

THE GAS PIPELINE

DEPARTMENT OF ANESTHESIA

STANFORD UNIVERSITY MEDICAL CENTER

STANFORD, CA 94305



Patricia I. Rohrs, Editor ♦ Susan Lim, Assistant Editor ♦ February-March 2006

CHAIRMAN'S UPDATE



The future for anesthesiologists in the OR and critical care—During the past two months, I met 150 anesthesia residency applicants invited to interview at Stanford. They repeatedly asked about the future of our specialty. I also spoke at anesthesia meetings on critical care topics and at critical care meetings on anesthesia topics, where we discussed the role of anesthesiologists in critical care. In this column, I will discuss my thoughts on two, related questions:

- Is there a future for anesthesiologists in the OR?
- Is there a future for anesthesiologists in critical care?

Caliber of students is source of optimism—As mentioned in my last column, the quality of medical students entering our specialty is a reason for great optimism. Anesthesia residency applications increased by over 20% this year; Stanford had over 600 applicants. Of 150 applicants we interviewed, over half were AOA, and their median USMLE step 1 score was 237. The applicants possessed an impressive array of

academic and extracurricular accomplishments, and they were equally impressive in person. However, although many of them are excited by critical care and pain management, the majority plan on a career focused on operating room anesthesia.

Predictions—Many nationally prominent anesthesiologists predict that a career focused on operating room anesthesia will not be possible, because safer drugs and less invasive surgical procedures will encourage the practice of non-anesthesiologists taking over more OR procedures, resulting in an excess of anesthesiologists. These pundits say our specialty should shift its focus from the operating room to perioperative management (preoperative assessment, critical care, pain management, and postoperative care).

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CHAIRMAN'S UPDATE CONTINUED

Although initially persuaded by this argument, I no longer agree for the following reasons: The increasing size of an aging and aged population and its increasing use of surgery (e.g., orthopedic surgery) to avoid disability guarantee that invasive surgery will continue to increase. Currently the number of anesthesiologists being trained barely exceeds the number retiring. Moreover, I am convinced that any advances in safer medication or less-invasive procedures will be balanced by the development of more complex surgical procedures and by an increased amount of surgery on sicker patients. For example, although we no longer provide anesthesia for routine pacemaker insertions, we now provide it for AICD insertions. The operating room has always been the core of our specialty, and I do not believe we will exist as a specialty without continuing this focus.

Anesthesiologists or Hospitalists? The argument that anesthesiologists should become perioperative physicians does not match the goals of the applicants I talked with. Although anesthesiologists may be interested in preoperative assessment, critical care, and pain management, they do not wish to be hospitalists—managing medical problems in stable patients before surgery, dealing with wounds, advancing diets after surgery, or planning discharges. I do not believe anesthesiologists can or should become hospitalists.

Critical Care is a Core Competency—I do vigorously support the goal of increasing the number of anesthesiologists involved in critical care. In fact, I am concerned that anesthesia is in danger of losing its current role in critical care. Our anesthesia residents are superb at managing critically ill medical and surgical patients, and their critical care experience is important in teaching intraoperative anesthesia management. However, despite the fact that many residents enter anesthesia with an interest in critical care, only 3% actually continue with a critical care fellowship. I am optimistic that we can triple that number, but the number of critical care fellows will still remain a small proportion of our specialty.

The 51 anesthesia critical care fellows in 2004-5 contrast to the 119 surgical critical care fellows and the 1,249 medicine and pulmonary critical care fellows. I am very concerned that when anesthesiologists represent only 5% of critical care physicians, we will cease to be recognized as a significant player in critical care. We should place high priority on increasing the number of anesthesiologists who enter critical care. Although some leaders advocate increasing the number of months residents train in critical care, I do not believe that the problem is one of exposure or experience. At Stanford, our residents participate in primary, multidisciplinary critical care in the leading program in the country, yet the percentage who enter critical care is not dramatically higher than in other programs. We provide superb models of academic anesthesia-trained intensivists for our residents, but, as a specialty, we have failed to develop models of community practice that effectively combine operating room anesthesia and critical care. We will not increase the number of residents who enter critical care until practice group dynamics change, so that a critical care residency increases rather than decreases job opportunities.

Anesthesiologists played a central role in developing the field of critical care. Critical care is one of anesthesiology's success stories. We often state that the anesthesiologist is the internist in the operating room, but it may be more accurate to state that the anesthesiologist is the intensivist in the operating room. I believe anesthesiology should expand its role in critical care to survive as a specialty, while recognizing that the major efforts of anesthesiologists will remain in the operating room. I look forward to the readers' views on these issues.

Ronald G. Pearl, MD, PhD
Professor and Chairman
Department of Anesthesia

ALUMNI CORNER

I want to say “hi” to my friends and those who became like family to me during my time at Stanford. Sam (my husband), Brian (my 10 month old son), and I are all loving living in Colorado. We are in Fort Collins, a rapidly growing area with a relatively inexpensive cost of living, great schools, and good proximity to the mountains. I am job-sharing with two other new Moms (we each do 2/3 time). My practice is general, but I am as involved in OB as possible as that is my interest. The group is collegial, competent, and happy to be living in such a nice place. The hospital where we are currently based is a Level 2 trauma center and there is another one being built which will be functional in 2007. While I can’t guarantee that we will be hiring for the new hospital, I know that my group keeps its eyes and ears out for good people. Despite my happiness with my new situation, I really miss my friends at Stanford! I hope that the New Year finds you all well.

—**Andi Fuller, MD** (Stanford Anesthesia Class of 2003, OB Fellow in 2003-04, and Staff in ‘04-05)

As an adult, you discover you’ve grown up to be remarkably similar to your parents. As an anesthesiologist, I find myself acting like my mentors at Stanford. While we teased several of the junior faculty about always saying, “We did it this way at (fill in the blank)” I now say, “We did it like this at Stanford.” Last fall while in Palo Alto for a wedding, I drove by the Stanford Art Museum. A large banner outside announced a party in honor of Mike Rosenthal. My husband and I crashed the party and what a wonderful time it was! I told Mike Rosenthal that as chair of the Resident Competency Committee at MetroHealth I’ve taken a page out of his playbook. I’ve grown up to become like my anesthesia parents! And I’m honored to say it.

—**Elizabeth A. Steele, MD**
Case Western/Metrohealth Medical Center

I left Stanford in 1997 after 19 wonderful years on the Farm to head up a newly created Division of Anesthesiology and Critical Care at the University of Texas MD Anderson Cancer Center in Houston. As Helen Shafer Fly Distinguished Professor in Anesthesiology, I currently lead 75 faculty and nearly 300 staff in three departments that provide patient care, research, and education for cancer patients. Our center is one of two, comprehensive cancer centers in the nation. We provide anesthesia care, critical care, respiratory care and pain management services in 36 ORs, 52 ICU beds and two major clinics, as well as throughout the institution. We train residents from 6 different institutions and operate fellowship programs in Pain Management and Critical Care Medicine.

Our clinical and laboratory research programs are well-funded by the NIH. In 2005 we published a first of its kind major textbook entitled *Acute Care of the Cancer Patient* (Taylor and Francis, New York) based on our clinical experiences here and at Stanford. We are fortunate to have Dr. Greg Botz, Stanford alum, as a key member of our faculty in the Department of Critical Care.

In addition to my anesthesiology responsibilities, I serve as the VP for Medical Operations assisting our Physician-in-Chief in providing medical leadership for over 900 physicians and 9,000 clinical employees. My responsibilities range from quality improvement to patient safety. As an anesthesiologist in a cancer institution I am truly honored to be serving in this capacity.

My wife Reisha and I live on our 225-acre ranch about an hour west of the medical center where we raise cattle and hay and keep a few horses. Our land varies from pastureland to woods with several lakes and streams. We share the area with deer, coyotes, raccoons, possum, wild turkeys and a variety of other friends a just outside a very typical rural Texas small town of 3500 residents.

The children still live in California. Brian, a former Stanford undergrad and medical student, is a senior resident in orthopedic surgery at UCLA with Phil Larson. Andrea lives happily in her Big Sur home, doing landscape design.

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Clinical Case of the Month: You're setting up to give anesthesia for a laparoscopic cholecystectomy. How many syringes and labels do you draw up and prepare? For a D & C? For an open abdominal aortic aneurysm repair?

Discussion: Try something new. When preparing for a cholecystectomy, open two syringes, both unlabelled, and don't open any ampules until the patient is in the OR. More on that later.

Let's examine two questions: **Why do we label syringes, and why do we load syringes with drugs ahead of time?** The answer to the first question is easy—we label syringes because we want to know what's inside of them. The Institute of Medicine's report from 1999, *To Err is Human: Building a Safer Health Care System*, reported that 98,000 patients died in U.S. hospitals each year due to medical errors. Administering the wrong drug is a known anesthesia risk which we all try to avoid.

In a study of 55,426 anesthetics used in Norway over 36 months, drug error was reported in 63 or 0.11% of cases. (Fasting S, *Can J Anaesth*.2004 Oct;51(8):853-4.) Drug errors included 28 syringe swaps, 9 ampule swaps, 8 'other wrong drug' cases, and 18 cases where the wrong dose of the correct drug was given.

In the second 18 months of their study, they switched to color-coded syringe labels and found

their results unchanged, except for a decreased number of ampule swaps ($P=.04$). They concluded that drug errors were uncommon, that syringe swaps occurred most often between syringes of equal size, and that color-coding of labels did not eliminate drug errors.

In a study of 896 drug errors reported in Australia, syringe- and drug-preparation errors accounted for 452 (50.4%) incidents. Of the 896 errors, 169 (18.9%) involved syringe swaps with the drug was correctly labeled but given in error, and 187 (20.8%) involved selecting the wrong ampule or making an error in drug labeling. (Abeysekera A, *Anaesthesia*. 2005 Mar; 60(3):220-7). Contributing factors included inattention, haste, drug-labeling error, communication failure, and fatigue. Factors minimizing the events included prior experience and training.

According to the first reference, a drug error was reported about once per 1000 cases in Norway. I'd ask you to consider how many incidents of drug error occur, versus how many are actually reported. I submit that the real prevalence probably exceeds what anesthesiologists admit to, and the real prevalence is significantly greater than 0.11%. And even though labeling syringes is important and mandated, doing so fails to decrease medication error to zero. In the future, we may see computerized visual and auditory bar-code verification of ampules and/or labels just before drug administration.

My second question to you was "Why do we load syringes with drugs ahead of time?" Common sense answers might be, "Because it makes our work more efficient," or "We might need them fast, and we don't want to draw the drugs up at the last moment." Opinions regarding the preparation of pre-drawn emergency syringes differ. In a study from New Zealand, a quarter of respondent anesthesiologists routinely drew up emergency drugs, and a third either never or very infrequently did so (Ducat CM, *Anaesth Intensive Care*. 2000 Dec;28(6):692-7). Among the drugs most commonly drawn up was succinylcholine, vascular cases were cited as factors that prompted anesthesiologists to draw up one or more of these drugs.

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DEPUTY CHIEF'S COLUMN CONTINUED

Drug wastage is known to be a significant portion of anesthesia drug budgets. In one fiscal year, the cost of unadministered drugs at Rhode Island Hospital was \$165,667 (Gillerman RG, *Anesth Analg* 2000 Oct; 91(4):921-4). Efficiency indexes, defined as the percent of a restocked drug that was actually administered to patients, were as follows: succinylcholine, 33%, propofol, 49%, rocuronium, 61%, and thiopental, 31%. In a study at UC San Diego, drug wastage was quantitated in 166 cases during a two week period (Weinger MB, *J Clin Anesth*. 2001 Nov; 13(7):491-7). Based on hospital drug acquisition costs, \$1802 of drugs were wasted in two weeks. Six drugs accounted for three quarters of the total wastage: phenylephrine (20.8%), propofol (14.5%), vecuronium (12.2%), midazolam (11.4%), labetalol (9.1%), and ephedrine (8.6%).

Think about it, my colleagues. Do you really need to draw up atropine and ephedrine before every case?

I queried Fred Hurt from the Stanford OR Pharmacy, and he gave me the following drug ampule acquisition costs: atropine \$0.23, ephedrine \$0.74, phenylephrine \$2.47, vecuronium \$2.51, rocuronium \$18.89, succinylcholine \$1.93, propofol 20ml \$4.76, and propofol 50 ml \$11.91.

I'll admit, in the scope of the healthcare budget of the United States, these numbers are miniscule, and you may not give a damn if your unused atropine and ephedrine costs Stanford 97 cents. But let's go back to my first paragraph and a technique to avoid drawing up a lot of drugs and labeling them. Part of the rationale is to avoid drug wastage, but the greater issue is the KISS principle—"Keep It Simple, Stupid." In a 20-year career you'll do 14,000 cases, and any practice that avoids wasted time and energy on each case is of value.

Try this: For a cholecystectomy, use an unlabelled 5 ml syringe to draw 2 mg of midazolam from its already labeled ampule, and inject it into the patient's IV. Minutes later, use the same syringe to draw 100 micrograms of

fentanyl from its already labeled ampule, and inject it into the patient's IV. Then use a second syringe, a 20 ml syringe, to draw 200 mg of propofol from its already labeled ampule, and inject it into the patient's IV. Finally, use the first syringe to draw 10 ml of Lactated Ringers from the IV bag and inject it into an already labeled ampule of vecuronium, mix it up, and inject 0.1mg/kg of vecuronium into the patient's IV.

Reusing the same syringe on the same patient for several single-patient use ampules is safe. The ampules are already labeled. Why add another intermediate step and store them in a labeled syringe? The exception to this practice is for drugs that need to be diluted—for example, phenylephrine (for a case you expect you might need it, such as vascular surgery or geriatric surgery) or narcotics such as morphine and meperidine. Syringes for these diluted drugs need to be prepared and labeled. Syringes should not be carried over from one patient to the next.

As Burger King used to say, "Have it your way!" You don't have to agree with or accept my suggestions, but I'd be interested in hearing if you've changed your mind, 14,000 cases from now.

Clinical case for next month: A 52-year-old asthmatic with obstructive sleep apnea develops a heart rate of 125 and a blood pressure of 160/95 in the Recovery Room, thirty minutes following a UPPP. His throat pain is well-controlled, and he has no dyspnea or chest pain. The nurse asks you if she can give the patient a beta-blocker. **What do you do?**

Rick Novak, MD
Associated Anesthesiologists Medical Group
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EDITOR'S NOTE

New email address? Would you like to submit an article or news item for consideration? Contact rohrrs@stanford.edu

ALUMNI CORNER CONTINUED

I will always cherish my time at Stanford and was truly honored to deliver the first Myer H. Rosenthal Lecture last October honoring Mike's retirement from 30 years in the ICU. You are all missed but, as Aud once told me, "...there is life after Stanford."!

—**Thomas W. Feeley, MD**

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Graduated 2004, cardiac anesthesia fellowship Aug 2004—Aug 2005 at New York Presbyterian Columbia Hospital. August 2005 to present cardiac anesthesia attending at New York Presbyterian Columbia Hospital. Yes, I was the anesthesiologist to former President Clinton for both surgeries. Married 2005. Son, Sam, born September 4th, 2005 at Mt. Sinai Hospital, NY, NY. Currently living in the Upper West Side of Manhattan.

—**Sanford M. Littwin, MD**

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Although I finished training in 94 and returned to Texas, I think of Stanford with the fondest memories. The two years that Suzanne and I were there were very special, fun times.

After practicing for a year in Houston, I joined Austin Anesthesiology Group and enjoyed ten years of practice. After a failed consolidation attempt with the other large practice in town, it became apparent that my talents were best-suited to said practice, and I joined Capitol Anesthesiology Association in July. I feel very fortunate to have been offered the opportunity, as the practice is a more natural "fit".

We have three boys and a girl, ages ten, eight (identical twin boys), and a daughter five. Family obviously consumes a large part of our life!

We stay in close contact with Jenifer Damewood and Steve Howard, and see them at least once a year. California is our desired vacation spot and has a second-home feel, so we have visited their home on many occasions.

We also talk to Berklee Robins and his wife Lisa from time-to-time, but we have not made it to Oregon to visit them yet.

My practice is large and diverse, with a very large contingent of pediatric-trained anesthesiologists. Austin is a great town, so if any graduating residents or alumni are interested in practicing in Texas, please contact me.

—**Jim Bell, MD**

jbellox@hotmail.com

In 1959 the Department of Anesthesia at Stanford escaped the clutches of San Francisco and arrived on the Farm. The big three—Bunker, Cohen and Belleville—were firmly entrenched, and a clinical program was starting with Chuck Witcher, one of the helmsmen. John Bunker started a British invasion of which I was a part, coming straight out of residency with my boards to an Instructor's position in 1965.

That started a relationship I am proud of. Two years here, nine years there, and twenty years in private practice saw me turn up like a bad penny on the Farm on many months of any year. I spent my last three years before retirement in 2001 back at Stanford where I started working and teaching.

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ALUMNI CORNER CONTINUED

As a boy I collected stamps from the South Pacific and longed for sandy beaches and warm surf. (Most British beaches are stone and pebbles and cold surf.) Today I live on Maui, looking to the top of the mountain (10,000 ft) that supports my home. I see the ocean and view sunsets over the West Maui mountains.

When I turned 70 this year, I noticed something missing. Most of the work around the house was done. Many of you know my love for food, so I got an idea: I took a handyman position at the Maui Culinary Academy where I wander round kitchens and restaurants, finding and fixing items broken down at the hands of the students and faculty alike. It is great to be amongst college kids again, this time to watch them being taught in another discipline. Two half- days a week I turn up at 8 am, and of course they feed me along the way.

This same year I also attended a meeting on the Big Island and found that the Substance Abuse and Psychology course instructors needed help from guest speakers with a medical background. Now once or twice a month, when school is in session, I travel the Big Island, back in the teaching role again.

My belly is full and my mind is being exercised.

Our children, other relatives, and friends come visit us frequently, and we hop a flight to the West Coast at least once a year. Life is good to us, and I stay alive, by being as active as I can. Come visit if you are of a mind. We will be glad to see you.

—**Gordon Taylor, MD**

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Aud was a fixture of the residency. It is hard to imagine a new generation of residents who will not have Aud looking after them. We were lucky to have her take us under her wing!

—**Berklee Robins, MD**

Resident 1990-93

I am currently the Director of Anesthesia at Webster Surgery Center, a busy, multi-specialty center in Oakland. I also provide anesthesia services for an excellent cosmetic surgeon in San Francisco at our Surgery Center. My partner Craig and I just opened our own business, Gentle Star Medspa in San Francisco. If any of you wants a clinical facial, Botox, or facial fillers, give us a call! Check us out at www.gentlestar.com

—**Tom Ellis, MD**, Class of 1997

tellis@webstersurgerycenter.com

We are seeking one or two anesthesiologists to join our group in Las Vegas. We prefer a faculty member looking for a practice opportunity or someone who has recently completed a fellowship in either pediatrics or cardiac. We will consider a very strong resident. Our practice is dominated by CVT and pediatrics but it also includes neuro, general, ortho, ent and a small amount of urology. If you know someone looking for a busy practice, comfortable in a fast-moving, unstructured environment, please let me know.

—**Donald Mason, MD**

dmasonjr@cox.net mobile: 702.370.2650

THE FOURTH ANNUAL GOLF TOURNAMENT

Save April 30, 2006 for the Anesthesia Department's 4th annual golf tournament at Stanford's golf course. The event is open to **all** department members and alumni and one guest each. Sign up now, as we have limited space.

Tee off at 10-minute intervals, beginning at 1:00 pm. The format is a scramble, so there's no pressure. You will have to carry your own bag of clubs, however. After the game we will enjoy eats, drinks, and prizes on the patio overlooking the 18th Green.

Residents can play for \$20 per round, if they sign up on Ann Dohn's golf list (adohn1@stanford.edu). University faculty pay \$60; all others pay \$110.

Email me about this "mighty event."

John G. Brock-Utne, MD, PhD

brockutn@stanford.edu

**CONGRATULATIONS, DR. INGER ALAISON!
RESIDENT-OF-THE-MONTH, DEC 2005**



**CONGRATULATIONS, DR. SCOTT RUDY!
RESIDENT-OF-THE-MONTH, JAN 2006**



NEW PUBLICATIONS



Sourkes B, Frankl L,
Brown M, Contro N,
Benitz W, Case C,
Good J, Jones L
Komejan J,
Modderman-Marshall J,
Reichard W, Sentivany-
Collins S, Sunde C.

Food, Toys and Love:

*Pediatric Palliative Care; Current Problems in
Pediatric and Adolescent Health Care* 2005 Oct; 35
(9):350-86.

- ❖ Koppert W, Filitz J, Troster A, Ihmsen H, Angst M, Flor H, Schuttler J, Schmelz M. **Activation of naloxone-sensitive and -insensitive inhibitory systems in a human pain model.** *J Pain* 2005 Nov; 6 (11):757-64.
- ❖ deCharms C, Maeda F, Glover G, Ludlow D, Pauly J, Soneji D, Gabrieli J, Mackey S. **Control over brain activation and pain learned by using real-time functional MRI.** *PNAS*, December 2005, 102:51;18626-31 **(See article on page 10.)**
- ❖ Chu LF, Clark DJ, Angst MS. **Opioid tolerance and hyperalgesia in chronic pain patients after one month of oral morphine therapy: a preliminary prospective study.** *J Pain.* 2006 Jan; 7(1):43-8.
- ❖ Soto RG, Chu LF, Goldman JM, Rampil IJ, Ruskin KJ. **Communication in critical care environments: mobile telephones improve patient care.** *Anesth Analg.* 2006 Feb; 102 (2):535-41.
- ❖ Sun Y, Ouyang YB, Xu L, Chow AM, Anderson R, Hecker JG, Giffard, RG **The carboxyl-terminal domain of inducible Hsp70 protects from ischemic injury in vivo and in vitro** *Journal of Cerebral Blood Flow & Metabolism* (16 Nov 2005).
- ❖ Lee YS, Song YS, Giffard RG, Chan PH **Biphasic role of nuclear factor- κ B on cell survival and COX-2 expression in SOD1 Tg astrocytes after oxygen glucose deprivation** *Journal of Cerebral Blood Flow & Metabolism* (14 Dec 2005).

INVITED TALKS, PANELS, AND TASK FORCE

- ❖ Andrew J. Patterson, MD, PhD spoke about **Bioterrorism and Chemical Injuries: How to Recognize and Respond** (10th Critical Care Refresher Course) on January 6, 2005 at the Society of Critical Care Medicine's 35th Critical Care Congress in San Francisco.
 - ❖ Jim Wong, MD spoke about **Links Between the beta Adrenergic Receptor and Immunity** on January 8, 2006 at the Society of Critical Care Medicine's 35th Critical Care Congress in San Francisco.
 - ❖ Allen Namath, MD spoke about **beta Adrenergic Receptor Polymorphisms and their Phenotypic Effects** on January 8, 2006 at the Society of Critical Care Medicine's 35th Critical Care Congress in San Francisco.
 - ❖ Christina Mora-Mangano, MD spoke about **Temperature Management during Cardiac Surgery: *too cold vs. too hot*** at Cleveland Clinic's Grand Rounds on January 18, 2006.
 - ❖ Andrew J. Patterson, MD, PhD moderated a panel about **Cardiovascular Adrenergic Receptor Biology** at the January 2006 Society of Critical Care Medicine's 35th Critical Care Congress in San Francisco.
 - ❖ Juli Barr, MD will chair the American College of Critical Care Medicine's Task Force on updating the national guidelines for Sedation and Analgesia in the ICU. The task force will consider (1) recent research on the effects of short- vs. long-term sedation, (2) the growing use of dexmedetomidine for ICU sedation, (3) the use of sedation and analgesia protocols to shorten ICU length of stay and to improve patient outcomes, (4) the use of processed EEG to monitor depth of sedation, and (5) emphasizing the incidence and clinical implications of ICU patients who develop delirium during their stay
-

ABSTRACTS

- ❖ Craig Chen, Jim Wong, MD, Brandon Penn, Marissa Patterson, Nathan Pearl, Rani Agrawal, M.S., Brian K. Kobilka, MD, and Andrew J. Patterson, MD, PhD presented an oral abstract about **Disruption of the beta2 Adrenergic Receptor PDZ Binding Motif: Impact Upon Cardiac Structure and Function** at the January 2006 Society of Critical Care Medicine's 35th Critical Care Congress in San Francisco.
- ❖ Christine Chang, Matt Bruss, Helen Hwang, Tahmina Samad, Elise Perry, Ashley Hawrylyshyn, Rani Agrawal, M.S., Marco Conti, MD, and Andrew J. Patterson, MD, PhD presented a poster abstract **Disruption of Phosphodiesterase 4D: Impact Upon Murine Cardiac Contraction Rate** at the January 2006 Society of Critical Care Medicine's 35th Critical Care Congress in San Francisco.
- ❖ Greg Hammer MD, Hong Cao, David Drover MD, et al presented a poster abstract **Dexmedetomidine for sedation and analgesia following tracheal reconstruction in children** at the Society for Pediatric Anesthesia Meeting in Ft. Myers, FL in February 2006.
- ❖ Hammer GB, Cao H, Drover DL et al presented a poster abstract **Dexmedetomidine does not facilitate rapid weaning from morphine and midazolam after prolonged use in children** at the February 2006 Society for Pediatric Anesthesia Meeting in Ft. Myers, FL.
- ❖ Krane E, Finkel B, Finkel J, Hammer GB et al presented a poster abstract **ALGRX 3268 produces well-tolerated local anesthesia within 1 to 3 minutes for venipuncture and peripheral venous cannulation procedures in children** at the February 2006 Society for Pediatric Anesthesia Meeting in Ft. Myers, Florida.
- ❖ Harrison TK, Hammer GB, Frankel LR et al presented an abstract **Use of a new pediatric simulator for training in Pediatric Advanced Life Support** at the February 2006 Society for Pediatric Anesthesia Meeting in Ft. Myers, FL.

THE BUZZ ON BRAIN-ACTIVATED PAIN

Pain has been stimulating lots of excitement recently. In December 2005, *PNAS* published [Control over brain activation and pain learned by using real-time functional MRI](#) by Sean Mackey, MD, PhD, senior author, and several colleagues ([See New Publications](#)). Not only is this article on the “most read” short list, but its findings and implications produced quite the media buzz in such communications channels as NBC, BBC, New York Times, Science, etc.

The *PNAS* article’s abstract states:

If an individual can learn to directly control activation of localized regions within the brain, this approach might provide control over the neurophysiological mechanisms that mediate behavior and cognition and could potentially provide a different route for treating disease. Control over the endogenous pain modulatory system is a particularly important target because it could enable a unique mechanism for clinical control over pain. Here, we found that by using real-time functional MRI (rtfMRI) to guide training, subjects were able to learn to control activation in the rostral anterior cingulate cortex (rACC), a region putatively involved in pain perception and regulation. When subjects deliberately induced increases or decreases in rACC fMRI activation, there was a corresponding change in the perception of pain caused by an applied noxious thermal stimulus. Controlled experiments demonstrated that this effect was not observed after similar training conducted without rtfMRI information, or using rtfMRI information derived from a different brain region, or sham rtfMRI information derived previously from a different subject. Chronic pain patients were also trained to control activation in rACC and reported decreases in the ongoing level of chronic pain after training. These findings show that individuals can gain voluntary control over activation in a specific brain region given appropriate training, that voluntary control over activation in rACC leads to control over pain perception, and that these effects were powerful enough to impact severe, chronic clinical pain.

These findings made a splash in the December 20, 2005 *New York Times* column, [Feedback: Relief from chronic pain may be a thought away](#), by Eric Nagourney, who wrote:

People who have [chronic pain](#) may be able to reduce their suffering by using brain-scanning equipment that lets them see their brain activity and try to modify it, researchers say. The process, which the researchers say may eventually prove useful as a treatment, is described online in The Proceedings of the National Academy of Sciences ([pnas.org](#)).

For the study, the researchers asked a group of chronic pain sufferers to view their brain activity on a functional M.R.I. scanner. A group of healthy volunteers were given painful heat stimuli to the hand and were also scanned. The equipment was modified to allow the volunteers to see brain activity as it occurred. The scanner was focused on a part of the brain involved in the perception of pain, the rostral anterior cingulate cortex.

The researchers asked the volunteers to try to change the patterns they saw on the screen, giving them suggestions for strategies. One chronic back pain sufferer, for example, thought of little people digging out the pain.

After practice, the study found, the volunteers were able to make detectable changes in the way their brains processed pain signals, and they reported feeling less pain. The improvement was not found in members of control groups who were given no M.R.I. information or who were shown images from another part of the brain.

In the past, the study noted, people have learned to control other autonomic functions like heart rate. But the study’s senior author, Dr. Sean C. Mackey of the Stanford University School of Medicine, urged caution in interpreting the results.

Dr. Mackey said, “We still have a lot of work to do to prove that this has long-term clinical efficacy.”

The study, supported by a grant from the National Institutes of Health, was led by R. Christopher DeCharms of Omneuron, a life-sciences technology company. Dr. DeCharms is trying to develop the equipment for commercial use.

See <http://paincenter.stanford.edu> for links to research areas and popular press coverage.

STANFORD WINS NIH GRANT TO STUDY fMRI OF HUMAN SPINAL CORD PAIN

A beautiful feather in the Stanford Anesthesia Department's cap is the NIH's five-year funding of the Pain Management Center's grant proposal—*fMRI of Pain in the Human Spinal Cord*. This proposal ranked in the top 3% of all grants submitted in an environment where only the top 9% are actually funded.

Sean Mackey, MD, PhD is the grant's principal investigator, and Gary Glover, PhD is its co-investigator.

Excerpts from the proposal's abstract give the gist of what will be studied:

Chronic pain has a tremendous impact on individual patients, their families, and society. Functional magnetic resonance imaging (fMRI) has been used to investigate nociceptive processing and central sensitization in the human **brain**—the goals being to better understand and ultimately develop improved therapies for chronic pain (See *The Buzz on Brain-Activated Pain* on page 10).

The human **spinal cord** is also important in the nociceptive processing. Moreover, direct animal and indirect psychophysical and behavioral human studies have demonstrated the spinal cord's role in generating and maintaining hyperalgesia and allodynia.

To complement and amplify the brain studies, we will use fMRI to elucidate two mechanisms in both healthy subjects and subjects with chronic neuropathic pain: (1) nociceptive processing in the spinal cord and (2) spinal cord plasticity.

Our specific aims are these:

1. Optimize human spinal fMRI by characterizing the hemodynamic impulse response function.

2. Characterize and compare spinal cord activity (fMRI signal and spatial activation properties) in response to (a) noxious thermal stimuli (b) non-noxious mechanical stimuli, and (c) thermal stimuli.
3. Elucidate the human spinal cord's response to normally non-noxious mechanical stimuli—use the heat/capsaicin pain model to measure allodynia and hyperalgesia.
4. Characterize dorsal horn responsiveness to normally non-noxious thermal and tactile stimuli in patients with chronic neuropathic pain.
5. To obtain further insight into the mechanisms of spinal plasticity, compare spinal fMRI activation patterns in these two scenarios: (a) after noxious thermal stimuli have been applied to healthy subjects and (b) after normally non-noxious but painfully perceived thermal stimuli have been applied in patients who experience chronic neuropathic pain.

We hope to learn more about how chronic pain states are generated, maintained, and potentially treated. Furthermore, we expect to more objectively assess neural function in patients with peripheral nerve and spinal cord injury.

Dr. Mackey serves as associate director of the Pain Management Division and as co-director of the Pain Working Group (PWG) in Stanford's Neuroscience Institute. Dr. Glover serves as professor in the Department of Radiology and Director of The Richard M. Lucas Center for Magnetic Resonance Spectroscopy and Imaging.

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**ATTENDING-OF-THE-MONTH, DEC 2005
CONGRATULATIONS, DR. ALICE EDLER!**



Resident responses:

“Alice is an excellent teacher in the OR. She always takes time to discuss a topic relevant to each day’s schedule....she finds a nice balance of supervision and autonomy ... and stresses the importance of each resident becoming comfortable with being in charge of an anesthetic.”

Dr. Edler’s favorite quotation: *“Good teachers like students.”* LM Smith, *Complexities of an Urban Classroom* 1967

ANESTHESIA RESEARCH AWARDS DINNER

Save Tuesday, May 9, 2006 from 6–10 pm for this annual dinner at Michaels at Shoreline, 2960 Shoreline Blvd., Mountain View.

RSVP Renee Grys grys@stanford by April 27th

**CONGRATULATIONS, DR. JASON COONEY!
ATTENDING-OF-THE-MONTH, JAN 2006**



Resident responses:

“Dr. Cooney is a great teacher of critical thinking about anesthesia.”

“He is helpful and remembers what it’s like to be a resident.”

“... always quick with a great laugh.”



BIRTHS

Julie Good, MD and her husband, Dan Kaleba, welcomed Torii Joy Kaleba on December 6, 2005. All are doing well.



Jonay and Charles Hill are happy to announce that Keller Charles Hill was born at 9 pm on December 6, 2005. He weighed 7 pounds, and he was 19 ¼ inches long. Little Keller is happy and healthy.



I have once again defied the laws of Natural Selection, this time by successfully reproducing.

William Henry Walton was born at 2:10 PM at Stanford Medical Center. He weighed in at 6 pounds 8oz (almost 9 pints in beer units). He is 18 1/4 inches long (about 0.002272725 furlongs for those keeping count). Mother and baby are doing just fine.

—**Brant Walton**



“INTERPLAST BRINGS SMILES TO THE THIRD WORLD”

The article cited above and excerpted below, was written by Diana Reynolds Roome and published in the *Mountain View Voice*, December 16, 2005.

Frederick Mihm, MD, a veteran Interplast volunteer, recently served in Chongqing, China. See www.interplast.org for further information.

A child's smile is priceless, but there are thousands of children in the world who are literally unable to smile due to deformities of the mouth and nose caused by cleft palate, cleft-lip, or serious burns. Some of these children cannot swallow or speak properly. For them, as for those with a malformed hand or ear, there are not only functional difficulties but also a feeling of shame that often makes them shy and withdrawn.

For such children and teenagers, happiness requires medical expertise from a team of doctors and nurses. But thousands live in countries where they have no access to skilled plastic surgeons, much less the money to pay them.

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...SMILES TO THE THIRD WORLD CONTINUED

That's where Interplast comes in. For more than 35 years, the nonprofit has been organizing specialized medical teams from its headquarters in Mountain View and sending them all over the globe to

perform corrective surgery. Volunteer pediatric surgeons, anesthesiologists and nurses travel to South America, Africa and Asia, from Peru and Zambia to Vietnam and Nepal, where many children walk long distances with their families to have the life-changing surgery. Medical teams routinely work in unpredictable and difficult conditions, giving up work or vacation time for no pay. Between them, they perform some 3,000 operations a year, allowing children with profound congenital and accidental disfigurements to function more easily in society.

"It's good medicine for anyone who goes," said Dr. Frederick Mihm, associate medical director of intensive care units at Stanford and a professor of anesthesia. Mihm recently returned to his home in Mountain View (where he's lived for nearly three decades) from an Interplast trip to Chongqing, China. While there, his international team performed 72 operations in two weeks, working in a brand-new hospital that nevertheless had antiquated lights and operating tables. Working with well-trained but non-English-speaking Chinese nurses, they communicated through sign language and by putting up a sheet in the operating room with critical surgical and anesthetics terms.

Since the early 1970s, soon after **Dr. Donald Laub** started Interplast at Stanford, Mihm has been on 21 trips. One of the major concerns over the years has been the quality of the equipment available on site, for example anesthesia machines, IV catheters and laryngoscopes, which may not be like those the team is used to working with at home.

"The anesthesia machine is much like driving a car—you come out of a Beamer and go into a 55-year-old Jeep. Little things like that can disrupt your sense of control and throw you off," said Mihm, who as an intensive care anesthesiologist is accustomed to taking difficult cases. "We've even lost electricity in mid-operation. It's a challenge, but you have to like living on the edge a bit to do this."
...

Essential equipment is costly, and updated electronic equipment has become more critical than ever to Interplast's operations. Small medical teams often work in isolation, far from their colleagues and the

resources they would have access to at home. Some of their cases are extremely challenging—for example, a 12-year-old Nepalese old boy with severe burn scars on his torso, arms and face. The pulling of the scars had had contracted his neck, shoulders, chin and lower lip, painfully distorting his body. His retracted neck and chest interfered with his airways, making it very difficult to use the usual methods of anesthesia for performing skin grafts.



Dr. Mihm with anesthesia supplies taped on the *Great Wall* for easy access. If they run low, they can usually buy replacements in most countries.

Despite their extensive experience, doctors need to proceed carefully in such cases, which are sometimes different from anything they have encountered before. In addition, this boy needed tissue expanders—routinely used in Western burn surgery but difficult to obtain and very expensive in Nepal.

Using Web-based communication, the doctor in charge was able to consult with colleagues at home and around the world to discuss the case and solicit ideas for dealing with it. This was done as part of an Interplast program called Grand Rounds, which allows doctors to post photographs and case summaries on the Web and receive advice and insights from medical professional in other countries, within hours or even minutes. The posting of Web logs has also been instructive and helps the world understand better the importance of Interplast's work.

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...SMILES TO THE THIRD WORLD CONTINUED

The proximity of high-tech companies has made a huge difference in the way doctors are able to keep records and communicate. For example, Palm Inc., maker of the Palm Pilot and a neighbor to Interplast on the Mountain View-Sunnyvale border, for several years has donated its handheld digital organizers to the doctors, who use them to chart and track patient records. (These records can be downloaded into a regular medical database upon the doctors' return.) Meanwhile, volunteers from Cisco Systems helped to build a database on burns and burn victims which doctors can access from anywhere in the world.

Technology has also helped Interplast move into a new phase, in which its medical volunteers become primarily trainers and mentors to local doctors and nurses in the countries they visit. Interplast produces and distributes educational materials on CD-ROM, which can provide advanced medical training. Mihm was able to give a lecture to Chinese physicians, most of whom did not understand English, when his whole lecture was translated into Chinese on PowerPoint.

“We’re more about teaching and local empowerment now—this enables far more patients to be reached,” said Susan Hayes, president and CEO of Interplast, who recalls that there was no e-mail communication for doctors in the bush when she first started working for Interplast 10 years ago. “We’re building local capacity, and technology has been the single most important factor in allowing us to realize that vision. The change is remarkable—there are computers everywhere we go now. I’ve worked on the Internet next to a cow in Nepal and chickens in Vietnam.”

Mihm also enjoys the opportunity to see new countries while having something meaningful to do there. Ultimately, what makes it worthwhile is the moment when he sees the look on the faces of parents seeing their child transformed, and knowing there is a better future ahead for them.

“In Brazil, we operated on a child with a horrible cleft palate,” he recalls. “The child was changed so much by the plastic surgery. I watched the parents walk in and see the baby—for a moment both seemed not to know it was theirs. Then they started crying. It’s definitely life-changing when you change a child from a freak to a normal kid.”
