

# INTERCHANGE

SOCIETY OF CRITICAL CARE ANESTHESIOLOGISTS

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## President's Message

### SOCCA and Health Care: We Find Ways



Brenda G. Fahy, M.D., F.C.C.M.

Health care issues remain at the forefront of the political and social agenda – and the dialog about how to address the increasing costs of care, inefficiencies and access will continue to escalate. Two key drivers of cost include end-of-life care and critical care medicine. The ICUs are recognized for the high costs of care and the apparent infinite resources that are used to address the complexities of medical conditions faced by patients and their providers.

As a result of this emphasis on the costlier components of the health care system, critical care providers are in a very important position to address the challenges and assume a greater role in resolving them – without compromising patient care or clinical outcomes. Critical care in general and critical care anesthesiologists in

particular are in a position to assume a greater role, and with the support of the membership, SOCCA can serve as a forum for dialog, sharing of best practices and educating the community-at-large about these important issues.

The SOCCA Annual Meeting and Critical Care Update in Washington D.C. last October provided an excellent example of some of the challenges facing patients and providers. The program included many timely topics and opportunities for discussion: strategies to enhance cost-effective care delivery, the value of early mobilization on ICU patient outcome, the importance of integrating palliative care services into the intensive care unit, and a review of some of the professional liability issues that face critical care providers. In honor of the 25<sup>th</sup> anniversary of our society, the meeting included an outstanding panel in which past presidents of the society provided an overview and their perspective on the changes they have seen in critical care medicine over the past quarter century.

“The society is in a good position to continue to lead these efforts and provide greater opportunities for our members to assume leadership roles, not only in the ICU but within each health system.”

In addition to the SOCCA Annual Meeting, members of the society participated in many other educational sessions during the ASA annual meeting. A number of critical care anesthesiologists participated in the planning for the critical care educational track, providing educational opportunities

for both the critical care community and the practicing anesthesiologist who has to manage the critically ill patient. SOCCA also sponsored a panel on perioperative respiratory complications and potential opportunities to optimize intraoperative respiratory function and reduce perioperative respiratory complications.

SOCCA serves as a resource to the critical care community in a number of other important ways. The society sponsors sessions that bring together critical care anesthesiology fellowship directors, providing updates from ACGME, the American Board of Anesthesiology and to share best practices among the programs. SOCCA produced a “Residents’ Guide” covering content for those involved in training residents in critical care for a nominal fee (it can be found at the bottom left of the homepage at [www.socca.org](http://www.socca.org)).

SOCCA contributes to scholarship, including bench and translational research in critical care. SOCCA and the Foundation for Anesthesia Education and Research (FAER) co-sponsor a FAER critical care research grant. Recent awardees were able to complete preliminary or pilot projects. Based on these studies, investigators have successfully received NIH R01 funding to continue studies that

will eventually lead to improvements in the care of critically ill patients (details on page 11).

*Anesthesia & Analgesia* serves as the premier journal for SOCCA and critical care anesthesiology. A review of recent publications

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### Membership

Membership in SOCCA is open to all anesthesiologists and residents in approved anesthesiology programs. Membership applications may be obtained by contacting SOCCA at (847) 825-5586 or through the SOCCA website at **www.SOCCA.org/membership.php**.

### SOCCA Dues

Dues are \$150 for active members; \$100 for affiliate members and \$20 for residents/fellows. Dues may be paid online at **www.SOCCA.org/membership.php** by credit card or by mailing payment to the SOCCA office at 520 N. Northwest Highway, Park Ridge, IL 60068.

Remember, payment of your dues allows you to enjoy the full privileges of SOCCA membership.

### Web Page

You may visit the SOCCA website at:  
**www.SOCCA.org**

## EDITORIAL NOTES

### Editorial Policy

The opinions presented are those of the authors only, not of SOCCA. Drug dosages, accuracy and completeness of content are not guaranteed by SOCCA.

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### A Note from the Editor to SOCCA Members:

If you would like to contribute a review for a Fellowship Program at your institution in a future issue of the SOCCA Interchange, please contact Chris Dionne at **c.dionne@asahq.org**.

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## President's Message Continued

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indicates that the support of the editorial board of *Anesthesia & Analgesia* has provided a forum for dissemination of publications that benefit both critical care providers and their patients. Those of you who have manuscripts or editorials that are of interest to the critical care community should consider submitting them to *Anesthesia & Analgesia* [www.anesthesia-analgesia.org](http://www.anesthesia-analgesia.org).

In response to a request from the ABA, the SOCCA ACCM PD Committee recently supported the request by emergency physicians

to complete critical care anesthesiology fellowships after completing emergency medicine residency training. The ABA is working with the American Board of Emergency Medicine to finalize the requirements for both the fellowship and certification.

The examples provided above emphasize the important role played by SOCCA and its members. Critical care anesthesiologists have made significant advances in patient care, education, research and health policy related to critical illness and its implications for our health care system. The society is in a good position to continue to lead these efforts and

provide greater opportunities for our members to assume leadership roles, not only in the ICU but within each health system. We need to continue to advance these missions and make significant contributions for our patients, organizations and health care systems during this coming year. On behalf of SOCCA and the Board of Directors, Season's Greetings, Happy New Year and best wishes to you and your families for 2013!

## PRO: Telemedicine ICU Coverage



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The recent boon in technological advents has ushered in a new age of digital communication. Sophistication in video conferencing, VOIP, and mobile communication have streamlined the gathering and dissemination of health care provisions. The Leapfrog Group has estimated 53,000 lives will be saved annually with mandated intensivist coverage, a standard only 10-15 percent of U.S. hospitals are able to achieve.<sup>1</sup> The integration of telecommunication advances will avail intensivist oversight to a greater percentage of hospitals, establish a superior standard of critical care services, maintain quality assurance of best-practice protocols, and revolutionize medical education.

“Telemedicine” is the use of information technology to provide remote health care. Initial reports of telemedicine underscore the propagation of information; African villages use smoke signals to forewarn others of disease; the Royal Flying Doctors of Australia (circa 1900s) communicated with patients via two-way radio powered by a bike pedal dynamo.<sup>2</sup> Current

telemedicine utilizes two categories of health care informatics: 1) Asynchronous Telemedicine (Store and Forward) is the transmission of data to an intermediate station for access at a later time. 2) Real Time Telemedicine is the remote interaction between patient and health care team. In 1997, Rosenfeld et al. reported the feasibility of around-the-clock real-time telemedicine intensive care coverage. This 16-week trial demonstrated LOS and mortality data similar to in-house intensivist programs.<sup>3</sup>

In 2000, VISICU came to fruition from the momentum of this preliminary telemedicine data. Senataro Healthcare launched this pioneering, multicenter telemedicine program, operating like an air-traffic control room for ICU support. In-hospital mortality and hospital LOS decreased 27 percent and 17 percent, respectively.<sup>4</sup> By 2006, 32 health care systems nationwide ran remote ICU programs. A 2011 meta-analysis evaluated patient outcomes with telemedicine ICU coverage. Collectively, 12 trials demonstrated a decreased ICU mortality (pooled OR 0.80, 95% CI [0.66 – 0.97],  $p = 0.02$ ) and a decreased ICU LOS (1.26 day decrease,  $p=0.01$ ).

A 2011 UMASS trial verified the efficacy of the tele-ICU model with standardized best-practice protocols (i.e., ventilator-associated pneumonia, venous thrombosis prevention and stress ulcer prophylaxis). ICU mortality, and both ICU and hospital LOS, showed statistically significant reduction in the tele-ICU group.<sup>5</sup> Additionally, there was significant higher adherence to these best practice protocols, and lower rates of catheter-related blood stream infections and ventilator-associated pneumonias. During this era of checklist-driven programs, this technology will augment best-practice recommendations.

A drawback to the control-room model of telemedicine is the significant expense incurred for establishment and maintenance. Streamlining key components of the tele-ICU lowers cost and enhances care. The Remote Presence 7 robot (RP7, In Touch Health, Santa

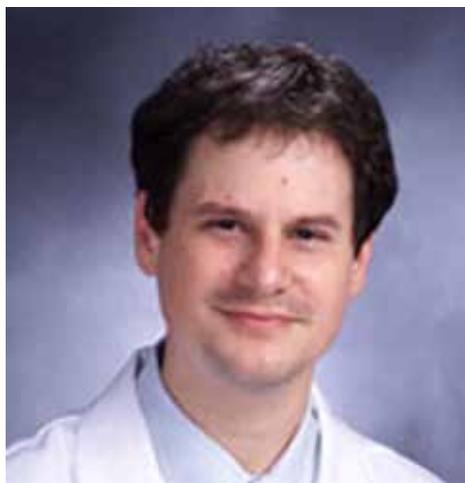
Barbara, CA) allows tele-presence via a monitor mounted upon an ~5-foot base, HD camera, speakers for two-way communication, and collision sensors to optimize maneuverability. A moveable head allows for panning, tilting and zooming, all controlled remotely via laptop. Integrated in neuro-ICU practice, the tele-presence has markedly decreased response time in critical situations (i.e., hypotension, elevated ICP, brain ischemia, seizures), decreased ICU LOS, and decreased net ICU cost by \$1.1 million.<sup>6</sup>

Finally, there is tremendous scope for the use of tele-presence within the paradigm of medical education. While trainee didactics are standardized, the experiential learning is not uniform. Asynchronous and real-time telemedicine will broaden the scope of the clinical experience by allowing for access to specialized centers and exposure to novel procedures. The mantra of aviation is “train as you fly, fly as you train” – nobody sits at the helm of a jet before executing tasks on a simulator. Similarly, telemedicine advances facilitate the axiom of medical education – “see one, do one, teach one.”

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## CON: Telemedicine ICU Coverage



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Telemedicine has been in use for more than 25 years with a continued uncertain optimal role in ICU care. ICU 24/7 in-house critical care attending coverage has been a subject of debate for a number of years. Some of the reasons for justifying not hiring around-the-clock intensivist coverage are lack of patient volume (cost), overall shortage of trained intensivists, absence of both studies that provide strong support and the absence of mandates from regulatory bodies for 24/7 attending intensivist in-house coverage. Under these circumstances, hospitals are adopting telemedicine ICU coverage as a way to compensate for the lack of on-site intensivist presence overnight and on weekends, staffing model that has been supported by the LeapFrog group.<sup>3</sup>

To date, telemedicine studies have shown mixed results on clinical outcomes such as improved mortality and length of stay. In a multicenter observational study of 5 hospitals and 6 ICU's in which 2034 patients were studied in the pre intervention period and 2018 patients studied in the post intervention period, the authors concluded that remote monitoring of ICU patients was not associated with an overall improvement in mortality or LOS.

In contrast, a single center prospective clinical practice study by Lilly et al, telemedicine intervention (*Visicu*) was associated with reduced *hospital mortality* 11.8%, 95% CI, 10.9-12.8% vs. 13.6%, 95% CI, 11.9-15.4%, adjusted OR 0.40 95% CI, 0.31-0.52), *reduced hospital LOS (9.8 vs. 13.3 days*, hazard ratio for discharge 1.44; 95% CI, 1.33-1.56), *adherence to best practice and lower rate of preventable complications. (1.6% vs 13%, for VAP Pneumonia, OR, 0.15; 95% CI, 0.09-0.23) and (0.6% vs 1.0 %*, for catheter-related bloodstream infection OR, 0.50; 95% CI, 0.27 – 0.93). In a meta-analysis of 13 studies involving 35 ICU's, telemedicine ICU coverage was associated with *lower ICU mortality* (pooled OR = 0.80, 95% CI, 0.66-0.97, P= .02) and *ICU LOS* (length of stay), (mean difference = -1.26

to the development and implementation of telemedicine through two basic models: The *Visicu* model and *Remote presence - InTouch* model of telemedicine delivery. The *Visicu* care delivery system provides a robust *central monitoring station* equipped with monitors connected by a camera system from patient ICU rooms, continuous telemetry vitals monitoring and access to electronic medical record. These monitoring stations are completely staffed 24/7 by a physician intensivist, nurse and clerk. This central monitoring station can be within the hospital or at a distant remote location, providing care to an ICU of a geographically distant hospital, however, in direct telephone contact with the ICU care team. With the *Remote presence* system - InTouch, the ICU or primary care physicians have the ability to monitor their own patients and communicate with ICU staff, from a secure connection via the Internet over night or from a remote location off hours, with a mobile robot camera stationed in the ICU. The main differences in these two models is the goal in the *Visicu* model, assurance of *adherence to best medical practice* and *continuity of care* by the intensivist, surgeon, internist in the *Remote presence-InTouch* model.

Some of the challenges of (*Visicu*) telemedicine in ICU care have been: Acceptance of telemedicine ICU consultant directives, timely availability and accuracy of electronic record entry and ability to provide staffing 24/7 coverage in central stations with board certified intensivists. In reference

“Advances in information technology and electronic record keeping have contributed to the development and implementation of telemedicine through two basic models: The *Visicu* model and *Remote presence - InTouch* model of telemedicine delivery.”

days, 95% CI, -2.1 to -0.30, P= .01), but not with *lower in-hospital mortality* (pooled OR = 0.82, 95% CI, 0.65-1.03, P= .08) or *hospital LOS* (mean difference = -0.64; 95% CI, -1.52 to 0.25, P= .16).

Advances in information technology and electronic record keeping have contributed

to the *Remote presence-InTouch* technology, currently there are no patient outcome studies available.

Supporters of *Visicu* telemedicine argue that this type of care promotes *adherence to best medical practice* via a *proactive role* through systematic review of daily goals such as DVT

## CON: Telemedicine ICU Coverage

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prophylaxis, VAP bundle prophylaxis, adherence to prevention of blood stream infections, etc. In addition, this type of care allows physicians at the monitoring station to assume the *reactive role* in the care of ICU patients in prevention of acute events. The integrated smart electronic software monitors all patients in the target ICU at the same time, analyze the trends in vital signs and fires alerts to physicians in the monitoring station.

On the other hand, critics of telemedicine argue that all *quality improvement goals* can be achieved without telemedicine simply by adhering to best practices. This can be further facilitated by electronic health record adoption and facilitating health information exchange. This would include work on compatibility of electronic medical records for inpatient, ambulatory, medical offices and radiology/laboratory data systems in academic as well as community hospitals.

In reference to accuracy of direct and manually entered data in electronic medical records, the air industry has recently brought to our attention the final report stressing (Air-France flight 447 crash Airbus from Rio de Janeiro – Paris 2009 ) *potential dangers of blind adherence to technology* and in that context, occurrence of *human error*.

This is a segment from the final report Air-France flight 447: *“As a result of incorrect speed indications ( Hypothesis: secondary to presence of pitot probes ice crystals) and some automatic systems being disconnected, the airplane’s path flight 447 was not controlled by the two co-pilots, they were re-joined 1 min and 30 sec later by the captain while the airplane was in a stall situation that lasted until impact with the sea.*

Although, the supporting evidence for the value of telemedicine is yet to come, this model of ICU care will continue to offer hospitals and physicians an additional resource for management of critically ill patients in community hospitals and those academic centers where the weekend coverage and night coverage is not provided by an in house intensivist. However, cost of installation and additional ongoing costs for upkeep needs to be considered when adopting this ICU care model. More studies showing the impact of the telemedicine intervention in abolishing deficiencies in the studied ICU may help better establish the role of telemedicine in ICU care.

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## ASA House of Delegates Summary



Mark E. Nunnally, M.D., F.C.C.M., ASA Delegate

The American Society of Anesthesiologists (ASA) House of Delegates met on Sunday, October 14, and Wednesday, October 17, completing the governance cycle for the year. The House must consider all reports submitted to it or to the Board of Directors in the last governance year. Once again, reports totaled over 1,300 pages. Fortunately, only a few items were controversial.

The past year has seen ASA undergo many administrative and staff changes. Chief among them was a transition to a single CEO, currently filled on an interim basis. At the same time these changes have happened, there is ongoing debate about the bylaws of the organization and the way it is governed. Contentious language about the respective roles of the House of Delegates and the Board of Directors in the business and financial affairs of the society were referred to committee, and an item that had been hotly debated at the Board of Directors was disposed of with little discussion.

An ongoing concern for SOCCA are the changes within ASA regarding the care of subspecialties. Subspecialty administration fees are rising annually, as a part of the ASA's recalculation. Now in implementation is the

proposal passed at last year's House to form a committee "to define and report to this House of Delegates what type of relationship with the anesthesia subspecialty organizations best gets us to our mission statement of 'Advancing the Practice and Securing the Future' and how any change in the current relationship might affect the health of the ASA and the subspecialty societies." We anticipate a report from the ad hoc committee by fall or spring. Although subspecialty fees will increase, it is expected that the committee might come up with a better framework for deciding their amount and the nature of the relationship between ASA and its subspecialties.

Deep sedation was again an area of debate. The House approved amended language to the "STATEMENT ON GRANTING PRIVILEGES TO NONANESTHESIOLOGIST PHYSICIANS FOR PERSONALLY ADMINISTERING OR SUPERVISING DEEP SEDATION." A separate proposal was passed to have a committee develop educational and media products to raise awareness about the risks, benefits and safety of sedation.

There were several other interesting items of business. The possibility of publishing *Anesthesiology* is being explored. A proposal to create certification for the subspecialty of cardiovascular anesthesiology was referred to committee. Support for international outreach is high. Measures to improve anesthesia care in Central America and Rwanda were supported, but a motion to make improving care in resource-limited settings a core ASA objective was disapproved. Language defining "immediately available" in the context of anesthesiologist supervision was referred to committee. Plans for another ASA educational summit and for a simulation summit in the next year were approved.

In elections, J. P. Abenstein, M.D., defeated Arthur M. Boudreaux, M.D., for first vice president and Jeffrey Plagenhoeff, M.D., won the seat of assistant secretary, defeating Scott Groudine, M.D.

### Other elected officers for ASA in 2013 are:

Immediate Past President:

Jerry A. Cohen, M.D.

President:

John M. Zerwas, M.D.

President-Elect:

Jane C. K. Fitch, M.D.

Vice President for Professional Affairs:

Norman A. Cohen, M.D.

Vice President for Scientific Affairs:

Arnold Berry, M.D.

Treasurer:

James Grant, M.D.

Assistant Treasurer:

Mary Dale Peterson, M.D.

Secretary:

Linda Mason, M.D.

Speaker:

Steven L. Sween, M.D.

Vice Speaker:

Ron Harter, M.D.

Your delegate and alternate delegate are happy to serve the society and hear any concerns you might have. We encourage you to get involved in the ASA political process with testimony or volunteer efforts.

As a final note, I will submit my last House Update for the *Interchange*, having completed my second term as delegate. Dan Brown, M.D. will be carrying out SOCCA's delegate duties for the next three years. It has been my pleasure to serve this society in the past six years, and I look forward to my service on the SOCCA Board of Directors.

Respectfully submitted as your society's representatives in the House.

Mark E. Nunnally, M.D., F.C.C.M., Delegate

## Calling All Researchers: Time to Submit Your Results to A&A



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Just a few years ago SOCCA entered into an agreement with *Anesthesia & Analgesia*; having our logo on the cover of every issue gives our society visibility and a venue to educate our colleagues on topics regarding the care of patients who are critically ill. The journal's goal is to increase its coverage of critical care medicine issues of importance to anesthesiologists and to increase the journal's scientific impact. To do so, the journal is

soliciting original, innovative scientific articles devoted to critical care medicine, the results of which would be of interest to clinical anesthesiologists and that would help advance the practice of anesthesiology.

As the section editor for "Critical Care, Trauma and Resuscitation," the section sponsored by SOCCA, I encourage you, our members, to consider *Anesthesia & Analgesia* as the journal in which to publish your work.

If you have not published in *Anesthesia & Analgesia* in the past, please consider doing so now in support of our society.

If you are new to the area of research, but have an interest in sharing your insights with colleagues, might now be a good time

"test" this hypothesis. I emphasize "test" as opposed to "prove" because if one is trying to "prove" something, one has a bias that will result in a flawed study. From the scientific perspective, the goal is to assess the impact of an intervention in an unbiased fashion. With a statistician's help, one can plan a protocol and perform a power analysis to know how many subjects must be in each population studied to minimize the chance of a Type I error, one of the most common errors seen in manuscripts submitted to journals.

Once the study is completed and the data analyzed, my final recommendation to you is to solicit the help of a medical writer to help prepare the final manuscript describing the

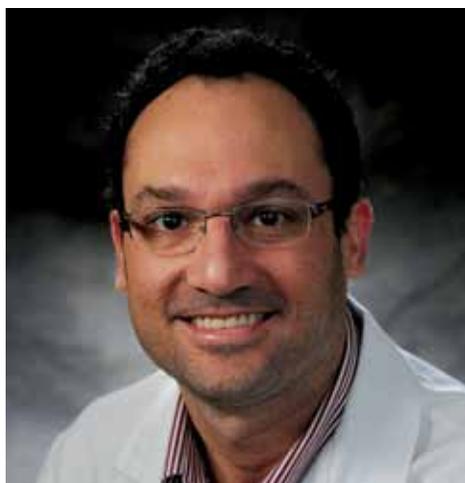
"If you are new to the area of research, but have an interest in sharing your insights with colleagues, might now be a good time to consider doing so?"

to consider doing so? I have a few caveats for you, though, if you wish to pursue this quest. If you have an opinion or an interest or a question about a treatment or technology, I encourage you to pursue your interest and answer your question with a scientific study, one that you would then submit to our section in *Anesthesia & Analgesia*. The most important initial issue is to develop a hypothesis whether you plan a retrospective study, an observational study or a prospective study. Once the hypothesis is established, the next equally important step is to talk to a statistician on how one would

study. For many of us, we are so familiar with the details of the study that we can't see the forest for the trees. If an experienced writer edits the manuscript, the chances are increased that the editors, reviewers and, most importantly, the readers of *Anesthesia & Analgesia* will understand your work and insights.

SOCCA is committed to its relationship with *Anesthesia & Analgesia*. I encourage you to submit your manuscripts, or if in a more embryonic phase, I encourage you to contact me with any questions about studies you are considering.

## Fellowship Program Directors Breakfast Summary



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 Chief, Division of Critical Care  
 Program Director, Adult Critical Care Medicine Fellowship  
 Medical Director, Penn eLert Telemedicine Program  
 Department of Anesthesiology and Critical Care  
 Perelman School of Medicine, University of Pennsylvania

This year's Fellowship Program Directors (PDs) Breakfast saw a change in format. Whereas in prior years a speaker was invited to give a lecture on an issue of interest for PDs, this year we devoted the entire two hours to a robust agenda created with input from all PDs. The SOCCA Program Directors Committee has been formally recognized by the society and our charter is in accordance with SOCCA bylaws. I am currently chair of this committee of 10, with Dr. Steve Deem as my co-chair. Initial members were selected by the SOCCA Board of Directors and represent diversity with respect to, among other things, gender, race, geography and program size. All terms and subsequent appointments will occur per SOCCA committee bylaws. Over the past year, this committee

has worked hard to unify and organize our PD group at large (now 51 strong). Through our newly created listserv, communication within the group is now frequent and lively. As was evident by the large attendance at our breakfast meeting, our group has grown tremendously and our voice is stronger than ever. While our myriad opinions are diverse and, at times, seemingly incongruent with others, we have clearly become comfortable with our new forum and we are making great advancements for our specialty and our trainees.

We began our meeting at 7 a.m. with an update by Dr. Doug Coursin on relevant ABA/RRC issues. Importantly, the ABA has recently announced that it is in the process of developing formal pathways for emergency medicine (EM) residents to enter our Anesthesia Critical Care Medicine (ACCM) fellowships and be eligible for board certification upon completion. Dr. Robert Sladen, president of the Association of Anesthesiology Subspecialty Program Directors (AASPD), and PD at Columbia, updated us on activities relevant to AASPD and encouraged all PDs to attend the upcoming meeting in San Francisco.

### Ultrasound

Our group has made considerable strides in efforts related to advancing the use of critical care ultrasound and trying to evaluate barriers to comprehensive training for our fellows, something that likely will become mandatory in the coming years. All PDs were surveyed online prior to the annual meeting about issues pertaining to ultrasound and the results were disseminated to the group at large. This will be helpful as we continue moving forward.

### Match

The remaining discussion primarily centered on the Match. Specifically, creating timelines and finalizing our common application form. We had previously identified that the vast majority of ACCM PDs have interest in participating in a match process. We are working with SOCCA lawyers to establish SOCCA as our primary sponsor in this effort. It was noted that the Society of Cardiovascular Anesthesiologists (SCA) has recently gone forward in joining the match in the upcoming cycle. Our group is finalizing what we feel is an appropriate common application form that will be made available online on the SOCCA website. SOCCA has generously added a specific section to the website dedicated to fellowship training programs.

### Interchange PDs Corner

Dr. Liza Weavind, upcoming editor of the SOCCA Interchange, and PD at Vanderbilt, invited PDs to share and exchange their experiences through a newly planned section in the newsletter. All PDs are welcome to present ideas and suggestions that would be of benefit to other PDs.

Our meeting adjourned at 9 a.m. As per our charter, our next in-person meetings will be held at AASPD in San Francisco followed by SCCM in San Juan, Puerto Rico.

## Literature Review: Hydroxyethyl Starch in Severe Sepsis



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Article: Perner A, Hasse N, et al. Hydroxyethyl Starch 130/0.42 versus Ringer's Acetate in Severe Sepsis. *New Eng J Med.* 2012; 367:124-34.

The care of patients with sepsis, severe sepsis or septic shock is near and dear to the hearts of all intensivists. Well-established guidelines have been published and describe in detail the important first steps of initial resuscitation.<sup>1</sup> Markers such as central venous pressure between 8-12 mmHg, mean arterial pressure >65 mmHg, urine output >0.5 mL/kg/hr, central venous oxygen saturation of >70 percent, or mixed venous oxygen saturation of >65 percent are common resuscitation goals as defined by the "Surviving Sepsis Campaign." Early goal-directed therapy within the first six hours has been shown to reduce the 28-day mortality rate.<sup>2</sup> Existing guidelines recommend fluid challenges of 1,000 ml of crystalloids or 500 ml of colloids over 30-minute intervals. However, which fluid to use (crystalloids vs. albumin vs. artificial colloids) has not yet been fully established.

Randomized control trials have compared crystalloids to albumin<sup>3</sup>, along with crystalloids versus pentastarch.<sup>4</sup> In the normal saline vs. albumin fluid evaluation trial (SAFE trial), 6,997 heterogeneous patients admitted to the intensive care unit (ICU) were randomly assigned to receive either 4 percent albumin or normal saline for intravascular fluid resuscitation.<sup>3</sup> Single-organ and multiple-organ failure was similar, along with days in the ICU, days spent in the hospital, days of mechanical ventilation or days of renal-replacement therapy. However, a post-hoc analysis of the SAFE study does suggest that critically ill patients with traumatic brain injury who were resuscitated with albumin had higher mortality rates when compared with the normal saline group.<sup>5</sup> In the crystalloid vs. pentastarch trial (Intensive Insulin Therapy and Pentastarch Resuscitation in Severe Sepsis, VISEP study), 537 patients with severe sepsis were randomly assigned to either group and no difference was found in 28-day mortality.<sup>4</sup> The trial was stopped early for safety reasons because of the increasing trend in 90-day mortality among the patients receiving pentastarch.

In a recent article from the July 2012 issue of the *New England Journal of Medicine*, Perner et al. question the use of hydroxyethyl starch (HES) 130/0.42 when comparing it to Ringer's acetate in patients with severe sepsis. HES (130/0.42), a third generation synthetic colloid, is considered to be safer because of its lower molecular weight and lower degree of substitution, which leads to theoretically less plasma accumulation and more rapid renal excretion.<sup>6</sup> In Perner's study, 798 patients who met the criteria for severe sepsis within the previous 24 hours were randomized into two groups, 6 percent HES 130/0.42 in Ringer's acetate or Ringer's acetate. The fluids were then used when the ICU physicians deemed volume expansion was necessary in the ICU for a maximum of 90 days. A maximum of 33 mL/kg ideal body weight was initially designated for each group; if more fluid was needed, Ringer's

acetate was used regardless of which fluid group the patient was initially assigned. The primary outcome of either death or dependence on renal replacement therapy at 90 days occurred in 51 percent of the patients in the HES group vs. 43 percent of the patients in the Ringer's acetate group (RR 1.17; 95% CI, 1.01 to 1.36; P=0.03). The secondary outcomes show that 10 percent of the HES group had severe bleeding vs. 6 percent in the Ringer's acetate group (RR 1.52; 95% CI, 0.94 to 2.48; P=0.09).

This article makes the argument that fluid resuscitation with HES 130/0.42 is associated with an increased risk of death at day 90 and is associated with an increased risk of renal replacement therapy when compared to the group receiving Ringer's acetate. There were several aspects of the study that should be mentioned. First, if additional fluid beyond the initial cap of 33 mL/kg was deemed necessary (at the discretion of the intensivist), Ringer's acetate was used regardless of which trial fluid the patient was initially assigned. Second, albumin and crystalloid solutions were allowed for other indications other than volume expansion, again at the discretion of the intensivist. When comparing median cumulative volume received, it was around 3,000 mL for both groups. Third, patients in the HES group received more blood products when compared to the Ringer's acetate group. The article does not specify why, but one would ponder if these patients needed more blood secondary to the use of HES (e.g., HES-induced coagulopathy) or if they had some type of sequelae from receiving blood (e.g., TRALI, SIRS). The trial also does not include hemodynamic monitoring or assessment of additional interventions. The lead investigators asked that the involved centers follow and use the Surviving Sepsis Campaign Guidelines, but this was again at the discretion of the treating intensivist.

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## Literature Review: Hydroxyethyl Starch in Severe Sepsis

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This article points out (yet again) the long saga for using HES in the critically ill patient. Numerous articles highlight and question the safety when HES is used,<sup>7-11</sup> illustrating the multitude of side effects (namely impaired renal function) that ensue with the use of HES. A study from the University of Maryland suggested not using HES in trauma patients secondary to increased risk of acute kidney injury and mortality.<sup>7</sup> Moreover, the European Society of Intensive Care Medicine (ESICM) developed a task force to create a consensus statement on the best evidence for using HES, gelatins and human albumin.<sup>9</sup> The ESICM findings suggested not using HES in patients with severe sepsis or those at risk of acute kidney injury. Furthermore, a multicenter, randomized control study published in *The Lancet* by Schortgen et al. demonstrated that the use of HES was an independent risk factor for acute kidney injury in patients with severe sepsis.<sup>11</sup> A 2011 Cochrane Collaborative review of 34 studies (~2,600 patients) compared HES vs. other fluid therapies regarding their effect on kidney function.<sup>12</sup> In the HES groups, the

risk of kidney injury was 1.50 (95% CI, 1.20-1.87) and 1.38 for patients requiring renal replacement therapy (95% CI, 0.89-2.16).

In summary, while most studies and systematic reviews on the safety and effectiveness of HES are prone to various study limitations, two sure conclusions can be drawn. First, when caring for any critically ill patient (septic, trauma, burn, post-surgical, etc.) meticulous fluid resuscitation gives these patients the best chance at survival, and second, the role of specific, early goal-directed therapies (source control, antibiotic therapy, lung protection ventilation, damage control surgery, etc.) can significantly improve survival. However, when choosing a fluid for resuscitation, starch formulations are probably best avoided in septic patients and/or those at risk for acute kidney injury.

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## SOCCA Member Wins NIH Award for Multicenter ICU Sedation Study

SOCCA is pleased to announce a recent NIH R01 award to Pratik Pandharipande, M.D., F.C.C.M., Associate Professor of Anesthesiology at Vanderbilt University. A SOCCA member since 2002, Dr. Pandharipande is part of the Vanderbilt ICU delirium and cognitive impairment study group focusing on cognitive effects of sedation in the ICU. Dr. Pandharipande's work has contributed to the identification of benzodiazepines as a risk factor for delirium and the potential benefit of non-benzodiazepine sedation strategies. He was a SOCCA/FAER/Hospira grant recipient in 2005 and was the lead author of the 2007

MENDS trial comparing deliriogenic effects of dexmedetomidine and lorazepam when used for ICU sedation.

Dr. Pandharipande's newly funded R01 will compare dexmedetomidine and propofol-based sedative strategies in 530 patients with severe sepsis and on mechanical ventilation and assess not only delirium and duration of mechanical ventilation outcomes, but also systemic inflammation, long-term cognitive impairment and mortality in humans. SOCCA congratulates Dr. Pandharipande on his award and impressive record of research accomplishment!



## Fellowship Review: Critical Care Medicine Fellowship at the University of Michigan



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The anesthesiology critical care medicine fellowship at the University of Michigan is a mixed anesthesiology/surgery program clinically based around 13 four-week clinical blocks. There are five blocks of SICU, three CVICU, one NSICU, two ICU-based elective, two general electives, and one block (four weeks) of vacation. There are six anesthesiology critical care medicine fellows who have a similar, but not identical, schedule to the nine surgical (six adult and three pediatric) critical care medicine fellows. Most of the anesthesiology fellows choose to use one month of their general elective rotation in the O.R. gaining experience with transesophageal echocardiography. Other popular choices for these general elective rotations include transthoracic echocardiography, nephrology and cardiology rotations. The ICU electives may

be in any ICU; however, most fellows choose the educational environment of the MICU.

The SICU is a closed unit in which the fellow is the team leader conducting daily multi-disciplinary rounds, triaging all SICU and step-down admits, and responding to calls on decompensating surgical patients throughout the hospital. The multidisciplinary care team includes a surgical or anesthesiology critical care attending, a fellow, several residents, a pharmacist, a dietician and a respiratory therapist. There are very few routine scheduled admits to the unit other than patients admitted following liver transplantation. The SICU is also a major regional referral center for ARDS and ECLS. The SICU fellow is responsible for all incoming calls for all external ECLS transfer requests. In addition, the fellow works with fixed and rotary wing flight crews to optimize these patients prior to and during transfer. Most of the transfer patients require advanced mechanical support such as HFOV, APRV and bi-level, many receive prone positioning and nitric oxide, and some go onto receive V-V

complex patients transferred from around the region. The majority of patients are admitted following complex aortic reconstruction and cardiac valve replacement procedures, including TAVI. In addition to the heart and lung transplant patients admitted to the CTICU, multiple advanced cardiac support devices, including VADs, V-A ECLS and IABP, are all frequently encountered.

In addition to the high daily clinical acuity, there is a strong didactic educational program at the University of Michigan. The CTICU has attending lectures twice weekly and a monthly fellow-driven M&M. The SICU has a weekly fellow-driven journal club, a weekly attending lecture from an expert within the institution and a weekly fellow-driven ICU lecture. There is also a monthly fellow-driven M&M. The fellows are given time and resources to attend the SOCCA and SCCM annual meetings. Each fellow is expected to submit at least one manuscript to a peer-reviewed publication. Each fellow is also given a generous book fund and iPad.

Overall, the critical care medicine fellowship at the University of Michigan provides fellows with a well-rounded clinical experience and ample education opportunities within a well-supported program set in a vibrant and growing community.

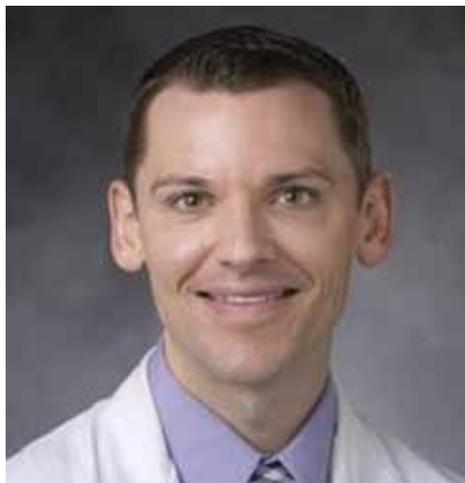
For more information on the program, please contact the program director, Yasser Kouatli, M.D., at [yassere@med.umich.edu](mailto:yassere@med.umich.edu).

“In addition to the high daily clinical acuity, there is a strong didactic educational program at the University of Michigan. The CTICU has attending lectures twice weekly and a monthly fellow-driven M&M.”

ECLS. The fellow manages ECLS with help from an ECLS-specialist service.

The CTICU is a closed unit within a very active cardiovascular center. The multidisciplinary care team includes an anesthesiology critical care medicine or cardiac surgical attending, a fellow, multiple residents, a nurse practitioner, a pharmacist, a dietician and a respiratory therapist. On this rotation, the fellow is part of a multidisciplinary team managing high-volume,

## Fellowship Review: Duke University Medical Center Anesthesiology/Critical Care Medicine Fellowship



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The critical care medicine fellowship at Duke University is an ACGME-accredited, multidisciplinary, 12-month training program. During training, ICU fellows experience a variety of ICU environments and management models, help to manage a wide array of surgical, traumatic and medical illnesses, and participate in the education of care teams. In addition to clinical practice and education, fellows gain experience in research and ICU administration under the supervision of the exceptional faculty of the Department of Anesthesiology at Duke University Medical Center to advance the field of anesthesiology and critical care medicine. Increasing levels of fellow responsibility throughout the training continuum leads to the development of expertise in independent practice by the completion of the fellowship.

Five one-year training positions are approved. The core of critical care training occurs in two ICUs. The first is the surgical and trauma ICU (SICU) at Duke Hospital. This 16 bed, level 1 trauma ICU is co-managed by anesthesiologists and trauma surgeons who

are board-certified in critical care medicine. In July 2013, this facility will move into a new, 24-bed, state-of-the-art unit, part of the nearly completed Duke Medicine Pavilion, a component of the expansion of Duke University Hospital that will add 16 new operating suites and 160 critical care and intermediate beds. Intensivists manage all patients admitted to the SICU. Patients are admitted to the SICU following large and/or complicated procedures such as vascular, gastrointestinal or ENT/plastic surgeries, as well as liver transplant, among others. The SICU fellow also manages obstetric patients who require critical care services and receives other surgical patients who develop complications. In addition, a large percentage of patients in this unit are those who have suffered major trauma. This unit provides a broad experience in the care of critical illness in patients with surgical and traumatic diseases and processes.

The other core ICU is at the Durham VA Hospital, located just across the street from Duke Hospital. This is an 11-bed, closed-unit

model ICU staffed by board-certified critical care anesthesiologists (many of whom also have cardiothoracic anesthesia training and are board-certified in transesophageal echocardiography). In close consultation with the surgical teams, fellows in this unit help to manage a wide range of surgical patients: general, neurologic, vascular, thoracic and cardiovascular, among others. The months spent at the VA hospital also allow for additional experience and training in transesophageal echocardiography, as described in subsequent paragraphs.

ICU fellows rotate through three other units at Duke Hospital. One month is spent in the medical ICU (MICU), which provides a wide breadth of critical medical illnesses. This unit is staffed by pulmonologists, and fellows work closely with the medical residents on this rotation to help manage the care of very ill patients. ICU fellows spend one month (broken into two, two-week blocks) in the cardiothoracic surgery ICU (CT-ICU). The CT-ICU is staffed by anesthesiologists specialized in cardiothoracic anesthesia, critical care medicine and transesophageal echocardiography. This rotation provides for an in-depth understanding of cardiovascular pathophysiology and the management of postoperative issues following cardiac surgery. Many patients in this unit have ventricular-assist devices in place, and patients on VA-ECMO are not uncommon. Finally, fellows experience one month of neurologic critical care. The fellows spend two weeks in the neuro-ICU. This is a 16-bed, mixed medical-surgical unit that cares mostly for postoperative neurosurgery patients, those with medical neurologic disease (i.e., stroke) and those with isolated traumatic brain injury. Experience is gained in various diagnostic (e.g., intraventricular, transcranial Doppler, and jugular venous saturation monitoring) and therapeutic (neuroradiologic intervention,

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## Fellowship Review: Duke University Medical Center Anesthesiology/Critical Care Medicine Fellowship

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therapeutic hypothermia) modalities. It is staffed by neuro-intensivists from the Division of Neurology and the Department of Anesthesiology. The fellow spends the remaining two weeks as a member of the stroke code team, responding to neurologic emergencies throughout the hospital and providing initial diagnostic and therapeutic interventions to patients presenting with signs and symptoms of acute cerebrovascular disease.

A unique aspect of the critical care training program at Duke is the integration of ICU fellows' instruction in transesophageal echocardiography (TEE) with the cardiothoracic anesthesia fellowship program. ICU fellows benefit immensely from the well-structured and thorough education in TEE. Six weeks are spent on the "echo rotation" – two-week blocks spaced intermittently throughout the year where ICU and cardiac fellows (usually one from each program) perform and interpret all TEEs that occur in the operating rooms and the CT-ICU. ICU fellows spend another five to six weeks in the cardiac operating rooms, performing TEEs and conducting the anesthesia for all types of cardiac cases: CABG, valve repair/replacement, HeartPort (minimally invasive) mitral and aortic replacements, transcatheter aortic valve replacements, ventricular-assist device placement, and heart and lung transplants, among others. During these weeks, fellows participate in the TEEs performed by the "echo fellow" occurring in the operating room. Cardiac anesthesiologists, board-certified in perioperative echocardiography, supervise fellows dur-

ing these rotations. In addition, while at the VA hospital, ICU fellows have the opportunity for further TEE training. They are responsible for performing postcardiopulmonary bypass echocardiograms in the cardiac surgery operating room, as well as for other indications, such as evaluation for intracardiac thrombus prior to cardioversion/ablation, and for suspected endocarditis. These experiences performing and interpreting a minimum of 300 TEEs (including 150 Level 1 exams), along with the yearlong, twice-weekly didactic series on echocardiography and cardiac anesthesia, provide sufficient experience for ICU fellows to qualify for board certification in advanced perioperative

provide patient care in the ICUs at Duke. Didactic sessions for fellows include the following: Monday afternoon critical care fellows didactic session focuses on board review topics and includes pulmonary, neurology, anesthesiology and surgical ICU fellows and attendings. The cardiothoracic anesthesia division organizes Tuesday evening and Wednesday morning conferences on TEE and cardiac anesthesia. Fellows are encouraged to attend anesthesiology grand rounds, also on Wednesday mornings. In addition, there is a multidisciplinary cardiac surgery and cardiac anesthesia conference at the VA hospital on Wednesday afternoons. Fellows on rotation at the VA attend this weekly

“Research is an important component to the critical care fellowship at Duke. There are many ongoing studies in the Department of Anesthesiology in which fellows can participate, but collaboration with other departments is encouraged and supported if it fits the trainee’s interest and goals.”

transesophageal echocardiography. Since the inception of TEE training as part of the critical care fellowship at Duke in 2008, all fellows have successfully gained board certification in both advanced perioperative TEE and critical care medicine.

Education of ICU fellows at Duke includes a combination of bedside teaching and didactics. Attending intensivists round on every patient, every day. Fellows act as both learners and teachers on rounds. Attending physicians, nurses, respiratory therapists, nutritionists and pharmacists all add to a multidisciplinary educational approach to daily rounds in all units. Fellows participate in teaching on rounds as well, especially for the residents, medical students and mid-level providers who all help to

TEE-based conference. Invited speakers provide a wide exposure to varied topics in critical care medicine during multidisciplinary critical care grand rounds every Thursday at noon. Finally, there is a fellow's conference on Thursday afternoons, which targets all anesthesiology subspecialty fellows in the department and covers a variety of topics important to practicing anesthesiologists. In addition, fellows are welcome to attend any didactic sessions throughout the hospital, including other departments, if so desired.

Research is an important component to the critical care fellowship at Duke. There are many ongoing studies in the Department of Anesthesiology in which fellows can participate, but collaboration with other departments is encouraged and supported if it fits the trainee's interest and goals. In addition, there is ample support for any trainee who is interested in starting his or her own project. Recent fellows

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## Fellowship Review: Duke University Medical Center Anesthesiology/Critical Care Medicine Fellowship

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have conducted research in a variety of topics, including the use of simulation for airway and sedation training of non-anesthesiologists; blood volume analysis; invasive and non-invasive hemodynamic monitoring; predictors of renal dysfunction following surgery; effects of blood storage on tissue oxygen delivery; and evaluation of effectiveness of patient hand-offs.

Duke University Hospital has been consistently recognized by publications such as *TIME* and *U.S. News and World Report* as one of the country's best health care providers. Duke Hospital is a 924-bed acute care hospital with a large referral network, with two new recent expansions representing a \$700 million investment in health care at Duke. The new cancer center, which opened in 2012, is a 267,000-square-foot facility built with the goal

of consolidating outpatient cancer services and research. The Duke Medicine Pavilion, opening in July 2013, will be an eight-story, 580,000-square-foot facility. This will include 16 new, state-of-the-art operating rooms, 96 critical care beds and 64 intermediate care beds. Duke University Hospital is located within walking distance of the beautiful Duke University undergraduate campus, home of the Duke Blue Devils, and is two miles from downtown Durham, an area with a growing reputation for excellence in sports, music, the arts, fine dining and more. (<http://www.downtowndurham.com/>) Durham and the surrounding areas, including Chapel Hill and Raleigh, have been consistently ranked among the best places in the country to work, live and eat.

The critical care medicine fellowship at Duke University provides an expansive and multidisciplinary education in critical

care medicine and transesophageal echocardiography in a supportive environment. We hope you consider Duke to further your education in ICU medicine. For further information, or to apply to this unique opportunity to train in both critical care medicine and transesophageal echocardiography, please visit our website: [http://anesthesiology.duke.edu/modules/anes\\_flwshp](http://anesthesiology.duke.edu/modules/anes_flwshp)

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## SOCCA 2013 Annual Meeting and Critical Care Update

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