy patients have an abnormal distribution of acetylcholine junctions or abnormal neuromuscular junction morphology. From this research, succinylcholine must be given carefully in this patient population.

The most important intraoperative concern for these patients is intraoperative bleeding since these patients tend to bleed more during large surgeries (ie. spinal fusion) due to multiple factors. These patients present to surgery chronically underhydrated because they are often fed by gastrostomy tube or need assistance with eating. As a result of this state, they often have increased hemoglobin and more concentrated urine. Several studies suggest that these patients have suboptimal clotting factors as indicated by abnormal TEG. Other studies have shown that PT/PTT/factor levels decrease faster in these during surgery compared to normal patients. Management principles include early transfusion of fresh frozen plasma and cryoprecipitate, keeping the hemoglobin greater than 10 gm and platelets greater than 100,000 and early transfusion of platelets in patients on multiple antiseizure medications.

The major issue these patients face postoperatively is spasm. Many cerebral palsy patients have crippling spasticity. Management includes diazepam and baclofen. Surgical interventions include botulinum toxin injection dorsal rhizotomy. Postoperatively it is important to treat the spasticity as well as pain. Regional anesthesia, especially in lower extremity surgery is very useful in controlling postoperative spasm. If regional anesthesia is not an option, the spasticity can be alleviated with oral medications such as diazepam and baclofen. Because of the seriousness of this problem and the lack of data on effective interventions, the American Academy of Neurology stated recently that there is an urgent need for more research into this issue.

The next lecture was Autism and AD/HD: An Overview of Current Concepts and Controversies by Dr. William Barbaresi (Boston Children's). This lecture reviewed the diagnostic criteria, treatment, current controversies and research about autism and ADHD.

Autism is part of a broader category of developmental disorders called pervasive developmental disorders, although these definitions may change. This category includes, autism, Asperger's and Pervasive Developmental Disorders –Not Otherwise Specified. All pervasive developmental disorders are characterized by severe and pervasive impairment in reciprocal social interactions, communication skills and stereotyped behaviors. It is important to remember however, that not all children with communication disorders are autistic. For example, Asperger's is a condition where children have some but not all the characteristics of autism. The psychological features of autism include impaired intellectual function, with 60 to 75% of autistic patients having an IQ in the mental retardation range with the greatest difficulty in language-based tasks. They also have absent joint attention, the defining characteristics of autism (the ability of a child to share interest through eye contact with another person with an example being that the child will actively engage the attention of the mother to get something). Autistic children also have an absent or underdeveloped ability to perceive and comprehend the thoughts and feelings of other people (theory of mind). They have an absent or delayed communicative language and instead rely on grunting, touching and pulling or idiosyncratic language.

Treatment for autism falls into several approaches: behavioral, medical and educational. The behavioral treatment is applied behavior analysis and is based on the principles of operant conditioning. Children undergo intensive training of specific social, communicative and behavioral skills that are explicitly reinforced.

It requires careful data collection to determine the progress and treatment efficacy. While this method has shown some improvement in long-term development and prognosis, most of those patients that benefited were less severely affected. The educational approach involves the TEACCH program, an adaptive program to help these children function better. This program takes advantage of the children's strength in visually-based cognitive skills. Children use visual schedules, structured physical environment to help them learn to function as independently as possible. Medical treatment focuses on controlling behaviors associated with autism such as irritability, stereotypy and hyperactivity. Antipsychotics (risperidone) and stimulants have been shown to help these behaviors, however no medication is available to treat the core symptoms of autism. The prognosis of this disease is variable and difficult to predict because most studies focus on a prior older population that did not have the same treatments available today. Factors that may be associated with a favorable outcome are acquisition of useful language before age 5, nonverbal IQ>60 and early intensive intervention. About 15-20% of children with autism develop epilepsy with a bimodal onset at infancy and again in adolescence.

The prognosis of this disease is variable and difficult to predict because most studies focus on a prior older population that did not have the same treatments available today.

Two major controversies surround autism. The first involves the rising incidence of autism. The prevalence of autism is as low as 10 in 10,000 from studies done in the 1980's to 30-50 per 10,000 according to recent work. As of December 2009, the CDC has stated that 9 per 1000 children age 8 have autism. Problems with the existing literature include small sample size, method of case identification and studies that focused on prevalence and not incidence. Another controversy was the evidence of a link with GI disorders and autism. The Wakefield report had suggested this link but has since been retracted because of faulty pathology slides and dishonest research practices. Population based studies done since then have shown no difference in the overall incidence of GI disorders. A potential medical treatment for autism involves the Fragile X Syndrome gene, FMR1. This gene encodes the Fragile X mental retardation protein and represses mRNA translation at excitatory glutamate rich synapses. A group of receptors, mGluR5 receptors, are important in synaptic protein synthesis. FMR1 knockout mice displayed the phenotype characteristic of Fragile X syndrome. However, double knockout mice (FMR1 and a 50% reduction in mGluR5 receptor) showed improvement in the symptoms of Fragile X. Therefore, medications that block this receptor may reverse the learning abnormalities. These studies may help to understand the neurophysiological processes that underlie developmental disorders.

Dr. Barbaresi also covered the topic of attention deficit/hyperactivity disorder (AD/HD). AD/HD is defined by the DSM IV as a triad of behaviors: inattentiveness, hyperactivity and impulsivity. The definition is imperfect because there are no biomarkers for AD/HD. The neuropsychological basis of AD/HD is thought to be a disorder in behavioral inhibition. Behavioral inhibition is the ability to stop an ongoing response thus permitting a delay in the decision to respond or not. Patients with AD/HD lack this inhibition. The biggest concern of children with AD/HD is the co-development of other psychiatric disorders such as mood disorders and antisocial behaviors in 50% of children by the age

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of 19. About 60% of these children also have at least one learning disability in reading written language and math by age 19. Therefore early behavioral intervention is crucial in managing AD/HD. The best approach involves concrete reinforcement of behaviors by parents and teachers as well as changing the learning environment to help compensate for the symptoms (ie. having a smaller class size to help with learning). There have been numerous studies regarding the effects of stimulant therapy that showed improvement in the core symptoms of AD/HD and short-term academics. The effect on long-term outcomes of stimulants is not as clear. However recent studies agreed with the earlier efficacy studies that showed that long-term stimulant therapy is associated with decreased frequency and cost of emergency care for these patients. Stimulants also decreased the risk of substance abuse, especially with boys. Stimulants also appeared to help with learning as noted by decreasing grade retention, absenteeism and improved reading. Future studies are now looking for biomarkers and genetic markers for ADHD that will help guide selection of optimal treatment and development of new treatments.

There have been numerous studies regarding the effects of stimulant therapy that showed improvement in the core symptoms of AD/HD and short-term academics.

The final didactic lecture in the Saturday morning session was Anesthetic Issues in Children with Neurologic Diseases by Dr. Robert Rust (University of Virginia). In this lecture, Dr Rust reviewed anesthetic issues with regard to multiple neurological conditions. In general, children with neurological diseases have cortical issues, visual or hearing disturbances, oropharyngeal and pulmonary mechanical problems, reflux, cervical instability and torticollis, contractures, hypotonia, movement disorders, and/or seizures. The first topic was an approach to epilepsy. General anesthetic management concepts involve avoiding prolonged preoperative fast, continuing anticonvulsant medications preoperatively and postoperatively, and care with hyperventilation and hypocarbia to prevent decreased cerebral blood flow. Many anesthetic agents may be useful in treating diazepam-resistant seizures. Some anesthetic agents have a proconvulsant activity, including etomidate, enflurane and sevoflurane. With sevoflurane, children appear to be vulnerable to either focal or generalized seizures, especially if they have epilepsy. These seizures are seen during a high dose, rapid induction, although the response may be suppressed with nitrous oxide. Nitrous oxide has little proconvulsive or anticonvulsive activity. Isoflurane and desflurane have little proconvulsive and may even be a valuable anticonvulsive agent. The barbiturates are anticonvulsants except for methohexital, which can be excitatory during induction and may be a proconvulsive agent at low doses. Ketamine may increase seizure risk in epileptics although there may be little risk of seizures in well-controlled patients. Propofol is a cortical depressant that can be used in the treatment of seizures including status epilepticus. However it can cause hypotension and metabolic acidosis so it should be replaced with other agents as soon as possible. Critically ill children with acute neurological or inflammatory diseases on propofol infusion are at higher risk of developing propofol infusion syndrome compared to adults. These patients have cardiac failure, severe metabolic acidosis, rhabdomyolysis and renal failure after being on high dose propofol. Since propofol is a potent inhibitor of complex 1 electron chain,

this leads to impaired free fatty acid utilization and a mismatch of energy supply and demand. Patients receiving propofol have movement abnormalities in the induction phase. There are many anesthetic agents besides propofol that may induce mitochondrial damage such as isoflurane, halothane, barbiturates, nitroprusside and haloperidol. Nondepolarizing muscle relaxants can have a lower than expected duration of action on patients taking hepatic enzyme-inducing antiseizure medications, so these should be titrated carefully.

The second part of this lecture reviewed various neurological conditions and their anesthetic considerations. Leigh Disease or subacute necrotizing encephalomyelopathy is due to a decrease in the PDH complex and electron chain leading to weakness, seizures, ataxia, and ophthalmoplegia. Brain scans show progressive symmetric necrosis in the basal ganglia, brainstem and periaqueductal gray matter. For these patients, avoiding stresses that increase energy demand such as prolonged fast, hypoglycemia, and hypercarbia is important. Barbiturates and volatile anesthetics may compromise mitochondrial respiratory function. Malignant hyperthermia is an inherited myopathy-related vulnerability that is classically associated with a mutation in the ryanodine receptor (RyR1). Volatile anesthetics and succinylcholine are triggers for this vulnerability with children being more susceptible than adults. There is a rhabdomyolytic variant of malignant hyperthermia that causes increased potassium, CK enzymes and myoglobin. Fifty percent of these patients will have a normal muscle test and a normal RyR1 receptor. The fever is of late onset and is more likely seen in patients with myopathies. Myopathies that are associated with malignant hyperthermia are King Denbrough Syndrome, succinylcholine induced trismus, Duchenne's and Becker dystrophy and central core disease. Duchenne's is not a true MH but the use of succinylcholine and inhalational anesthetics can lead to hyperkalemia and cardiac arrest. Muscle diseases not necessarily associated with MH are myotubular myopathy, an X linked myopathy associated with myopathy and hypotonia, and nemaline rod myopathy, a genetically heterogeneous condition associated with axioproximal weakness. These diseases are associated with respiratory issues due to muscle weakness. Another class of neurological disorders characterized by impaired pulmonary mechanics is Joubert's Syndrome. Joubert's includes psychomotor delay with tachypnea, apnea, panting, and oropharyngeal abnormalities. Anesthetic considerations include possible difficult intubations and apnea spells that may need caffeine therapy. Central hypoventilation syndrome or Ondine's Curse is a genetic disease characterized by low tone, somnolence, and apnea in REM sleep that worsens with anesthesia exposure. These patients may need a tracheotomy or positive pressure ventilation in sleep although oxygen may trigger apnea. Spinal Muscular Atrophy patients have progressive untreatable distal to central respiratory muscle paralysis. They require total ventilatory support after age one. General approaches to these patients include maintaining lung capacity, avoiding respiratory illnesses, using mucolytics, steroids, cough in-exsufflator and BiPAP. The last group reviewed was the neurometabolic diseases, phenylketonuria and Maple Syrup Urine disease. General considerations include continuing diet restrictions, cardiac issues and avoiding hypoglycemia, catabolic state, and a large protein load from blood and hemolysis.

Saturday afternoon provided attendees with the opportunity to participate in the AAP Ask the Experts Panel and Lunch. The panel was moderated by Dr. Carolyn Bannister (Children's Healthcare of Atlanta) and included experts from the sponsoring institutions of the luncheon panel, Dr. Charles Lee (Loma Linda University

Children's Hospital), Dr. Judit Szolnoki (The Children's Hospital, Aurora) and Dr. S. Devi Chiravuri (University of Michigan Medical Center).

Following lunch, Refresher Courses were provided by Dr. Sabine Kost-Byerly (Johns Hopkins) who presented *We Have Come a Long Way...Is There Anything Left To Do? An Update on Acute Pediatric Pain Management* and Dr. Stephen Stayer (Texas Children's) who presented *Anesthesia for Noncardiac Surgery in a Patient with CHD*. At the same period of time, a number of excellent Workshops were available and were very well attended. Please see Program for all the options.

Keynote Lecture

Submitted by Zulfiqar Ahmed, MD
Wayne State University

The plan for this early Sunday morning lecture was interrupted due to the volcanic eruption in Iceland prevented the guest speaker's from London to San Antonio, so Dr. Myron Yaster (Johns Hopkins) ably filled the spot with a very thought-provoking lecture on "Post Craniotomy Pain Management; A Model for Six Sigma".

The talk revolved around the premise of opportunities that are available where a problem can be defined, measured, analyzed, improved upon, and hence controlled. Dr. Yaster began the discussion with an incident where an adolescent patient had significant pain issues after his craniotomy procedure. This incident led to an IRB approved prospective study about evaluation of post-operative pain assessment of craniotomy patients in adult neurosurgical ICU at Johns Hopkins Medical Center. The study findings reveal that most patients undergoing elective major intracranial surgery will experience moderate to severe pain for the first 2 days after surgery and that this pain is often inadequately treated (Gottschalk et al. *J Neurosurg*, 2007). The paper was received with skepticism from the neurosurgical colleagues. There were two reasons behind the skepticism. The first reason was a belief by many neurosurgeons that narcotics will alter the neurologic exam of post craniotomy patients. Narcotics could also alter the consciousness and this can potentially lead to hypercarbia with significant effects on cerebral perfusion and intracranial pressure. The second reason was the belief that the brain has no pain receptors, with exceptions of scalp, bone and dura. This observation from the first study led to the second trial about modalities of post-operative pain control in neurosurgical patients who underwent supratentorial craniotomy (Morad et al. *J Neurosurg*, 2009). Patients were randomized into two groups. First group received intravenous fentanyl prn and the second group received a fentanyl PCA. Both groups of patients were monitored for end tidal capnography, pulse oximetry, GCS and other vitals. As a result it was found that intravenous PCA more effectively treats the pain of supratentorial intracranial surgery than prn fentanyl, and patients in the former group did not experience any untoward events related to the self-administration of opioids. These findings led to some change in practice of pain management in the neurosurgical ICU with a further follow-up study for assessing safety of fentanyl PCA in craniotomy patients being underway.



Dr. Ahmed

Sunday Session

Submitted by Sean Flack, MD
Seattle Children's Hospital



Dr. Flack

The 2010 spring meeting concluded with the Editors' Best Picks. The Moderator Dr. Jerry Lerman (Women and Children's of Buffalo) opened the session with his choices for the top articles from *Anesthesiology*. Both articles address the hot topic facing pediatric anesthesiologists: anesthetic toxicity and the developing brain. Brambrink AM et al (*Anesthesiol* 2010; 112:834-41) published a study of isoflurane-induced neuroapoptosis in rhesus macaque brains. On the 6th post-natal day (equivalent to a 6 month old human), 5 monkeys were exposed to 0.7-1.5% isoflurane for 5 hours. To avoid a common criticism of earlier studies, hemodynamic and blood-gas homeostasis was maintained throughout. After euthanasia, brain histology was compared with 5 controls looking for evidence of neuronal damage. The isoflurane group exhibited a 13-fold increase in neuroapoptosis.

The second study, by Briner A et al (*Anesthesiol* 2010; 112:546-56), complements prior work demonstrating increased dendritic spine and synapse density in 16 day old mice following exposure to intravenous anesthetics (midazolam, propofol, ketamine). In the selected study, mice pups were exposed to volatile anesthetics (isoflurane, desflurane and sevoflurane) for 30, 60, or 120 minutes. They were killed 6 hours following induction of anesthesia and their neuronal architecture evaluated. No performance evaluations (water maze, etc) were conducted. Increased spine density was demonstrated with increasing time exposure to isoflurane. Sevoflurane exposure resulted in gross increases in spine density independent of exposure time. However, very little change was noted in neuronal architecture following exposure to desflurane. The authors concluded that up to 2 hours of volatile anesthetic exposure did not lead to apoptosis or gross changes in dendritic architecture in 16 day-old mice. However, increased dendritic arborization was noted. This is notable as dendritic spine arborization is directly associated with certain neurologic disorders and cognitive dysfunction.

An important caveat to these findings was made from the audience; these studies have examined histologic changes in animals exposed to anesthesia but absent any painful stimuli. Normal neuronal architecture has been demonstrated following anesthesia in the presence of painful stimuli in similar animal models. Considerable work remains before accurate conclusions regarding anesthetic neurotoxicity can be made.

The top papers from Anesthesia and Analgesia were presented by Dr. Peter Davis (Pittsburgh Children's). The first paper (Lardner DR et al, 2010; 110:1102-08) addresses a contentious issue for our specialty, parental presence in the recovery room. It is known that negative behavioral changes extend as long as 2 weeks after surgery. Increased risk for behavioral disturbance includes children aged 1-5 years, and parental anxiety trait. Preoperative anxiety is also associated with postoperative emergence delirium. In this study, healthy children aged 2-9 years undergoing elective surgery were randomized to parental PACU presence versus no parental presence. All families watched an 8 minute video preop-

Continued on page 16

eratively and were provided with an informative brochure. Anesthetic technique was at the anesthesiologist's discretion and parental presence for induction was permitted, if desired. Postoperative behavior was measured using the COLE scale as well as the postoperative behavioral questionnaire (PBQ) at 2 weeks. 300 children (150/group) were enrolled. Time, as well as crying, in PACU did not differ between the 2 groups, but negative behavior assessed by the PBQ was increased in the non-parental presence group. Regression analysis showed children aged <5 and parental absence in PACU to be predictive for negative behavior.

Dr Davis then drew the audience's attention to a paper (Dinardo JA et al, *Anesth Analg* 2010; 110:1121-5) in which a schema, developed by a working group of the Congenital Cardiac Anesthesia Society, is presented for training in pediatric cardiac anesthesia. Educators internationally should consider this a template to be modified as necessary.

Dr. Zeev Kain (University Children's Hospital, Orange) presented his picks from Pediatrics. Miller MR et al (2010; 125:206-213) studied pediatric-specific catheter care practices for reducing blood stream infection rates in children with central lines in 29 PICUs across the United States. The goal was to achieve 50% reduction in infection rates through a combination of insertion and maintenance strategies. Insertion strategies included hand washing, whole-body chlorhexidine wash, air drying, avoidance of iodine prep, use of pre packs, an insertion checklist, polyurethane or teflon catheters and insertion training. Maintenance strategies were derived from the Centers for Disease Control and Prevention recommendations and expert pediatric clinician consensus. A 43% reduction in BSI rates (5.4-3.1%) was achieved. However, subsequent comparable modeling showed that maintenance bundle compliance was the only significant predictor for reduced BSI rates. The authors concluded that "in contrast with adult ICU care, maximizing insertion-bundle compliance alone cannot help PICUs to eliminate CA-BSIs. Instead, the main drivers for additional reductions in pediatric CA-BSI rates seem to be issues surrounding daily maintenance care for central lines."

The second paper from Pediatrics (Donoghue A et al. 2009; 124:1541-1548) assessed whether pediatric inpatients who receive cardiopulmonary resuscitation (CPR) for bradycardia with poor perfusion were more likely to survive to hospital discharge than those who received CPR for pulseless arrest (asystole/pulseless electrical activity [PEA]). From a database of 197,000 children, 3342 were identified as requiring CPR for bradycardia. 40.7% of children that received chest compression prior to loss of pulse survived compared with 24.5% of children that were pulseless prior to chest compressions. The study authors concluded that CPR for bradycardia should be instituted early (i.e., prior to loss of pulses), however, Dr Kain cautioned that he was unsure whether cause or effect had led to the observed findings.

Paediatric Anaesthesia was represented by Dr. Andrew Davidson (Melbourne, Australia), who drew the audience's attention to a number of theme issues (airway, ethics, TIVA) published by the journal last year. The best review per Dr Davidson was an overview of TIVA in children (Mani V et al, 2010; 20:211-222), while his choice for best editorial was an evaluation of intraoperative memory and postoperative behavior in children (Lopez U et al, 2009; 19:1147-1151).

Dr Davidson commented that studies are only as good as their outcome measures and that adult measures may not be applicable in children. To illustrate this point, he mentioned a survey (Nafiu

Dr Davidson commented that studies are only as good as their outcome measures and that adult measures may not be applicable in children.

O et al, 2009; 19:1048-1053) demonstrating great variability in blood pressure parameters used and the threshold for defining and treating intraoperative hypotension among pediatric anesthesiologists.

Best original papers included the APA national audit of pediatric opioid infusions (Morton et al, 2010; 20:119-125) in which the nature and severity of adverse events were noted. 46 serious clinical incidents were reported in 10,726 children. Respiratory depression was most likely in the very young or in children with comorbidities. Half of these events occurred within one hour of commencing the infusion, suggesting that closer monitoring for at least two hours needed for these children. Avoidable factors included prescription and pump programming errors, use of concurrent sedatives or opioids by different routes and overgenerous dosing in infants.

Other papers mentioned included a new approach to maxillary nerve block for children undergoing cleft palate repair (Mesnil M et al, 2010; 20:343-349), as well as a paper demonstrating that head rotation is not recommended prior to internal jugular puncture in children (Arai T et al, 2009; 19:844-847). A final paper (Standing J et al, 2010; 20:7-18) concerned pharmacokinetic-pharmacodynamic modeling of the hypotensive effects of remifentanyl in infants undergoing cranioplasty. The authors found remifentanyl to be effective in causing hypotension and predicted that a steady state concentration of 14 ng•ml⁻¹ would typically achieve a 30% decrease in MAP.

Dr. Lerman closed the session by presenting a paper published in JAMA (2008; 300:261) in which it was concluded that dexamethasone increased the risk for bleeding following tonsillectomy in children. The publication of this study in a "high impact factor" journal might lead clinicians to accept the conclusions without critical analysis of the study. Dr. Lerman made a number of observations, including: these children underwent surgery in an adult hospital, 20% of bleeding occurred on the day of surgery, 54% of children received ibuprofen prior to bleeding. In particular, he noted that day of surgery bleeding is surgical in origin and that had those cases been excluded from analysis, no evidence for increased bleeding would have been demonstrated. A letter to the editors detailing concerns with this study was mentioned (JAMA 2009; 301:1704). Dr. Lerman concluded by stating that a single dose of dexamethasone reduces PONV following tonsillectomy in children with no evidence for increased bleeding, even if such a finding is published in JAMA!

The meeting was then adjourned after a successful event. The next Society for Pediatric Anesthesia Program will be held October 15, 2010 in San Diego, California. It will be a joint meeting with the Society for Pediatric Anesthesia and the Society for Paediatric Anaesthesia in New Zealand and Australia (SPANZA) and promises to offer a wonderful day of didactics and camaraderie.

Dr. Gutierrez-Mazorra receives Smith Award

By **Linda S. Georges, MD**
University of North Carolina

*Introduction and history by Mark A. Rockoff, MD, FAAP
Boston Childrens Hospital*

The Robert M. Smith Award has been presented each year since 1986 by the AAP Division of Anesthesiology and Pain Management to an individual who has made significant contributions to the field of Pediatric Anesthesia and Pain Management. It is the highest honor a pediatric anesthesiologist in the United States can receive. Dr. Smith, who is considered by many to be the Father of Pediatric Anesthesia, recently died in November, 2009, at the age of 97. This year, in addition to presentation of the award, tribute was paid to the remarkable life of Robert M. Smith.

Dr. Smith was born and died in Winchester, Mass. He was home schooled, graduated from Dartmouth College and Harvard Medical School. He completed a two year surgical residency at Boston City Hospital, during which time he undertook a three month anesthesia rotation. After one year of private practice, he joined the US Army to serve in World War II. Because the Army needed anesthesiologists more than surgeons at the time, Dr. Smith received another three month course in anesthesia. He became Chief Anesthesiologist to the 100th General Hospital and served facilities throughout France and Germany.

Following the war, Dr. Smith returned to Boston, where he became the first Chief of Anesthesiology at the Children's Hospital of Boston. He held this position until 1980. Working with Betty Lange, Chief CRNA, and other excellent nurse anesthetists, they made remarkable advances in the complexity and safety of the anesthetic care of infants and children. In addition, Dr. Smith is said to have trained greater than 800 anesthesiologists from around the world.

One of Dr. Smith's most memorable contributions to the field was the publication of the first textbook of pediatric anesthesia in 1959, "Anesthesia for Infants and Children". Dr. Smith oversaw publication of four editions of the text prior to his retirement in 1980. Since then the text has been edited by one of his "trainees", Dr. Etsuro Motoyama, and Dr. Peter Davis. "Smith's Textbook of Anesthesia for Infants and Children" is soon to be published in its 8th Edition.

Long before the advent of the Society for Pediatric Anesthesia, Dr. Smith was Chairman of the Committee on Pediatric Anesthesia of the AAP. He received Special Recognition by the Surgical Section of the AAP for his contributions to the advances in pediatric surgery and was made an Honorary Fellow. He also received the Distinguished Service Award of the American Society of Anesthesiologists in 1987.

At the time of his retirement from Boston Children's Hospital in 1980, Dr. Smith had served as Chief of Anesthesiology for 34 years. He was also Clinical Professor of Anesthesiology at the Harvard Medical School. He continued to practice at the Franciscan Hospital for children in Brighton, where he worked until he was 80 years old.

In an interview a few years prior to his death, Dr. Smith was asked what he felt was his greatest contribution to the field of pediatric anesthesia. His answer was "the stethoscope". He felt that listening to the patient continuously throughout a procedure was key to safe anesthesia care.

Dr. Smith and his wife Margaret met while he was in medical school and were married for 69 years. They have two daughters and a son. Their son, Jonathan, and his wife, Connie, attended the 2010 RM Smith Award presentation.

After Dr. Rockoff discussed the history of the Award, Dr. Striker enthusiastically paid tribute to his friend of 35 years, Dr. Juan Francisco Gutierrez-Mazorra, the recipient of the 2010 Robert M. Smith Award. He described Dr. Gutierrez-Mazorra as a remarkable man, who has served as Professor of Anesthesiology, Department Director and "politician", meeting with legislators and political organizations while lobbying for the causes of pediatrics, pediatric anesthesia and pediatric pain management. Among his notable accomplishments, in 1985 Dr. Gutierrez-Mazorra presented evidence to the AAP that "infants feel pain". The AAP subsequently recommended local anesthesia for infants undergoing circumcision.

Dr. Gutierrez-Mazorra came to the United States from his native Cuba as a high school student. He earned a bachelor's degree in chemical engineering from Northeastern University before following in his father's footsteps to become an anesthesiologist. Dr. Gutierrez-Mazorra earned his medical degree from West Virginia University School of Medicine and completed his anesthesiology residency at the University of Alabama Birmingham with an emphasis in pediatric anesthesia. Following service in the U.S. Navy, he began practicing at West Virginia University, where he served as Chief of Pediatric Anesthesia. Dr. Gutierrez returned to Birmingham in 1978 and served as Chief of Anesthesia at the Children's Hospital of Alabama until 1999. Currently, he continues his practice at Children's as President of Pediatric Anesthesia Associates, Inc.

Dr. Gutierrez-Mazorra has maintained an active involvement in many professional organizations throughout his career and his personal and professional awards abound. He is Founding Board Member of the Society for Pediatric Anesthesia and has been a Diplomate of the American Board of Anesthesiology since 1974. Dr. Striker described Dr. Gutierrez-Mazorra's most remarkable characteristic as "connectivity". "He knows everyone who is anyone and knows how to accomplish his goals!"

Dr. Gutierrez-Mazorra thanked the AAP for bestowing on him the honor of the Robert M. Smith Award. He described his pleasure at meeting Dr. Smith in 1955, when he was eleven years old and was introduced by his father, also an anesthesiologist. He thanked all of the friends and colleagues with whom he has worked during his career in Pediatric Anesthesia. He also thanked his wife and children for their support and encouragement.

As a founding board member of the SPA, Dr. Gutierrez-Mazorra is proud of the organization that went from 18-20 individuals at their first gathering to the over 700 registrants at the 2010 Winter Meeting. He recommended to all members of the Society that they come to the meetings, meet everyone that they can, and learn from them!



Juan F. Gutierrez-Mazorra, MD,
FAAP

SPA Board of Directors election nominees announced

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VICE PRESIDENT / PRESIDENT-ELECT

Nancy L. Glass, MD, MBA, FAAP



Texas Children's Hospital and Baylor College of Medicine, Houston, TX

Professor of Anesthesiology and Pediatrics, Baylor College of Medicine

Director, Anesthesia Education and Pediatric Anesthesia Fellowship, Director, Pediatric Pain Service, Texas Children's Hospital.

Name and City/State of College attended; degree and year obtained:

Rice University, Houston, TX, BA 1986

Name and City/State of Medical School attended, degree and year obtained:

Baylor College of Medicine, Houston, TX, MD, 1978.

Name and City/State of Hospital where Internship was completed; type and dates attended; degree and year obtained:

Baylor College of Medicine Affiliated Hospitals, Pediatrics, 1978 - 1981.

Name and City/State of Hospital where Anesthesiology Residency was completed; dates of training:

University of Texas Health Science Center at Houston, Houston, TX, 1986-1987.

Name and City/State of Hospital where Fellowship training was completed; type and dates of Fellowship:

Children's National Medical Center, Washington, DC, Pediatric Critical Care Medicine, 1981-1983.

Name and City/State of Hospital/University where additional training was completed; type and dates of training:

Rice University, Houston, TX, MBA, 2002.

Prior involvement with SPA (Board, Committee, etc)

Presenter of PBLDs, abstracts, and Workshops (Epidural and Peripheral Blocks)

Board Member, 2000-2004

Winter Mtg Program Chair, 2005 and 2006

Secretary, 2006-2008

Treasurer, 2008-2010

Member, Education and Finance and Membership Committees

Member, Executive Committee.

Involvement with other national/international (pediatric) anesthesia organizations

Member, ASA

Member, ASRA

Member, ASA Sub-Committee on Pediatric Program

SECRETARY/TREASURER

Shobha Malviya, MD, FAAP



University of Michigan Health System, Ann Arbor, MI

Professor of Anesthesiology, Associate Director of Pediatric Anesthesiology, Director of Pediatric Anesthesia Research

Name and City/State of College attended; degree and year obtained

Jai Hind College and Basantsingh

Institute of Science, Bombay University Mumbai/Maharashtra/India Inter Science Degree 1975

Name and City/State of Medical School attended, degree and year obtained

Topiwala National Medical College, Bombay University Mumbai/Maharashtra/India MBBS, 1981

Name and City/State of Hospital where Internship was completed; type and dates attended; degree and year obtained

St. Luke's Roosevelt Medical Center, NY, NY Pediatrics Internship, 07/01/1981 - 06/30/1982

Name and City/State of Hospital where Anesthesiology Residency was completed; dates of training.

University of Michigan Health System, Ann Arbor, MI 07/01/1985 - 06/30/1987

Name and City/State of Hospital where Fellowship training was completed (if applicable); type and dates of Fellowship

Hospital for Sick Children, Toronto, Ontario, Canada 08/01/1987 - 07/30/1988

Name and City/State of Hospital/University where addi-

tional training was completed (if applicable); type and dates of training

Rainbow Babies' and Children's Hospital, Cleveland, OH
Pediatrics Residency, 07/01/1982 - 06/30/1984

Prior involvement with SPA (Board, Committee, etc)

Committee memberships and chair positions:

- 1994-present SPA member
- 1998-2004 Member, Subcommittee on Publications
- 2004-2008 Member, Board of Directors
- 2005-2008 Co-Chair, Communications Committee
- 2008-present Secretary
- 2008-present Chair, Membership Committee
- 2008-present Member, Executive Committee
- 2008-present Member, Finance Committee
- 2009-present Member, Education Committee
- 2009-present Member, Enduring Materials Committee

Educational activities:

- 2003 Refresher Course lecture
- 2004 Delivered lecture at AAP breakfast panel
- 2005 Faculty, Success in Academics Workshop
- 2006 Lecture at annual meeting
- 2009 Lecture at Fundamentals course

Other SPA related activities:

- Presented numerous research abstracts
- Contributions to newsletter and website
- Redesigned website during tenure as communications committee chair
- Moderated several poster sessions
- Attended SPA strategic planning meeting in Chicago IL
- 100% attendance at board meetings and executive committee meetings
- Participation in all teleconferences for board of directors and executive committee
- Reviewer of submitted abstracts on a regular basis

Involvement with other national/international (pediatric) anesthesia organizations

- 2003-2005 Member, Committee on Pediatric Anesthesia, American Society of Anesthesiologists
- 2003 Invited lectures, American Academy of Pediatrics NCE
- 2005-2008 Organizing Committee, Congenital Cardiac Anesthesia Society

DIRECTORS

Rita Agarwal, MD, FAAP



The Children's Hospital of Denver,
Aurora, CO

Associate Professor of Anesthesiology, Pediatric Anesthesiology Program Director and Director of Education

Name and City/State of College attended; degree and year obtained

Texas A&M University, College

Station, TX, 1979-1982, Degree: BA. 1982

Name and City/State of Medical School attended, degree and year obtained

Baylor College of Medicine, Houston, TX, 1982-1986 Degree: MD. 1986

Name and City/State of Hospital where Internship was completed; type and dates attended; degree and year obtained

Surgery, Baylor College of Medicine Houston, TX 1986-1987

Name and City/State of Hospital where Anesthesiology Residency was completed; dates of training

Anesthesiology, Baylor College of Medicine, Houston, TX, 1987-1990

RITA AGARWAL, continued –

Name and City/State of Hospital where Fellowship training was completed; type and dates of Fellowship

Pediatric Anesthesiology, The Children's Hospital, Denver, Colorado, 1990-1991

Prior involvement with SPA (Board, Committee, etc)

Board of Directors 2007-present

Member: Publications Committee 1996-2001

Member: Communications Committee 2001-present

Assistant Editor: Newsletter 1996-2001

Editor: Newsletter 2001-2007

Member: Education Committee 1999-present

Special Interest Group for Pediatric Pain Management-co-founder 2009-present

Involvement with other national/international (pediatric) anesthesia organizations

American Academy of Pediatrics:

Re-Imbursement Committee 2000-present

American Academy of Pediatrics: Section on Anesthesiology:

Member: Executive Committee 1999-present

Chair: Membership Committee 2001-2007

Member: Education Committee

American Society of Anesthesiologists, Subcommittee on Pediatric Anesthesia 1994-1995, 2007-8, 2009-present

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Director Nominees, from page 19

Charles Dean Kurth, MD, FAAP



Cincinnati Children's Hospital
Medical Center, Cincinnati, Ohio
Chairman, Department of Anesthesiology
Anesthesiologist-In-Chief
Cincinnati Children's Hospital
Medical Center
Professor of Anesthesia and Pediatrics
University of Cincinnati College of Medicine

Name and City/State of College attended; degree and year obtained

Colorado College, Bachelor of Arts, Chemistry, 1978
Colorado Springs, Colorado

Name and City/State of Medical School attended, degree and year obtained

University of Wisconsin, M.D. 1982
Madison, Wisconsin

Name and City/State of Hospital where Internship was completed; type and dates attended; degree and year obtained

Internship in Pediatrics, 1983-1984
The Children's Hospital of Philadelphia
University of Pennsylvania, School of Medicine
Philadelphia, Pennsylvania

Name and City/State of Hospital where Anesthesiology Residency was completed; dates of training.

Resident in Anesthesiology, 1985-1987
Shand's Teaching Hospital
College of Medicine, University of Florida
Gainesville, Florida

Name and City/State of Hospital where Fellowship training was completed (if applicable); type and dates of Fellowship

Fellowship in Pediatric Anesthesia and Pediatric Cardiac Anesthesia 1987-1988
The Children's Hospital of Philadelphia
University of Pennsylvania, School of Medicine
Philadelphia, Pennsylvania

Name and City/State of Hospital/University where additional training was completed (if applicable); type and dates of training

Residency in Pediatrics 1984-1985
The Children's Hospital of Philadelphia
University of Pennsylvania, School of Medicine
Philadelphia, Pennsylvania
NIH Fellowship in Physiology 1988-1989
Grant # HL07027-14
University of Pennsylvania, School of Medicine
Philadelphia, Pennsylvania
Certificate in Business Administration 2001-2002
University of Houston School of Business

Houston, Texas

Prior involvement with SPA (Board, Committee, etc)

- Member of Executive Committee for "Wake-Up Safe", 2008-present. The wake-up safe is a multi-institutional collaborative started in 2008 under the auspices of the SPA. The mission of the collaborative is to improve safety in children undergoing anesthesia. As a member of the executive committee, I participated in the strategy, design, formation, and fund-raising to get the collaborative up and running. I am also currently overseeing the running of the collaborative and monitoring its success against the mission.
- Member of Education Committee, 2002-2004. As a committee member, I helped to design and implement the program for the annual Spring meeting of the SPA. I relinquished this position to a colleague whose expertise is education in pediatric anesthesia.

Involvement with other national/international (pediatric) anesthesia organizations

- Member of the Executive Committee for "Pediatric Anesthesia Leadership Council", 2009 to present. This council was formed in 2009 and consists of the chairs, directors, and chiefs of the Departments and Divisions of pediatric anesthesia in the USA. The mission of the council is to provide leaders in pediatric anesthesiology a forum to exchange ideas and experience and to develop strategies to grow and strengthen our profession to serve our patients and their families. As a member of the executive committee, I participate in planning the meetings and in facilitating the discussion at the meeting.
- Member of the Editorial Board for the journal Pediatric Anesthesia, 2008- present. As a board member, I participate in developing strategy to grow and enhance the role of the journal in improving the practice of pediatric anesthesia world wide, to recruit members to the editorial staff and advisory board, and to monitor the progress of the journal to meet its mission.

Ira Landsman, MD



Monroe Carell Jr. Children's Hospital at Vanderbilt
Nashville, TN
Chief, Division of Pediatric Anesthesiology
Associate Professor of Pediatric & Anesthesiology

Name and City/State of College attended; degree and year obtained

State University of New York, Binghamton, NY. B.A. Biology. 1975

Name and City/State of Medical School attended, degree and year obtained

State University of New York, Buffalo, NY. M.D. 1979

Name and City/State of Hospital where Internship was

completed; type and dates attended; degree and year obtained:

Pediatric Residency, Children's Hospital of Buffalo. Buffalo, NY. 6/1983

Name and City/State of Hospital where Anesthesiology Residency was completed; dates of training:

Anesthesiology Residency, St. Luke's Hospital of Kansas City. Kansas City, MO. 12/1992

Name and City/State of Hospital where Fellowship training was completed (if applicable); type and dates of Fellowship:

Anesthesiology Fellowship, Children's Hospital of Pittsburgh. Pittsburgh, PA. 12/1993

Name and City/State of Hospital/University where additional training was completed (if applicable); type and dates of training:

Critical Care Fellowship, Texas Children's Hospital. Houston, TX. 6/1985

Pediatric Emergency Care Fellowship, The Children's Mercy Hospital. Kansas, MO. /1986

Prior involvement with SPA (Board, Committee, etc):

Participation in SPA activities: Present

- Member of PAPD committee since inception.
- Chairman of Education subcommittee of PAPD.
- Member of PBLD committee.
- Presenter of PBLD's for past 4 years.
- Contributor to newsletter in 2 issues over the last 2 years.
- Invited lecturer last year for clinician section but I canceled last minute due to a death of a good friend.

Participation in SPA activities: Past

- Active participant in airway workshop director for 1 year.
- Member of education committee.
- Lecturer: Airway Nightmares.
- Panel: Pain control.

Ronald S. Litman, DO, FAAP



Department of Anesthesiology & Critical Care
The Children's Hospital of Philadelphia
Philadelphia, PA

Professor of Anesthesiology and Pediatrics, University of Pennsylvania School of Medicine
Director of Clinical Research, General Anesthesia Division of the

Department of Anesthesiology and Critical Care
Associate Fellowship Director (Director of Fellow Education and Research)
Chair, CHOP Sedation Committee

Name and City/State of College attended; degree and year obtained

B.A., 1980

State University of New York at Buffalo (Biology)

Name and City/State of Medical School attended, degree

and year obtained

D.O., 1985

New York College of Osteopathic Medicine, Old Westbury, NY

Name and City/State of Hospital where Internship was completed; type and dates attended; degree and year obtained

1985-1986, Pediatric Internship, Beth Israel Medical Center, NY, NY

Name and City/State of Hospital where Anesthesiology Residency was completed; dates of training

1988-1990, Anesthesiology Residency, Mount Sinai Medical Center, NY, NY

Name and City/State of Hospital where Fellowship training was completed; type and dates of Fellowship

1990-1991, Pediatric Anesthesia Fellowship, The Children's Hospital of Philadelphia

Name and City/State of Hospital/University where additional training was completed; type and dates of training

1986-1988, Pediatric Residency, Rainbow Babies and Children's Hospital, Case Western Reserve University, Cleveland, OH

Prior involvement with SPA (Board, Committee, etc)

Committees on Publications (1992-1996), Sedation (1997-present), Research (2000-present)

First author of "Curriculum on Pediatric Anesthesia for Residents in Anesthesiology": <http://www.pedsanesthesia.org/core-curriculum.iphtml>

Chair and Program Creator: MH-Associated Diseases, Who Needs a Non-triggering Technique?

RONALD S. LITMAN, continued –

SPA/MHAUS Symposium at the annual Spring meeting of the Society of Pediatric Anesthesia, San Diego, CA. Nine lecturers, approx 200 attendees.

http://www.pedsanesthesia.org/meetings/2008winter/spa08_program.pdf

Involvement with other national/international (pediatric) anesthesia organizations

1985-2007, American Academy of Pediatrics, Section on Anesthesiology QI Committee

1989-present

American Society of Anesthesiologists Committee on Pediatric Anesthesia

2002-present

Malignant Hyperthermia Association of the United States
Hotline Consultant

2007-present

Founding Member, Society of Pediatric Sedation (Board of Directors 2007-2008)

2009-present

ASA Representative Committee Member, Task Force of the

Continued on page 22

Director Nominees, from page 21

American Academy of Otolaryngologists, Head and Neck Surgeons: Clinical Practice Guideline: Tonsillectomy in Children (to be published 2010).

Chandra Ramamoorthy, MBBS, FRCA



Lucile Packard Children's Hospital at Stanford University, Palo Alto, CA

Professor of Anesthesiology, Stanford Univ School of Medicine

Director, Pediatric Cardiac Anesthesia, Lucile Packard Children's Hospital

Name and City/State of College attended; degree and year obtained:

Not Applicable

Name and City/State of Medical School attended, degree and year obtained:

University of Madras, India, MBBS; 1979

Name and City/State of Hospital where Internship was completed; type and dates attended; degree and year obtained:

JIMPER, Pondicherry, Rotating Internship, 1980

Name and City/State of Hospital where Anesthesiology Residency was completed; dates of training:

University of Leeds, and University of Aberdeen. 1981-1985. Degree obtained is FRCA (UK)

Name and City/State of Hospital where Fellowship training was completed (if applicable); type and dates of Fellowship:

Children's Hospital, Detroit, Mi: Pediatric Anesthesia Fellowship 1986-1987

Name and City/State of Hospital/University where additional training was completed; type and dates of training:

Cardiac Anesthesia Fellowship Loyola University of Chicago, 1987-1988

Prior involvement with SPA (Board, Committee, etc)

I have been associated with the SPA education committee and been actively involved in the program selection for meetings. More recently as President of CCAS, I have attended all the SPA board of Directors meeting and represented the interests of the pediatric cardiac anesthesia community to the SPA. I have presented abstracts at several SPA meetings. I was invited to speak at the last SPA meeting. Having been closely involved with both the CCAS and SPA, I recognize the value of a strong mutual relationship, and will work to foster it. I am dedicated to improving the perioperative care of children and am an advocate for the pediatric anesthesia community.

Involvement with other national/international (pediatric) anesthesia organizations

I have been the Vice president and am currently the president

of the CCAS. My term ends in October 2010. CCAS is under the umbrella of the SPA and has over 800 members in 4 years. It is the only organization dedicated to the education and advancement of education of pediatric cardiac anesthesiologists. I have been the program Director for the CCAS meeting. The PCICS is a multidisciplinary group with members from the fields of anesthesia, cardiology, surgery and allied health care workers. I have also been a speaker at the PCICS meetings and was its program director in 2008. I am a reviewer for the journals, Anesthesia and Analgesia and Pediatric Anesthesia. All my academic activities are related to Pediatric anesthesia and improving the care of children.

Lena S. Sun, MD



Morgan Stanley Children's Hospital of New York of Columbia University Medical Center
New York, New York

Chief of Pediatric Anesthesia

Name and City/State of College attended; degree and year obtained:

Massachusetts Institute of Technology

Cambridge, MA
1975

Name and City/State of Medical School attended, degree and year obtained:

Mount Sinai School of Medicine
New York, NY
1979

Name and City/State of Hospital where Internship was completed; type and dates attended; degree and year obtained:

Long Island Jewish Hospital, New Hyde Park, New York
1980

Name and City/State of Hospital where Anesthesiology Residency was completed; dates of training:

Columbia Presbyterian Medical Center
New York, NY
1986

Name and City/State of Hospital where Fellowship training was completed (if applicable); type and dates of Fellowship:

Columbia Presbyterian Medical Center (Pediatric Anesthesia)
New York, NY
7/1986-6/1987

Name and City/State of Hospital/University where additional training was completed (if applicable); type and dates of training:

Columbia University (Pharmacology T32)
New York, NY
7/1986-12/1988

Prior involvement with SPA (Board, Committee, etc):

- Member of Research Committee

Involvement with other national/international (pediatric) anesthesia organizations:

- Member of Association of University Anesthesiologists
- FAER Research Council (Pediatric)
- Pediatric Anesthesia Program Director Board member at large

Santhanam Suresh, MD, FAAP

Vice Chairman
Director, Pain Medicine & Research
Department of Pediatric Anesthesiology
Children's Memorial Hospital
Professor of Anesthesiology and Pediatrics
Northwestern University Feinberg School of Medicine

Medical School:

Stanley Medical College
Madras, India, 1983 - Degree: MB, BS

Residencies:

Pediatrics, Cook County Hospital
Chicago, Illinois, 1985-1988

Anesthesiology, Loyola University Medical Center
Maywood, Illinois, 1988-1990

Fellowship:

Pediatric Anesthesiology, Children's Memorial Hospital
and Northwestern University Medical School
Chicago, Illinois, 1990-1991

Certifications:

American Board of Pediatrics
American Board of Anesthesiology
Sub-specialty Certification in Pain, American Board of Anesthesiology

SPA Committees:

Education Committee, Society for Pediatric Anesthesia, 2000 to Present.

Program Chair, Society for Pediatric Anesthesia 2006 Annual Meeting, October 13, 2006, Chicago, IL

Member, Finance Committee, Society for Pediatric Anesthesia, 2010

Member, Board of Directors, Society for Pediatric Anesthesia, October 2007 to present.

National Organizations/Committees:

Part II Oral Boards Examiner, American Board of Anesthesiology, 2004 to Present.

Adjunct Member, Committee on Regional Anesthesia, American Society of Anesthesiologists, 2004 to Present.

Member, Committee on Scientific and Educational Exhibits, American Society of Anesthesiologists, 2005 to Present

District 1 Delegate, Illinois Society of Anesthesiologists, February 2007 to Present.

Member, Educational Track, Subcommittee on Pediatric Anesthesia, American Society of Anesthesiologists, 2008.

Member, Education Committee, American Society of Regional Anesthesia and Pain Medicine, 2007 to Present.

Activities:

Worked with the Society for Pediatric Anesthesia to further the interests of regional anesthesia in children. Moderated regional anesthesia workshops for children at the annual meetings for the Society for Pediatric Anesthesia, American Society of Anesthesiologists as well as the American Society of Regional Anesthesia and Pain Medicine. Charter member of the pain subcommittee of the Society for pediatric anesthesia. Awarded a FAER research in Education grant for training residents to perform regional anesthesia. Providing mentorship to attending staff at various pediatric institutions in the USA and across the globe to improve pain management in children.

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Society for Pediatric Anesthesia



education • research • patient care

October 10 - 12, 2012
Marriott Wardman Park Hotel • Washington, DC

Please visit

www.worldassembly2012.org
for developing program updates
and registration information

September 1-3: Columbus, Ohio, USA

International Symposium on the Hybrid Approach to Congenital Heart Disease

Tel: (614)-722-2000

Information: Nationwide Children's Hospital, 700 Children's Drive, Columbus, Ohio 43205

www.hybridsymposium.com

September 2-4: Berlin, Germany

European Society for Paediatric Anaesthesiology 2010/2nd Congress of the European Society for Paediatric Anaesthesiology

Tel. +49-30-9401-53200, Fax +49-30-9401-53209

Information: Prof. Jochen Strauß, Klinik für Anästhesie, Perioperative Medizin und Schmerztherapie Helios-Klinikum Berlin-Buch, Schwanebecker Chaussee 50, D-13125 Berlin

www.mcn-nuernberg.de/feapa/

September 2-5: Queenstown, New Zealand

Society for Paediatric Anaesthesia in New Zealand and Australia (SPANZA) Combined Meeting with Asian Society of Paediatric Anaesthesiologists (ASPA)

Tel: +61 2 4973 6573, Fax: +61 2 4973 6609

Information: SPANZA Secretariat, P.O. Box 180, Morriston, New South Wales, Australia 2264

www.spanza.org.au

September 11-13: San Francisco, California, USA

Pediatric Sedation Outside of the Operating Room

Tel: (617)-384-8600, Fax: (617)-384-8686

Information: Keira P. Mason, M.D., Harvard Medical School Department of Continuing Education, P.O. Box 825, Boston, MA 02117-0825

www.cme.hms.harvard.edu/courses/pediatric

September 16-17: Manchester, United Kingdom

Paediatric Intensive Care Society (PICS) Annual Conference 2010

Telephone: +44 (0) 1403 711301, Fax: +44 (0) 1403 710058

Information: Tarquin Scadding-Hunt, Maximize Events Ltd, Virginia House, High Street, Partridge Green, West Sussex RH13 8HX

www.ukpics.org

September 24-26: Seattle, Washington, USA

Regional Anesthesia in Children

Tel: (206)-987-5379, Fax: (206)-987-5798

Information: Kathie Kohorn, CME Coordinator, Children's Hospital & Regional Medical Center, M/S S-219, P.O. Box 50020, Seattle, WA 98145-5020

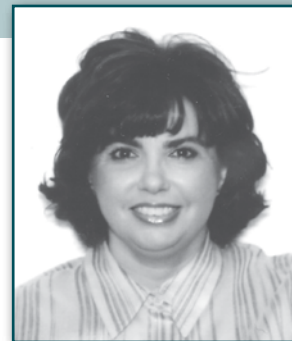
www.seattlechildrens.org/healthcare-professionals/education/cme/calendar/#anesthesia

October 2-5: Copenhagen, Denmark

21th European Society of Paediatric and Neonatal Intensive Care (ESPNIC) Medical and Nursing Annual Congress at the European Academy of Paediatrics

Tel: +41 22 906 9178 Fax: +41 22 732 2850

Information: ESPNIC Administrative Office, c/o Kenes International, 1-e Rue de Chantepoulet, P.O. Box 1726, CH-1211 Geneva 1, Switzerland
www.espnice.de



Helen V. Lauro, MD, MPH, FAAP
Long Island College Hospital,
Brooklyn, NY

October 15: San Diego, California, USA

Society for Pediatric Anesthesia (SPA)/Society for Paediatric Anaesthesia in New Zealand and Australia (SPANZA) Joint Meeting

Tel: (804)-282-9780, Fax: (804)-282-0090

Information: Society for Pediatric Anesthesia, 2209 Dickens Rd., Richmond, VA 23230-2005
www.pedsanesthesia.org

October 23-26: Copenhagen, Denmark

The 3rd Congress of the European Academy of Paediatric Societies

Tel: +41 22 908 0488, Fax: +41 22 906 9140

Information: Registration and Accommodation Department, Kenes International, 1-3 Rue de Chantepoulet, PO Box 1726, CH-1211, Geneva 1, Switzerland
www.kenes.com/paediatrics

December 7-10: Miami Beach, Florida, USA

The Pediatric Cardiac Intensive Care Society 8th International Conference

Tel: (866)-904-2048

Information: DRIVE Medical Consulting & Communications, Miami Beach, Florida
www.pcics.org/meeting_info.php

December 9-12: Los Angeles, California, USA

Pediatric Anesthesia Review

Tel: (800)-222-6927

Information: Northwest American Seminars, P.O. Box 2797, Pasco, WA 99302
Website: www.nwas.com

Please forward all information concerning congresses relevant to Pediatric Anesthesia to:

Helen V. Lauro, MD, MPH, FAAP, Department of Anesthesiology, Long Island College Hospital
339 Hicks Street, Brooklyn, New York 11201.

2011

March 13-17: Sydney, Australia

6th World Congress on Pediatric Critical Care
Tel: +61 292650700, Fax: +61 292675443
Information: 6th World Congress on Pediatric Critical Care
Congress Organizers, GPO Box 128, Sydney, NSW 1001,
Australia
www.pcc2011.com

March 30-April 3: San Diego, California, USA

Society for Pediatric Anesthesia (SPA)/American Association
of Pediatrics (AAP) 2011 Winter Meeting
Tel: (804)-282-9780, Fax (804)-282-0090
Information: Society for Pediatric Anesthesia, 2209 Dickens
Rd., Richmond, VA 23230-2005
www.pedsanesthesia.org

May 22-25: Hannover, Germany

22nd European Society of Paediatric and Neonatal Intensive
Care (ESPNIC) Medical and Nursing Annual Congress
Tel: +41 22 906 9178, Fax: +41 22 732 2850
Information: ESPNIC Administrative Office, c/o Kenes Inter-
national, 1-e Rue de Chantepoulet,
P/O/ Box 1726, CH- 1211 Geneva 1, Switzerland
www.espnice.de

October 14: Chicago, Illinois, USA

Society for Pediatric Anesthesia (SPA) 25th Annual Meeting
Tel: (804)-282-9780, Fax (804)-282-0090
Information: Society for Pediatric Anesthesia, 2209 Dickens
Rd., Richmond, VA 23230-2005
www.pedsanesthesia.org

October 20-23: Queensland, New Zealand

Society for Paediatric Anaesthesia in New Zealand and Aus-
tralia (SPANZA)/Australian & New Zealand Association of
Paediatric Surgeons (ANZAPS) Conference
Tel: +61 2 4973 6573, Fax: +61 2 4973 6609
Information: SPANZA Secretariat, P.O. Box 180, Morriston,
New South Wales, Australia 2264
<http://www.spanza.org.au>

2012

October 10-12: Washington, D.C., USA

International Assembly of Pediatric Anesthesia
Tel: (804)-282-9780, Fax (804)-282-0090
Information: Society for Pediatric Anesthesia, 2209 Dickens
Rd., Richmond, VA 23230-2005
www.worldassembly2012.org

2013

February 17-22: Cape Town, South Africa

6th World Congress of Paediatric Cardiology
& Cardiac Surgery
Tel: +27 21 532 6333 | Fax: +27 21 532 6331
Information: PCCS Conference Secretariat, Global Confer-
ences, P.O. Box 632, Howard Place, Pinelands 7450
www.pccs2013.co.za

October 11: San Francisco, California, USA

Society for Pediatric Anesthesia (SPA) 27th Annual Meeting
Tel: (804)-282-9780, Fax (804)-282-0090
Information: Society for Pediatric Anesthesia, 2209 Dickens
Rd., Richmond, VA 23230-2005
www.pedsanesthesia.org



SAVE THE DATES

October 15, 2010

Joint Annual Meeting

Society for Pediatric
Anesthesia and the
Society for Paediatric
Anaesthesia in New
Zealand and Australia

Manchester Grand Hyatt
San Diego, CA

March 30 - April 3, 2011

**Pediatric
Anesthesiology 2011**
Society for Pediatric
Anesthesia and the
American Academy of
Pediatrics

Sheraton San Diego
Hotel & Marina
San Diego, CA

October 14, 2011

24th Annual Meeting

Society for Pediatric
Anesthesia

Chicago, IL
Hotel TBA

February 21 - 26 2012

**Pediatric
Anesthesiology 2012**
Society for Pediatric
Anesthesia and the
American Academy of
Pediatrics

Marriott Tampa
Waterside
Tampa, FL

October 10 -11 2012

**International Assembly
of Pediatric Anesthesia**
Society for Pediatric
Anesthesia

Marriott Wardman Park
Washington, DC

Please visit www.pedsanesthesia.org for program and registration details



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ANNUAL MEETING

JOINT

Society for Pediatric Anesthesia

Society for Paediatric Anaesthesia
in New Zealand and Australia

Society for Pediatric Anesthesia



Friday, October 15, 2010
Manchester Grand Hyatt • San Diego, CA