

CISL2008

Center for Immersive and Simulation-based Learning



STANFORD
SCHOOL OF MEDICINE

Stanford University Medical Center

Deployed Curricula Using Immersive & Simulation-based Learning by Target Population • October 2008

Pre-Clerkship Med Students	Clerkship Med Students	Interns / Residents / Fellows	Combined Team (Housestaff, attendings, RNs, Allied Health)	Courses for External Learners	Nursing or Allied Health	
ONGOING COURSES						
Procedures Course - POMQ5 (Mod C)	Adult Crit Care Sims – (STARS) (VA Sim Ctr)	Anesth Novice Resident Sims (VA Sim Ctr)	EM CRM 1, 2, 3 (VA Sim Ctr)	IMPES - ICU Combined Team CRM Simulations (VA)	NeoSim (CAPE) CRM Instructor (CISL/VA)	RT student sims – with FH College (VA Sim Ctr)
Intro to Mgmt of Ill Pt (IMIP) POM Q6 (VA Sim Ctr)	Anesth Clkshp Sims (VA Sim Ctr)	ACRM1, 2, 3 (VA Sim Ctr)	SCARED – Resuc Decision Making Int Med (VA)	Sim DR – Perinatal Combined Team Training (CAPE)	PediSim (CAPE) Simulation Instructor (CAPE)	Primary Certification in PALS - Sims (CAPE)
SURG 254 Operative analysis and techniques	PICU/NICU/ CVICU Critical Care Clkshp (CAPE)	NeoSim I, II & III (CAPE)	SCARED - Surgery (VA)	Disclosure of Unanticipated consequences (CAPE)	Pedi ERSim (CAPE) P.A.S.S. program–part of the Soc of Ped Anesth	Versant Nursing Ed (VA)
Mini-CPX (SP)	Neo Critical Care for NICU subinternship (CAPE)	Pedi Sim I, II & III (CAPE)	SOS Int Med (VA)	Mock Drills for Cardiac Arrests (VA, Monthly)	OBSim (CAPE)	LifeFlight (GSC)
	Compassionate Deliv of Bad News for Gen Ped Clkshp (CAPE)	Pedi ER Sim I, II, III (CAPE)	Perinatal Counseling (CAPE)	Mock Drills for medical emergency team (VA, 6-7/yr)	Sim DR - Perinatal Team Training (CAPE)	Cardiac Cath Lab (GSC)
	Emergency Sims (GSC)	Sims for Card Surg fellows (CV Sim)	Compass. Deliv. of Bad News (CAPE)	Trauma Combined Team Training (GSC)	ECMO Sim (CAPE)	Defibrillator and CPR training for nurses (VA)
	Intro to Vascular Disease and Rx SURG 228 (GSC)	OB Sim I Sim DR I (CAPE)	Endo-vascular procedures (GSC)	SHC Recognition of Critical Events (<i>In-situ</i>) (GSC/VA)	Critical Care Transport (CAPE)	
	Adv Surg Skills SURG 205 (GSC)	ECMO Sim (CAPE)	Laprascopic Surg for GYN (GSC)	Labor & Delivery <i>In-Situ</i> Sim Drills	ACRM (VA)	
	Surg Trauma Sims SURG 300A (GSC)	CVC Insertion – Med Interns (GSC)	Surgical Skills (monthly - GSC)	Pedi Anesth <i>InSitu</i> Sims (LPCH)	FLS Testing (GSC)	
	CPX (SP)	Surgery Intern Boot Camp (GSC)	CVC Insertion (GSC)	Mgmt of emergencies in Radiology (<i>in situ</i>)		
	CPX - R (SP)	Surgery Lab Residents Boot Camp (GSC)	Surgical Safety Sims (GSC)			
	BLAST (Critical Care Simulation)					
PILOTED / OR UNDER DEVELOPMENT						
Anesthesia SIG		Cardiac Surgery CRM (VA)				

The Center for Immersive and Simulation-based Learning

2007-2008 CISL Accomplishments Report

The academic year 2007-2008 was another successful one for the Center for Immersive and Simulation-based Learning (CISL). This report provides details on a myriad of projects and developments that further cement the role of ISL (Immersive and Simulation-based Learning) in the fabric of learning and patient care at Stanford School of Medicine and its affiliated hospitals. Our faculty, clinicians, researchers, and staff continue to be innovators of ISL and to play major roles in the national and international adoption of ISL techniques and applications to improve quality and patient safety.

While the report provides the details, let me summarize some of the big picture trends on a national and international basis. Simulation continues to grow around the world, largely based on technological and pedagogical creativity of CISL's faculty. The key focus going forward is on creating the organizational infrastructures to sustain continued development of ISL techniques and technologies. These will be needed at all levels, from Divisions to Departments in the School of Medicine, to care units and hospitals, and for regions, states, and nations.

Our long awaited flagship facility – the Immersive Learning in the Li Ka Shing Center for Learning and Knowledge (LKSC) – is now well under construction. At the time of this writing the wall studs have mostly been installed – giving form to the design that many faculty and staff hammered out several years ago. We hope to open the LKSC in mid 2010 but the next year and a half will be busy as we oversee the construction and the installation of core infrastructures (especially the complex audiovisual system), acquire and install simulation equipment, create the operational structures, and prepare faculty and staff to make the most out of the new facility. We are particularly grateful for the generosity of Mr. Li and Joseph and Hon-Mai Goodman, the primary donors for the ILC (Immersive Learning Center) floor for providing the opportunity to

create this world-leading integrated center where all modalities of immersive and simulation-based learning can exist in one spot.

There remain large organizational challenges ahead of us to determine how best to implement ISL techniques within the healthcare system, both on the large scales (nationally and internationally) as well as locally as these issues play out at Stanford. Where are major systems changes needed? Where can we graft ISL onto existing structures? How do we make learners available for ISL's kind of intensive training episodes? What simulation accreditation bodies exist and must be satisfied? We are currently at an early tipping point for many of these organizational issues. Professional societies, certifying boards, hospital accreditors and payers, liability insurers and risk managers are all getting into the act. The next decade(s) will see enormous strides made to work out the proper role of ISL in the overall structure of healthcare education and training, credentialing, and regulation.

This report lays out how Stanford is leading and responding to these challenges. We work with many others around the world of like mind and vision. Our goal is, as ever, to improve the efficiency, quality, and safety of care for all patients, while simultaneously improving the education, training, and assessment of the caregivers. This is a noble goal and we are pleased to present this update on our progress as pioneers of this effort.



David M. Gaba, MD
Associate Dean,
Immersive and Simulation-based Learning

This document is designed to highlight the new activities of the Center for Immersive and Simulation-based Learning (CISL) under the purview of the office of Associate Dean for ISL, for the time period of August 2007- September 2008.

CISL MISSION To improve patient safety, patient care, education, and research through innovations in immersive and simulation-based learning techniques and tools and through embedding them throughout Stanford Medical Center's education and training programs.



CISL STRATEGIC GOALS CISL continues to focus their activities around the ten strategic goals articulated at CISL's inception in 2004. These goals are:

1. Education and Training of Students and Clinical Trainees
2. Healthcare Systems Improvement
3. Assessment/testing
4. Research
5. Provide ISL Learning to External Experienced Clinicians
6. Community Outreach
7. Leadership and Advocacy
8. Faculty Development
9. Sustainability
10. Management

Provided in the document are highlights of ISL programs that are occurring throughout the Stanford community. The extent of activities of the CISL faculty and staff are quite large so this summary may not be inclusive of all activities; some may have been inadvertently omitted. For this we apologize.

Applications of Immersive and Simulation-based Learning

STRATEGIC GOAL 1:

Education and Training of Students and Clinical Trainees

Stanford is rich in ISL education and training for students and trainees. New programs are continually evolving and more faculty are embracing alternative ways of educating students and trainees. *This section will highlight these programs especially those that are new in the last year.*

ANESTHESIA AND CRITICAL CARE

Anesthesia & critical care skills training: VA Palo Alto HCS now offers a permanent, 24/7 accessible teaching lab of partial task trainers relevant to anesthetic and ICU procedures for residents and students working under their supervision. The goal is to change the tradition of “see one, do one” to the higher standard of “see one, simulate several, then do one.” The lab is under the direction of Drs. Harrison and Lighthall with generous cooperation from Dr. Kevin Fish, Chief, Anesthesiology Service.

Dr. Kyle Harrison added the simulation course titled “BLAST” to the already popular course “STARS” for critical care clerkship students.

The VA team has started to teach a simulation-based airway management course for critical care fellows.

EMERGENCY MEDICINE

All residents in Emergency Medicine participate in both adult and pediatric ER Simulation. Newly developed Pediatric ER SIM emphasizes emergency management of pediatric patients and was designed by Bernard Dannenberg, MD and colleagues to allow housestaff the opportunity to practice those skills required when caring for acutely ill children presenting to the emergency room.

NURSING

The VAPAHCS has recently begun integrating a simulation experience to the Versant Nursing program that trains and educates new-hire nurses.

Stanford’s Cardiac Catheterization Lab also trains their nurses in the Goodman Simulation Center on various problems the nurses may encounter both during cardiac catheterization and post catheterization procedures.



Stanford’s LifeFlight Team has utilized mannequin-based simulation for skills training for the new and current staff.

STANDARDIZED PATIENT PROGRAM

In the 2007-08 academic year, the Standardized Patient Program (SPP) introduced several new programs and exercises into the medical curriculum.

CPX-R: The CPX (clinical performance exam) is a standardized patient-based examination administered to all clinical medical students as they enter their last year of clinical training and is a requirement for graduation. Previous years have seen the introduction of additional

standardized patient exams which encompass a three-examination series assessing medical student clinical skills throughout the curriculum: the “Micro-CPX” at the end of the first year, the “Mini-CPX” at the end of the second year, and the CPX during the graduation year. This year, the SPP introduced the CPX-R (CPX-Remediation) examination, intended for students who do not meet passing criteria for the CPX. This exercise was well received and will be administered again in 2009.

The “Mini-CPX” was further developed as an end-of-second year exercise assessing history taking, physical examination and interpersonal skills, and clinical reasoning. Successful completion of the Mini-CPX is now a requirement in order to begin clinical clerkships.

For the first time, a “hybrid” standardized patient case was administered as part of the CPX. This case involved students performing a basic surgical procedure while interacting with a patient with low English proficiency. A CISL mini-grant was awarded to the Standardized Patient Program to help support the project.

The core internal medicine clerkship standardized patient examination introduced peer observation and direct feedback to this exercise in 2008. Both students and standardized patients share feedback from the interview and discuss learning points brought out by the case.

In collaboration with the American Medical Association, the SP program has been involved with a project aimed at helping physicians better understand and handle pharmaceutical industry marketing and promotional practices. There are two arms to the study. The first focuses on medical students and the impact of a web-based educational intervention to impact their knowledge, attitudes and potential prescribing behaviors when encountering the marketing practices of pharmaceuticals companies – especially aggressive direct-to-consumer advertising. The second arm of the study aims to evaluate if a web-based education intervention can impact residents prescribing decisions and communication skills when confronted with a “patient” who is “demanding” a widely marketed expensive medication when a less expensive and equally effective medication is available and would be the appropriate prescribing choice. Standardized patients are an integral part to both arms of this study, the first as one of the cases in the 2008

CPX, and the second as unannounced standardized patients in clinic.

Building on the SP program’s developing role in graduate medical education, an exercise was developed in conjunction with the plastic surgery residency program aimed at assessing communication skills among surgical residents.

The SP program continues to work collaboratively with the Practice of Medicine course (Dr. Preetha Basaviah and others) and the Cross-Cultural Medical Education Initiative (Drs. Clarence Braddock, Ron Garcia, Elizabeth Stuart, Sylvia Bereknyei, and Kambria Hooper) on new innovations in simulations for teaching and formative assessments.

SURGICAL PROGRAMS

Surgical Trauma (Surgery 300A) has been fully embedded into the surgery clerkship curriculum. Using mannequin-based simulation scenarios, the students work in teams to perform initial trauma evaluations following ATLS guidelines. The cases are based on similar patients they might see in the Emergency Department at Stanford or Santa Clara Valley Medical Center and are followed with active debriefing sessions to review current trauma protocols. These sessions are under the guidance of Dr. Paul Maggio with instruction provided by Drs. Ron Jou, Eliza Long, and Rich Parent.

Surgical Lab Resident Boot Camp: Prior to returning to clinical residency rotations on July 2008, six surgery residents at the end of their professional development (lab) years participated in a day long “Boot Camp”. These returning residents rotated through surgical skills stations including ultrasound guided central line placement, abdominal opening and closure model, virtual colonoscopy, laparoscopic suturing, surgical airways, chest tube placement, and virtual laparoscopic cholecystectomy. The residents also received hands-on sessions on bowel anastomosis from Dr. Myriam Curet and vascular anastomosis from Dr. Jason Lee.

Surgical Intern Boot Camp: Under the direction of Dr. Sanjeev Dutta, “Boot Camp” has been enhanced and is now embedded into the surgical curriculum. In order to evaluate the appropriate timing of an intense surgical skills “Boot Camp” for the first-year residents, the group of 30 interns were randomized to receive training in either July or December 2008. Training consisted



of introduction to instruments and suture, knot-tying, excisional biopsy, inguinal hernia repair, central line placement, chest tube placement, surgical airway, and introduction to laparoscopy. The interns also spent time participating in common floor call scenarios, designed by Dr. Eliza Long, 1st year Surgical Education Fellow using the SimMan[®] as their “standardized patient”. The assessment of the curriculum, consisting of 4 surgical skill test stations, will take place 3 times over the course of the year.

Fundamentals of Laparoscopic Surgery: Stanford is a designated FLS testing site. FLS is a comprehensive web-based education module that includes a hands-on skills training component and assessment tool designed to teach the physiology, fundamental knowledge, and technical skills required in basic laparoscopic surgery.

FLS was designed for surgical residents, fellows and practicing surgeons to measure cognitive knowledge, case or problem management skills and manual dexterity. The FLS program content has been endorsed by the American College of Surgeons (ACS) and is a joint educational offering of SAGES and ACS.

Endovascular Simulation: Since 2006, Jason T. Lee, MD has designed and implemented an active educational and research curriculum in vascular surgery and simulation involving undergraduates, medical students, general surgery residents, vascular surgery fellows, and practicing physicians in the region. Endovascular procedures such as iliac and femoral artery stenting, renal stenting, and carotid stenting can all be rehearsed in the Goodman Simulation Center on one of three different endovascular simulators.



Surgical Professor Rounds:

The Goodman Simulation Center has begun hosting Professor Rounds for the White, Gold and Trauma teams. Using the 3-D Bassett collection, anatomy can be viewed as case presentations are discussed. For more on the Bassett Collection, visit the following website: <http://med.stanford.edu/mcr/2008/bassett-0220/>.

The future goal is to take the teachings of the professor rounds and transfer that to simulated learning.

The Cardiovascular Surgery Simulation: The CVS-Sim Center continues to provide simulation training in coronary or small vessel anastomosis and valve surgery simulation for surgical residents and fellows under the leadership of Dr. James Fann. Dr. Fann also assisted in the organization of the anastomosis component of the first annual TSDA Boot Camp for 33 first-year cardiac surgery residents and served as the faculty for the Vessel Suturing session at the ACS/STS/AATS “Cardiothoracic Surgery in the Future: Technology Overview for Residents and Medical Students” at the American College of Surgeons Meeting.

James Fann, M.D., (Department of Cardiothoracic Surgery) and Peter Johannet, M.D., (Division of Plastic Surgery) direct *Operative Anatomy and Techniques (SURG 254)* for 2nd year preclinical students interested in learning the surgeon’s approach to anatomy. The course provides an opportunity for students to understand the goals of a given surgical procedure (translating pathophysiology to surgical decision making to actual incision). In the anatomy laboratory and using wet-lab simulation, the students learn surgical skills and perform the dissection of a number of commonly performed operations. Taught by faculty in General Surgery, Cardiothoracic Surgery, Vascular Surgery, Plastic Surgery, Head and Neck Surgery, Urologic Surgery, and Orthopedic Surgery, the course emphasizes direct “hands-on” participation.

STRATEGIC GOAL 2: Healthcare Systems Improvement

In 2007-2008, Risk Management at Stanford cemented their commitment and collaboration with CISL to focus on identifying and improving performance through the use of simulation.

In collaboration with Stanford's Risk Management Department, under the direction of Jeff Driver, the Critical Events Simulation Scenario Project for Observation-Oriented Learning (CEP)



led by Dr. Geoff Lighthall sought out ways of improving the overall performance in the delivery of medical care to the critically ill at Stanford. The main theme of this activity is that the management of unstable patients requires not only a sound base of medical knowledge, but also equal skill in *non-medical* skills such as teamwork, information acquisition and sharing, and the recognition of strengths and weaknesses of one's own cognitive processes. The CEP expands on the *non-medical* aspects of event management further by looking into how different hospital services interact to either facilitate or impair the *medical* response to a patient crisis.

The CEP embeds the patient simulator in a number of hospital locations to look at how system resources are utilized when a number of real life crises occur. A full article about CEP appeared in the October 1st Stanford Report: <http://news-service.stanford.edu/news/2008/october1/med-simulate-100108.html>



The CEP has benefitted greatly from a strong institutional ethic of self-examination and willingness to improve. The support and collaboration of Quality Management under Kevin Tabb, MD has been crucial to the conduct of the project, and has helped inspire an interest in multiple departments to examine their own work environments and to find means to increase performance.

Committee for the Utilization of Simulation at Packard (CUSP): CUSP was formed in FY 2007 to guide and support the use of simulation at LPCH. The membership includes the Director of Patient Safety at LPCH, the Director of CAPE, the Director of the Center for Nursing Excellence at LPCH, the Associate Dean for ISL, and hospital and school administration. CUSP's pilot project in the LPCH L&D will serve as the model for rolling out simulation-based training throughout LPCH.

Medicine Intern CVC Training: In collaboration with Stanford's Quality Management Department, central venous line insertion training was provided to all incoming medical interns in July 2008. The course curriculum website is now available on the medicine resident website: <http://medresidents.stanford.edu/cvc/>

Surgical Patient Safety Curriculum: Fifty junior surgery residents were randomized to receive either lecture or simulation based training on current Operating Room policies, Surgical Care Improvement Project guidelines, improved communication techniques, ways to involve Risk

Management when delivering bad news, and the process of obtaining consent. This pilot study, developed by Drs. Sanjeev Dutta and Richard Parent was completed in March and has led to a grant from ACS-METI to continue surgical team-based training this year. CISL is grateful for the contributions of Dana Taylor, Heather Davidson, Daisy Grewal, Rosette Reyes, and Catherine Mohr to the program.



Cardiac Surgery CRM: Dr. Fann and the core simulation group in Anesthesia at the VA Palo Alto continue to collaborate on designing cardiac crisis management training for residents, nurses, perfusionist and other staff.

Preparation for EPIC Electronic Medical Record transition: An *in-situ* simulation was conducted by the CEP team in spring, 2008, to help with the impending transition to the use of the EPIC EMR system. The simulation did identify a number of issues with the software and with protocols of use that improved the rollout of EPIC.

Obstetrics: With the support of Risk Management and the Johnson Center for Pregnancy and Newborn Services, funding was provided Drs. Kay Daniels and Steve Lipman and Julie Arafteh, RN develop an OB curriculum. The curriculum was developed by identifying high-risk issues in obstetric care at LPCH. The team then determined what could best be taught in a simulated environment.

The course consists of two training venues. The initial training was done as hi-fidelity

mannequin-based training of labor and delivery teams at the CAPE simulation center. Communication, teamwork and Crisis Resource Management, (CRM) principles were emphasized. This phase of the training was completed June 2008.

For the 2008-2009 academic year the OBSim team has expanded simulation training courses to include: all labor and delivery nurses at LPCH, all OB residents, most anesthesiology residents and a variety of OB and anesthesia attendings with drills being performed *in-situ* in the actual Labor and Delivery suite.

Nurse of > 20 years experience:

"I was in an emergency situation last week on labor and delivery. After my time in the simulation experience at OBSim, I felt that I knew what I needed to do. I needed to LISTEN, I needed to hear what the doctor was saying she needed and get it for her. After the OBSim course I have a better understanding of the need for effective communication and how to do it."

Nurse with 8 years experience:

"I attended the OB Sim training during which one of our scenarios was shoulder dystocia. Unbeknownst to me at the time, the very next day at work in L&D my exact same scenario would be replicated! I felt so much better equipped in my skills to handle this emergency situation as a result of my attendance at OBSim. Communication among the team members was very clear and the emergency was handled very smoothly. I am convinced of the value and benefit of OBSim validated by my own personal experience in the real L&D setting. Thank you all who are involved in OB Sim for your dedicated time and effort in this wonderful program!"



Medical Emergency Training for Radiology:

Medical emergencies (including adverse reactions to radiographic contrast media) during radiology scans and “x-rays” are uncommon. Radiologists receive little practice in handling such events. CISL faculty and staff joined with Drs. Desser and Gold from Radiology to conduct *in-situ* training sessions for radiology residents, technologists, and nurses in empty radiology imaging sites. A portable patient simulator was used to simulate different physiologic events, allowing each resident in turn to act as team leader (with the other personnel) in the evaluation and treatment of the patient. The program is expanding to include the entire residency cohort in FY 2009.

Unannounced Mock Codes: High fidelity unannounced mock codes are held monthly at VPAHCS and are handled by the code team, as they were real events. Mock events are being expanded to also challenge the rapid response team (called the “eTeam” at the VA).

In addition, nurse educators and nurse managers on different wards and units have been taught to conduct basic simulation sessions for nurses in their units without assistance by the simulation team. This has greatly increased the exposure of nursing personnel to simulation.

STRATEGIC GOAL 3: Simulation for Performance Assessment

CISL continues to be very interested in the applicability of simulation for both formative and summative performance assessment, eventually culminating in high-stakes assessments (such as graduation, board certification, maintenance of certification). We have a strong philosophy that assessment should, in general, be divorced from simulation sessions targeted for learning. Most of our simulation activities aim to create an open, constructive learning environment, using the “no assessment” ambiance to maximize frank discussion and self and group critique.

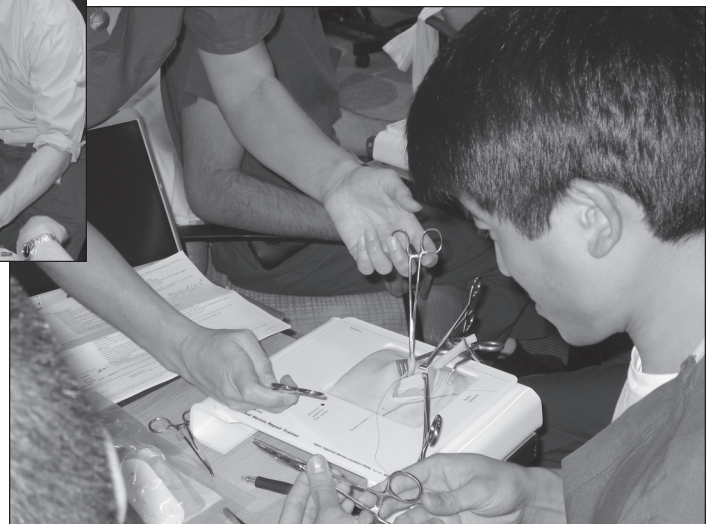


However, when participants fully understand that a session is all about assessment, this is perfectly fair.

Currently the Standardized Patient group conducts both formative and summative assessments of medical students’ clinical skills (e.g the CPX exam and its derivatives). The Goodman Simulation Center provides formative and summative assessment of basic skills of laparoscopy and is an accredited testing center for Fundamentals of Laparoscopic Surgery.

CISL faculty and staff have conducted research on the underpinnings for performance assessment using mannequin-based simulation in the past and they are currently engaged in such research. Dr. Mudumbai’s “360 study” (see Strategic Goal 4: Research) aims, in part, to identify a group of widely-acknowledged excellent clinicians whose performance during standardized simulation test-scenarios can be used as a benchmark against which to rate the performance of personnel at a similar level of training or experience.

The facilities of the LKSC promise to create many new opportunities for exploring the art and science of performance assessment, and to allow its use as part of the overall comprehensive strategy of continuous training and assessment that we envision is needed to improve the safety and quality of healthcare not only at Stanford, but everywhere around the world.



STRATEGIC GOAL 4: Research

CISL faculty and staff continue their collaboration with the Center for Health Policy at Stanford (and now with Harvard School of Public Health) on the AHRQ-funded project “Preparing Rural and Urban Hospitals to Improve Safety Culture Through Simulation”. The CISL team made two sites visits one year apart to each of the three client hospitals. All hospitals have developed active simulation programs and credit significantly the training and mentorship of the CISL team in their success.



ANESTHESIA

From Jan. to Aug. 2008, Dr. Sesh Mudumbai implemented a project titled “*Benchmarking Clinical Skills of Third Year Anesthesiology Residents Using 360 Multisource Ratings and High-Fidelity Simulation*” as part of a 2 year grant from the Foundation for Anesthesia Education and Research. The project had two phases for this year, which will be repeated in 2009. The two phases include:

- 1) a “360” survey in which third year anesthesia residents were scored for overall clinical ability separately by themselves, their peers, and the nurses, surgeons, and anesthesiology attendings with whom they have worked, and
- 2) a simulation phase in which the performance of these residents was assessed during a suite of calibrated scenarios of intraoperative challenges.

Mentors for this project were CISL Director and Associate Dean, David Gaba, MD and Associate Professor of Anesthesia, Steve Howard, MD.

NEONATAL-PERINATAL MEDICINE

Anand Rajani, MD, recently began as a fellow in Neonatal-Perinatal Medicine and will work at CAPE to investigate topics in simulation, human performance and patient safety.

SURGERY

As the course founder and director for Surgery 228, Introduction to Vascular Surgery, Dr. Jason Lee has been studying the introduction of vascular procedures to preclinical medical students. Research on this has been presented at Surgery Grand Rounds at Stanford, and recently Dr. Lee was invited to Hong Kong University,

Department of Surgery, and Harbor-UCLA, Department of Surgery to discuss the implementation of endovascular simulation and education. Dr. Lee has also presented this work at the Western Vascular Society and American College of Surgeons, and published in the *Journal of Vascular Surgery* and *Journal of the American College of Surgeons*. Several abstracts involving validity and reliability measures of global assessment scales of simulated procedures have currently been submitted to the upcoming Society for Simulation in Healthcare, Peripheral Vascular Surgery Society, and Surgery Education Week Meetings.

The next major focus is an intended 4-year project (submitted for funding consideration to the Robert Wood Johnson) involving a randomized trial of the general surgery residents at Stanford to mentored exposure to endovascular simulation. Outcome measures will be cognitive improvement, technical skills acquisition, and effects on overall program quality of care delivery.

Dr. James Fann completed an analysis of distributed practice in coronary anastomosis and has demonstrated that there is improvement among the residents after one week of practice using performance metrics, recognizing that there is a ceiling effect with the basic simulators and what is termed a “plateau effect” with some of the trainees. Their simulation efforts have been presented at the meeting of the Thoracic Surgery Directors Association (TSDA), the International Meeting of Simulation in Healthcare, and the Simulation in Medical Education lecture series. Their manuscript regarding the utility of distributed practice using simulation of coronary artery anastomosis will be published in the *Journal of Thoracic and Cardiovascular Surgery*.

VIRTUAL REALITY HYBRIDIZATION

Dr. LeRoy Heinrichs guided a project that explores trainees using a physical CPR mannequin designed to provide psychomotor learning, while it drives their avatar in a virtual world where they're engaged in cognitive learning:

http://www.stanford.edu/~kwillis/blog/archives/2008/08/summit_cpr_mann_1.html

Virtual reality and virtual worlds will be a significant thrust of the R&D work of the Ed Tech Innovations unit in the coming year.



STRATEGIC GOAL 5:

Provide ISL Learning to External Experienced Clinicians

CAPE continues its work on training local, national and international clinician in the care of neonatal resuscitation.

CISL provide instructor training for several multidisciplinary teams from hospitals or medical schools around the country. The CISL CRM Instructor Course is now accredited for Continuing Medical Education credit. A generic CRM course (that can be adapted for any healthcare discipline and domain, and for single-discipline or multi-disciplinary use) has been created and will be submitted in 2008-2009 for CME and CEU accreditations.

CAPE provides formal internships for local graduate and undergraduate nursing students and established a formal training agreement with the Bay Area Simulation Collaborative (BASC) in 2008. The BASC internship will provide local nurses with simulation instructor training in Obstetrics and Pediatrics.

STRATEGIC GOAL 6:

Community Outreach

STUDENT TOURS AND OTHER PROGRAMS

All CISL centers (CAPE, VA, Goodman) regularly conduct tours and special events for students, professional groups (local IEEE interest group), other Stanford Departments and Schools (alumni, biomedical, business, etc) and interested community members and governmental officials.

Presentations and tours for K-12 students provide young people with an opportunity for “hands-on medicine”. They can practice ventilation and compression on mannequin simulators, practice surgical techniques with part-task trainers and even deliver babies. All components of CISL feel that we can make an impact on the early learner, which may determine their career choice of medicine.

*“This session was one of the best days of my life”
– Stanford Bioengineering 201B Student*

“The Simulation center is one of the most fascinating things I’ve ever seen! Thank you for giving us a taste of what training to be surgeon might be like. John, the plastic human was my favorite – but I’m still bad at the IV catheterization” – High School Student

The simulation centers have also been important venues for the Office of Medical Development to engage potential donors to the LKSC project. In CISL’s experience, when it comes to building support for the ISL endeavor “seeing is believing.”



STRATEGIC GOAL 7: Leadership and Advocacy

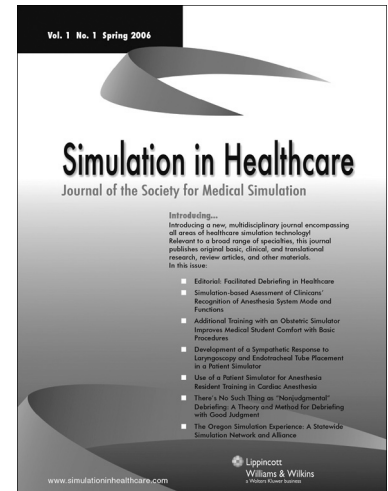
CISL members hold many leadership positions in the field of simulation ranging from the Associate Dean's Editor-in-Chief position for the Society for Simulation in Healthcare's peer-reviewed journal, and Dr. Lou Halamek's nomination for president of the board of SSH (at the time of this writing the votes are not yet in) to board positions on various specialty societies and chair positions within Stanford University School of Medicine. Please refer to individual faculty Community Academic Profiles (CAP) websites for specific interests and activities: <http://med.stanford.edu/profiles/>

CISL members were very active this year along with their legislative advocacy colleagues at Stanford University, Stanford Hospital and Lucile Packard Children's Hospital to help move forward the SIMULATION Act of 2007, H.R. 4321. Many legislators, including those from the Bay Area, have agreed to sponsor the bill after learning more about the advantages of simulation-based learning. Dr. Gaba, Ms. Feaster, and others made visits to Senators and Representative and their staffs at their offices in

Washington as part of the Advanced Initiatives on Medical Simulation (AIMS) <http://medsim.org/> meeting in May 2008.

It is with great pleasure that we report that SSH's peer-reviewed journal SIMULATION IN HEALTHCARE (SiH) received notification in November, 2008 of its acceptance by the National Library of Medicine for inclusion in the MEDLINE index.

Dr. Gaba, Editor-in-Chief, has worked very hard with the journal's editorial board (which includes two other CISL faculty) to achieve this important milestone.



STRATEGIC GOAL 8: Faculty Development

Post-doctoral fellowships: Many CISL components offer post-doctoral fellowships in ISL, including Emergency Medicine, Surgery, Anesthesia, Neonatology/Pediatrics. Many CISL-affiliated post-docs have advanced to faculty positions at Stanford (remaining active in ISL) while others have gone on to leadership positions in ISL at other institutions.

CISL conducted an internal debriefing course for faculty and staff of the School of Medicine and for selected nurses from affiliated hospitals. CISL plans to offer debriefing training to faculty from the Educators for Care program in the coming year.



Since summer of 2007 the Waxworks project has progressed steadily at Stanford. A short video documenting the principle stereo photography has been posted on the web site <http://summit.stanford.edu/Waxworks/>. In addition, a short leather bound book has been produced featuring a selection of the stereo images in anaglyphic format viewable with red-green glasses. During the creation of the book the Stanford School of Medicine requested this selection to be posted on Flickr in mono and stereo formats. The response has been astounding with over six thousands view combined.

Links:

Flickr Anaglyphs Images (Red-Green glasses needed):
<http://www.flickr.com/photos/stanfordmedicine/sets/72157604799639869>

Flickr Mono Images:
<http://www.flickr.com/photos/stanfordmedicine/sets/72157604831278554/>

Boing Boing Blog Story:
<http://www.boingboing.net/2008/05/08/3d-photos-of-centuri.html>

AWARDS

Dr. Jason Lee was selected as the Stanford University School of Medicine applicant for the 2009 Robert Wood Johnson Foundation Physician Faculty Scholars Program. Dr. David Gaba has agreed to serve as Dr. Lee's primary research mentor on this ambitious project. This past year, Dr. Lee's lab received several generous grants in the form of two endovascular simulators housed here at Stanford, as well as funding for purchase of a web-based tutorial on endovascular topics. The lab also was able to purchase open vascular surgical simulation tools through the CISL mini-grant.

Further recognition of the national and international ground that has been gained in this field has been the formation and involvement in the Simulation Committee of the Association for Program Directors in Vascular Surgery.

CISL MINI-GRANTS AWARDED IN MAY 2008

The following mini-grant applications were selected and awarded funding by The Center for Immersive and Simulation-based Learning. These grants were developed to encourage faculty to develop creative teaching approaches to immersive and simulation-based learning.

The 2008 awardees were:

A Novel Hybrid Standardized Patient Case for Medical Students

Andrew Nevins, MD
Julianne Arnall
John Grant
Sylvia Bereknyei, MA
Clarence H. Braddock III, MD, MPH

Developing a Curriculum for Teaching Cardiothoracic Surgical Skills and Applied Cardiopulmonary Physiology to Medical Students

Maziyar Kalani
James Fann, MD

Using a Virtual World Learning Environment to Train and Assess Medical students in Rapid Response to a Medical Emergency Requiring Cardio-Pulmonary Resuscitation (CPR)

Gregory Gilbert, MD
Sakti Srivastava, MBBS, MS

Cardiovascular Physiology and Pharmacology – Using Simulation for Experiential Learning

Kyle Harrison, MD

OB Clerkship Simulation-based Training

Kim Harney, MD
Julie Arafteh, RN

The Impact of Simulation, Technology, and Structured Education on Performance, Perceptions and Attitudes of Medical Students in Vascular Surgery

Jason T. Lee, MD
Mediget Teshome, MD
Janice Yeung, MD
Maureen M. Tedesco, MD
Tae K. Song, MD
Rich Parent, MD
Shyam Raghavan, BS
Mary Qiu
Pamela Grossman, PhD

PRESENTATIONS

Many of the CISL faculty presented courses, lectures and posters at the following meetings:

- SSH (Society of Simulation in Healthcare)
- AIMS (Advances in Medical Simulation), Washington DC
- SESAM (Society in Europe for Simulation Applied to Medicine)
- SimTect (Australian Society for Simulation in Healthcare)
- Pediatric Simulation, Stockholm, Sweden
- Canadian Pediatric Society
- Canadian Neonatal Resuscitation Program
- International Liaison Committee on Resuscitation (ILCOR)
- International Nursing Association of Simulation
- Expanding the Horizons of Critical Care Nursing, November 2008
- National Society of Hospital Medicine
- American Society for Healthcare Risk Management
- American Academy of Pediatrics
- Society for Pediatric Anesthesia
- Safety Across High Consequences Industries
- International Anesthesia Research Society

STRATEGIC GOAL 9: Sustainability and Finances of Simulation

With the building of the Li Ka Shing Center for Learning and Knowledge, (<http://lksc.stanford.edu>), Stanford has demonstrated its commitment to immersive learning by housing 28,000 sq. feet of mannequin-based, standardized patient, part-task trainers and virtual reality capabilities. CISL is highly active in planning the outfitting and operations of the Immersive Learning Center in the LKSC, and in creating mechanisms for the long term sustainability and growth of ISL to improve education, training, and clinical care at the School of Medicine and its affiliated hospitals.

STRATEGIC GOAL 10: Management

One important milestone is the reorganization of Information Resources and Technology (CISL's parent organization) to bring Educational Technology (EdTech) into alignment with CISL. EdTech will continue with Jenn Stringer, MLIS, as Director of Educational Technology and under the purview of the Associate Dean for ISL. In this reorganization a new unit has been born, EdTech Innovations. The Innovations unit will take on the challenge of assessing and adapting existing and emerging technologies for use in the Medical School educational programs. These technologies will range from innovative classroom hardware and applications to immersive and simulation-based technologies. This curricular focused group will in many ways continue the work of the spectacularly successful SUMMIT organization, an externally focused research laboratory that wrapped up its activities this past year. Particular thrust of the Innovations unit will be; i) Display Wall prototyping and applications; ii) exploration of both proprietary and generic Virtual Worlds for education, training, or assessment; iii) emerging applications of video technologies, and; iv) the use handheld and mobile technologies for education.

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