



CENTER FOR
IMMERSIVE AND
SIMULATION-BASED
LEARNING
STANFORD MEDICINE



2013-2014

Accomplishments Report

Stanford Medicine
Center for Immersive & Simulation-based Learning

immersion reflection integration
reflection integration immersion

Letter from the Associate Dean



CENTER FOR
IMMERSIVE AND
SIMULATION-BASED
LEARNING
STANFORD MEDICINE

Once again the Center for Immersive and Simulation-based Learning (CISL) has the opportunity to present an overview of highlights from the preceding academic year in immersive and simulation-based learning (ISL). We are also pleased to report on advances made by Stanford faculty and staff in other centers, and in programs of affiliated hospitals. This Report, as well as the preceding eight, focuses solely on new activities and cannot fully describe the extensive suite of ISL activities that have joined the mainstream of education, training, assessment, and research.



We continue to be grateful for the generosity of Mr. Li Ka Shing, naming donor of the LKSC, and of Hon-Mai and Joseph Goodman, primary donors of the Immersive Learning Center (ILC), for providing the opportunity to create this world-class integrated center where all modalities of immersive and simulation-based learning can exist in one location.

Stanford and affiliated faculty, clinicians, researchers, and staff continue to be innovators of ISL and play major roles in the national and international adoption of ISL techniques and applications to improve quality and patient safety. Simulation is a global enterprise thanks to more than 25 years of effort by CISL pioneers to bring simulation everywhere rather than focusing only on Stanford. I just returned from speaking at the 2014 SimTect/SimHealth meetings, the Australian national simulation conferences covering simulation in all industries, domains, and disciplines. Where before SimHealth was a minor track parallel to SimTect, the healthcare sessions now greatly exceed those addressing aviation, defense, mining, or maritime. Stanford faculty played major roles in launching and sustaining healthcare simulation in Australia. CISL faculty continue to conduct externally funded research either about simulation or using simulation to study other issues in healthcare. Collaborations between CISL and professors in other Stanford Schools and Departments continue to confirm the interdisciplinary nature of simulation and the culture of innovation at Stanford.

Efforts continue to embed immersive learning into the curriculum of the School of Medicine for all learner populations. Stanford Health Care and Stanford Children's Health continue to be supportive of the efforts of CISL to use simulation to address quality and safety in the training of interns, residents, fellows, and nurses. CISL is working with the hospitals of Stanford Medicine in developing activities for single professional disciplines, with the possibility of expanding to combined team simulation activities involving physicians, nurses, and allied health professionals.

Stanford faculty and staff continue to be world-recognized leaders in ISL techniques, applications, and technologies who are highly sought as teachers, scholars, advisors, and collaborators. Our goal, as ever, is to improve the efficiency, quality, and safety of care for all patients while simultaneously improving the education, training, and assessment of the caregivers. We thank the many people involved in the inception, implementation, and support of immersive and simulation-based learning at Stanford. Through their efforts we are certain that many individual lives around the world have already been saved. We are pledged to continue these efforts for the benefit of all humanity.

A handwritten signature in black ink, reading 'David M. Gaba, MD'. The signature is written in a cursive, flowing style.

David M. Gaba, MD

Associate Dean, Immersive & Simulation-based Learning

CISL STRATEGIC GOALS

1. Education and Training of Students and Clinical Trainees

Improve the education and training of Stanford students (undergraduate, medical, and graduate) and Medical Center trainees (residents, clinical fellows, and postdoctoral scholars) using ISL.

2. Healthcare Systems Improvement

Improve care delivery and operational outcomes throughout Stanford Medicine, Stanford Health Care, the VA Palo Alto, and the Stanford University Medical Idemnity and Trust Insurance (SUMIT) by improving the individual and teamwork skills of healthcare personnel.

3. Assessment/Testing

Use ISL techniques for explicit assessment/testing of skills, knowledge, and performance of students, trainees, and experienced personnel.

4. Research

Promote, support and conduct fundamental research and evaluation about ISL and to use the ISL techniques as a research tool.

5. Provide ISL Learning to External Experienced Clinicians

Improve the clinical skills (both “technical” and “non-technical”) of healthcare personnel, as individuals and in teams, through ISL.

6. Community Outreach

Develop and conduct outreach programs for local community and lay groups, as well as public safety and public health organizations, and healthcare providers, exposing them to the benefits and potential of ISL.

7. Leadership and Advocacy

Provide leadership in advocating the future vision of immersive and simulation-based learning in healthcare for the nation and the world.

8. Faculty Development

Recruit, train, and sustain faculty to become effective ISL educators.

9. Sustainability

Provide financial and program planning and analysis of ISL programs, and to support the Office of Medical Development fundraising and ensure long-term financial viability of ISL activities.

10. Management

Create management infrastructure and procedures that effectively coordinate and integrate the Center’s priorities, activities and resources among its constituent units and within the School and University.

Goodman Immersive Learning Center

Immersive Learning Center Programs by Target Population

Pre-Medical/ Community	Pre-Clinical Med Students	Clinical Med Students	Interns/Residents/ Fellows		Combined Team	CME or Equivalent	Nursing/ Allied Health
Discovering Medicine	Mini-CPX	MED 300A Bedside Rounds	ANES EVOLVE	ANES ACRM I, II, III	Code Blue Simulation	Advanced Pedi Life Support (APLS)	LifeFlight
MMI	INDE 201 Baseline SP Exercise	OBGYN 300A	EMED Intern Boot Camp	Anesthesia ImPRINT	OBGYN OB Simulation	Advanced Trauma Life Support (ATLS)	EMED Nursing
Health Matters	INDE 202 Clinical Skills	PEDS 300A Delivery of Bad News	NEURO Stroke Code	EMED EMCRM Adult I, II, III	Multi Discip Crisis Res Mgmt (MCRM)	Advanced Airway Management	Primary Care Asst Program (PCAP)
	INDE 203 Std Family	FAMMED 301A	PICU/CVICU Fellows Boot Camp	EMED EMCRM Peds I, II, III		CISL Simulation Instructor Course	Genetics Counseling MS Program
	INDE 204 Project Prepare	NENS 301A Neurology	ONCOLOGY Difficult Conversations	Peds EMED		Simulation Instructor Training: TRANSFORM	Safe Patient Handling
	INDE 204 Advanced Clinical Skills	ANES 306A Critical Care	HEM/ONC Fellows Skills	EMED Wilderness Simulation		Maint of Cert for Anesthesia (MOCA)	Social Work Advanced Care Planning
	INDE 205 Intro to Mgmt of Ill Patient (IMIP)	ANES 306P Peds Critical Care	Internal Medicine Boot Camp	EMED Disaster Simulation		ANES Chronic Pain Management	
	INDE 206 EMED	MED 313 Ambulatory Med	OBGYN Lap Surgery Training	EMED OB Simulation			
	INDE 221 HHD CV Phys	SURG 313A EMED	OBGYN Intern Boot Camp	PICU Residents Boot Camp			
	SURG 205 Advanced Suturing	Global Health	SURG Boot Camp	Ultrasound/ ECHO/FAST OB, Anes, Peds Cardio, Adult Cardio, Critical Care, EMED, Surgery, Internal Med			
	MED 227 Bedside Ultrasound	Capstone Clerkship					
	Anesthesia Special Interest Group	CPX, CPX-R		Palliative Care			
	Ultrafest Ultrasound						

 Combined Modalities

 Mannequin-based Simulation

 Standardized Patient Program

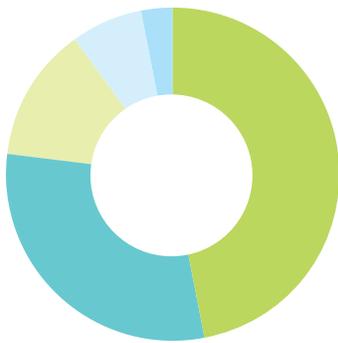
 Part-task Skills Training

Activity in the The Goodman Immersive Learning Center (ILC) has been steadily increasing as immersive and simulation-based modalities are becoming integrated in curricula at all levels of medical education. (Data as of August 2014)

Immersive Learning Center Activities At-a-Glance

(These graphs & charts represent activities for fiscal year 9/1/13 through 8/31/14)

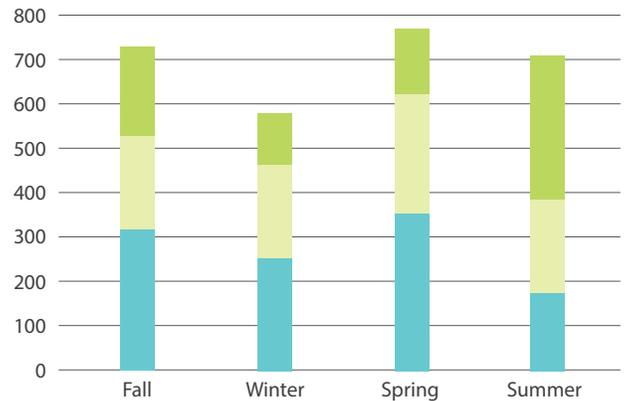
Primary Users of the ILC



■ UGME 47% ■ GME 30% ■ SPH 13% ■ CME 7% ■ RN 3%

This graph represents the various user groups hosted by the ILC.

Hours of Activity



■ Simulation ■ SP Activities ■ Task Training

Due to their intensity, simulation hours are generally high. Note the increase in task training during the 4th Quarter – this is due to boot camp activities for incoming residents.

Unique Activities



■ UGME ■ GME ■ SPH ■ CME ■ RN

This graph represents the variety of activities by user group that take place in the ILC. Medical student experiences (UGME) range from task training, clinical skills and decision-making to mannequin-based simulation and have the largest number of activities in the academic calendar year, followed by resident training (GME). The ILC also hosted 66 tours in fiscal year 2013-2014.



UGME - Undergraduate Medical Education
 GME - Graduate Medical Education
 SPH - Safe Patient Handling
 CME - Continuing Medical Education
 RN - Registered Nursing
 SP - Standardized Patient

Strategic Goal 1



1

Education & Training of Students & Clinical Trainees

Improve the education and training of Stanford students (undergraduate, medical, and graduate) and Medical Center trainees (residents, clinical fellows, and postdoctoral scholars) using ISL.

Undergraduate Medical Education (UGME)

The regular UGME activities that are held in the ILC, include clinical skills exercises (e.g. performing physical examinations and taking a patient history) that utilize standardized patient actors, partial task training (listening to heart sounds using a simulator, or starting an IV, etc.), and mannequin-based simulation.

LECTURE MEETS PRACTICE

In the spring of 2014, all 106 first-year medical students met in the ILC to learn and practice cardiovascular (CV) skills for their INDE 221 course. Course Director Dr. Donald Regula and Block Lead Dr. Andrew Patterson designed and developed this portion of the CV block after piloting a similar session in 2013. They took into account and integrated previous student and faculty feedback to enhance the session. The practice session focused on acquiring and interpreting the ECG and performing and interpreting cardiac ultrasound, thus integrating lecture content and hands-on practice. Dr. Eric Strong was the lead for the ECG exercises and Dr. Daryl Oakes was the lead for the ultrasound/echocardiography experience. In total 8-10 faculty participated in this four-hour teaching session. Student evaluations were positive for the session, and the ILC looks forward to hosting this event and more like it in future academic years.

STROKE SIMULATION

A stroke simulation exercise was created for first-year medical students having a specific interest in neurology. The group is called SIGN (Student Interest Group in Neurology) and was developed by Waimei Amy Tai, MD, a graduate of the CISL Simulation Instructor Course. This simulation is one of the earliest exposures for first year medical students to a simulation of an acutely ill patient, as they learned the symptoms, signs and treatment for stroke. The patient role was played by a nurse who could replicate the signs and symptoms of a stroke.



1 (CONTINUED)

ULTRAFEST

Approximately 200 medical students from all over California came to the ILC for a one-day ultrasound workshop organized by Laleh Ghrarahbaghian, MD, a leading ultrasound faculty member from the Department of Emergency Medicine. The students were able to practice on simulators, as well as on each other, to learn the techniques and challenges of performing an emergency ultrasound examination.



CAPSTONE CLERKSHIP

The Capstone Clerkship (formerly called Transition to Internship and developed as a pilot in 2013 by a former medical student, Vivian Lei) was offered as an elective course in the spring of 2014. The one-week course allowed the students the opportunity to practice various aspects of being an intern. Session topics included:

- Targeted procedural tasks such as intubation, defibrillation, central line insertion, etc.
- Mannequin-based simulation scenarios that required students to manage ill and deteriorating patients in the initial period (while more experienced hands were on the way).
- How to respond to simultaneous competing requests (e.g. receiving pages and phone calls, being at the bedside of a sick patient, writing notes and orders, talking to nursing and allied health staff).

Based on the feedback from last year, new sessions were added including:

- delivering bad news,
- professionalism,
- wellness, and
- financial planning.

Drs. Chi, Kugler, Harman, and Harter were the key designers and faculty for the course.



Jeffrey Chi, MD



John Kugler, MD



Stephanie Harman, MD



Phillip Harter, MD



Lizzie Calogero, Standardized Patient

Strategic Goal 1

1 (CONTINUED)

Graduate Medical Education (GME)

BOOT CAMPS & SKILLS ACQUISITION

June, July, and August are always busy months for incoming residents and their respective clinical departments. A variety of Boot Camps and Skills Labs kept the ILC buzzing with activity to help incoming residents learn procedural skills and the specific nuances of both Stanford Hospital and Clinics and Lucile Packard Children's Hospital. Various departments took advantage of mannequin-based simulations, task training and communication skills with patients (utilizing standardized patient actors).

The echocardiography (ECHO) simulator also worked overtime for residents and fellows, helping them acquire or hone their skills in the ever more important world of transthoracic (TTE) and transesophageal (TEE) echocardiography.



The following departments utilized the ILC for boot camps:

- Anesthesia
- Emergency Medicine
- General Surgery
- Hematology/Oncology
- Intensive Care
- Internal Medicine
- Neurology
- Obstetrics and Gynecology
- Pediatric Intensive Care

1 (CONTINUED)

EVOLVE

EVOLVE was launched in the fall of 2011 following a year-long needs assessment locally throughout the anesthesia residency program at Stanford and across anesthesiology programs nationally. Curricular development concentrates on perceived gaps and areas of curricular improvement (reported nationally and locally); paying particular attention to concerns and requests communicated by current and past residents at Stanford. This immersive curriculum uses multimodal techniques including mannequin-based simulation, partial task trainers, and standardized patient actors in a variety of formats and situations. Focused scenarios include:

- Dealing with diagnostic dilemmas and critical thinking concepts while supervising multiple inter-disciplinary teams.
- Challenging end-of-life conversations with families while managing acutely critical medical events.
- When and how to balance roles of patient care and teaching.

Results: To date, 37 EVOLVE courses have been completed with over 220 participants. Over 90% of the residents felt the course addressed an unmet need in the curriculum. Drs. Sara Goldhaber-Fiebert and Ruth Fanning have worked tirelessly on this curriculum and deserve kudos for their innovative work.

“ It is great to see how different people who are at different levels of learning think through difficult situations. ”

“ This course helped me improve my communication and prioritization skills. ”

-Participants in the EVOLVE course



Strategic Goal 1

1 (CONTINUED)

MULTIDISCIPLINARY CRISIS RESOURCE MANAGEMENT

This is one of the first courses that had combined anesthesia and surgery teams participating in simulations together, with realistic and challenging work on the same patient case for both surgery and anesthesia residents. The course was designed and run by Simulation Fellow, Ankeet Udani, MD, and Surgical Education Fellow, Cara Liebert, MD. A truly collaborative effort!



PAIN MEDICINE SIMULATION

Six pain medicine fellows had the opportunity through simulation to focus on patient communication and the management of opioid medications. Three standardized patient actors played various roles of opioid-seeking patients. This pain medicine simulation program was developed and successfully piloted by Jordan Newmark, MD, from the Division of Pain Medicine and Anesthesia.



NEUROLOGY SIMULATION - ACUTE HERNIATION SYNDROMES

The Department of Neurology expanded the neurology resident simulation curriculum to cover acute herniation syndromes. These exercises utilize patient actors to allow participants to assess a “patient” who exhibits speech and motor deficits. Anna Findley-Caulfield, MD, and Waimei Amy Tai, MD, developed these simulation exercises.



STARTPlus (formerly known as ImPRINT)

STARTPlus is a new blended learning program for incoming Stanford anesthesia interns. The sessions are aligned with an online program (www.startanesthesia.org/moodle) that uses point-of-view cameras to guide interns through real-life clinical cases and scenarios they might face during their first year of residency. The interns meet in-person on a monthly basis to participate in simulations where they practice and hone the concepts and skills they learned online. Drs. Larry Chu and Kyle Harrison have adapted this program from ImPRINT.



1 (CONTINUED)

OBSTETRIC SIMULATION FOR EMERGENCY MEDICINE RESIDENTS

Emergency medicine (EM) resident trainees must acquire the knowledge and skills to appropriately diagnose and manage a broad spectrum of obstetric emergencies. Faculty from the specialties of Emergency Medicine (Charles Lei, MD and Rebecca Smith-Coggins, MD) and Obstetrics and Gynecology (Kay Daniels, MD and Kim Harney, MD) collaborated and developed a multi-modal simulation-based course to educate EM residents in the management of uncommon yet critical obstetric emergencies. Three different simulation modalities were employed:

- 1) mannequin-based scenarios, with structured post-case debriefings, simulated cases of peripartum cardiac arrest and postpartum hemorrhage,
- 2) mock oral examinations about management strategies for eclampsia and chest pain in pregnancy, and
- 3) partial task trainers were used to practice the approach to uterine atony, vaginal delivery with nuchal cord, shoulder dystocia, and breech delivery.

In academic year 2014, twelve PGY-3 and nine PGY-2 EM residents participated in this course.



Strategic Goal 2



2

Healthcare Systems Improvement

Improve care delivery and operational outcomes throughout Stanford Medicine, Stanford Health Care, the VA Palo Alto, and the Stanford University Medical Idemnity and Trust Insurance (SUMIT) by improving the individual and teamwork skills of healthcare personnel.

ADVANCED CARE PLANNING FOR STANFORD HOSPITAL SOCIAL WORK

This program was designed to train approximately 60 social workers in baseline skills needed to discuss advanced care planning and care directives, Physician Orders for Life-Sustaining Treatment (POLSTs), and the differences between hospice and palliative care. Sandy Chan, LCSW, ACHP-SW (Palliative Medicine social work supervisor), at the encouragement of Stephanie Harman, MD (Medical Director for Palliative Medicine Program), consulted with the Standardized Patient Program (SPP) and used standardized patient actors playing various roles to allow the social workers to interact and discuss care options.

ELECTRONIC MEDICAL RECORDS AND EMERGENCY MEDICINE NURSING SIMULATION

Nurses at the Marc & Laura Andreesen Emergency Department at Stanford Hospital celebrated their second year in the ILC by incorporating the electronic medical record (EMR) in the simulation. The 160 ED nurses using the EMR were able to initiate protocols and document responses to interventions and treatments. Over 90 percent of the participants agreed that their simulation experience improved their clinical practice. Edward Shradar, RN, MSN, CCNS, CEN, Ijeoma Okonkwo-Pope, RN, BSN, CEN, and their team plan more interdisciplinary team activities as they continue this program into 2015.



2 (CONTINUED)



STANFORD HEALTH CARE TRANSFORM PATIENT SAFETY PROGRAM

The TRANSFORM Program that focuses on communication, teamwork, and patient safety is heavily based on in-situ interprofessional simulations occurring regularly in actual patient care sites. In 2014-2015 the program is rolling out in medical and surgical wards, but in subsequent years will expand to all settings of patient care. CISL leadership is acting as consultants to the TRANSFORM Program and is conducting one-day instructor training workshops for the unit-based medical directors and nursing leaders who will guide post-simulation debriefings and with TRANSFORM Program staff who will help the unit personnel to engage in simulation. The instructor workshops use a flipped classroom approach in which the new instructors first view the TRANSFORM videos (which will also be viewed by unit clinical staff) and then do a 10-hour hands-on experiential workshop with CISL instructors Assoc. Dean David Gaba, ILC Director Susan Eller, and Asst. Dean Sandra Feaster. The workshop is largely immersive, with participants taking part in simulations, conducting scenarios, and debriefing. The first workshop took place August 11, 2014.

The TRANSFORM Program is directed by James Lau, MD (Medical Director), Nancy Szflarski, PhD, RN, (Director of Patient Safety Transformation) and Carole Kulik, MSN, RN, (PCS Director of Practice and Education). Associate Medical Directors are John Kugler, MD, and Paul Mohabir, MD. The TRANSFORM staff are lead by TRANSFORM Program Manager, Deborah Arnold, MSN, RN, CHSE.

OBSTETRICS SIMULATION

Kay Daniels, MD, and the OBSim team conducted thirty multidisciplinary (OB, anesthesia, and nursing) in-situ drills in Labor and Delivery this past academic year. Introduction of checklists for emergency events as well as disaster training drills with the Office of Emergency Management were key highlights. Little to no planning (locally or nationally) has focused on the unique needs of an OB unit during a disaster. OBSim was instrumental in developing operational goals specific to the obstetric domain if an event should occur that requires shelter in place, operating at surge capacity, or evacuating a facility.



3

Assessment/Testing

Use ISL techniques for explicit assessment/testing of skills, knowledge, and performance of students, trainees, and experienced personnel.

No significant changes for fiscal year 2013-2014.

Strategic Goal 4

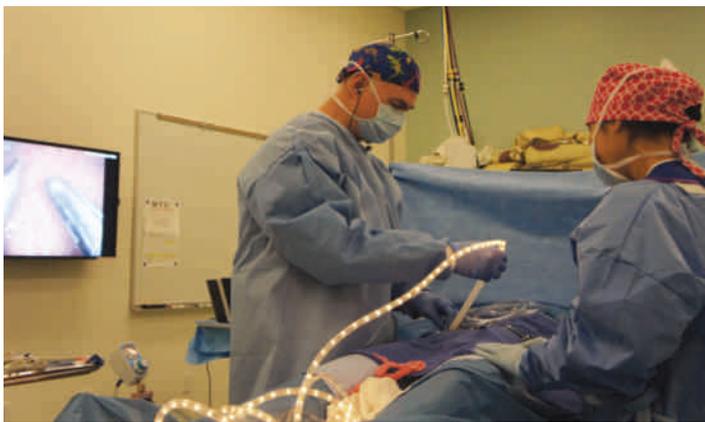
4

Research

Promote, support and conduct fundamental research and evaluation about ISL and to use the ISL techniques as a research tool.

MOCA AHRQ GRANT

CISL is significantly involved in a four-year multi-site research project funded by the Agency for Healthcare Research and Quality (AHRQ). The project is titled “Creating Simulation-Based Performance Assessment Tools For Practicing Physicians.” The Principal Investigator is Dr. Matt Weinger from Vanderbilt University, and Stanford ISL Associate Dean Dr. David Gaba is a co-Investigator and site PI. CISL was one of nine subject accrual sites. The project grafts performance assessment onto the ongoing Maintenance of Certification in Anesthesia (MOCA) simulation learning course for Board Certified Anesthesiologists. The project team created specially standardized scenarios, video and data collection systems, and performance assessment metrics and tools, and has collected over 250 videos of simulation runs across all sites. Dr. Gaba chaired the Performance Assessment Sub-Team. Both medical/technical and non-technical performance was assessed by real-time raters during the scenarios and is now being rated by specially trained post-hoc video raters. An extensive suite of analyses of the data will begin shortly. Dr. Gaba is also the primary consultant to a separately funded (Foundation for Anesthesia Education and Research) spin-off study that is comparing moment-by-moment rating while watching the video, to the usual form of rating that is done with numerical scores provided after the video is viewed in its entirety.



ACLS (for perioperative setting)		Fire – Airway	12
Asystole	1	Fire – Patient	13
Bradycardia – Unstable	2	Hemorrhage – MTG	14
PEA	3	Hypotension	15
SVT Unstable – Tachycardia	4	Hypoxemia	16
SVT Stable – Tachycardia	5	Local Anesthetic Toxicity	17
VF/VT	6	Malignant Hyperthermia	18
		Myocardial Ischemia	19
BROAD DIFFERENTIAL DIAGNOSES		Oxygen Failure	20
Hypotension	15	Pneumothorax	21
Hypoxemia	16	Power Failure	22
		SVT Stable – Tachycardia	5
SPECIFIC CRITICAL EVENTS		Total Spinal Anesthesia	23
Amniotic Fluid Embolism	7	Transfusion Reaction	24
Anaphylaxis	8	Venous Air Embolus	25
Bronchospasm	9		
Delayed Emergence	10	CRISIS RESOURCE MANAGEMENT	26
Difficult airway – Unanticipated	11		

EMERGENCY MANUAL

COGNITIVE AIDS FOR PERIOPERATIVE CRITICAL EVENTS 2014, V2.1
STANFORD ANESTHESIA COGNITIVE AID GROUP

USING STANDARDIZED PATIENT INSTRUCTORS TO COACH PRACTICING PHYSICIANS ON PATIENT-CENTERED COMMUNICATION

Ming Tai-Seale, PhD, MPH, Senior Investigator (Palo Alto Medical Foundation Research Institute/PAMFRI) is Principle Investigator for a study, entitled “Creating a Zone of Openness to Increase Patient-Centered Care.” The study aims to improve patient physician communication at the Palo Alto Medical Foundation and is funded by The Patient Centered Outcomes Research Institute (PCORI). The study team developed an intervention to coach physicians with standardized patient instructors (SPIs). The SPIs are actors who are trained to portray a patient with a particular medical history and then provide feedback and one-on-one coaching on how to use the communication intervention.

Dr. Tai-Seale initially collaborated with SP Medical Director Dr. Andrew Nevins, ILC Director Susan Eller, and SP Program Manager Karen Thomson-Hall on establishing the training protocols. SP Program Trainer Elias Escobedo led the efforts to recruit and train the SPIs. The study is ongoing and feedback from physicians who had gone through the SPI visits has been positive as it allows them a “safe space” to learn and practice some new communication skills.



5

Provide ISL Learning to External Experienced Clinicians

Improve the clinical skills (both “technical” and “non-technical”) of healthcare personnel, as individuals and in teams, through ISL.

The ILC continues to host and offer several CME and CEU programs to external experienced clinicians. Several of the courses are in their second and third year or more:

- Advanced Pediatric Life Support (APLS)
- Advanced Trauma Life Support (ATLS)
- Advanced Airway Management and Fiberoptic Course
- CISL Simulation Instructor Training
- Maintenance of Certification for Anesthesia (MOCA)

BEYOND THE EXPECTED: MAXIMIZING THE USE OF SIMULATED/STANDARDIZED PATIENTS

In collaboration with Eastern Virginia Medical School Sentara Center for Simulation and Immersive Learning, CISL hosted “Beyond the Expected: Maximizing the Use of Simulated/Standardized Patients.” This was a preconference workshop, held in the ILC as part of the International Meeting on Simulation in Healthcare (IMSH) in January 2014. The focus of the workshop was to discuss and provide group training in the use of SPs in extended roles (assisting with physical exams and assessment, procedural skills training, and communication behaviors). Andrew Nevins, MD, Susan Eller, RN, MSN, and Karen Thomson-Hall were the CISL faculty. The audience of physicians, nurses, and administrators commented that a highlight of the course was a demonstration of Stanford’s Standardized Family exercise that teaches participants to communicate with patients, family members, and an interprofessional team.

“ *Very student-centered. Excellent organization. High-quality hand-out materials. Very interactive.*
Lots of exposure to different models of SP use. Experienced faculty. Good hospitality. Excellent venue. ”

-Participants in the IMSH pre-conference workshop, January 2014

Strategic Goal 6

6

Community Outreach

Develop and conduct outreach programs for local community and lay groups, as well as public safety and public health organizations, and healthcare providers, exposing them to the benefits and potential of ISL.

CISL continues to provide immersive learning experiences for the community by offering regular tours, hosting global visitors, and providing training sessions to aspiring pre-professionals in healthcare careers. Below are a few highlights of how we inspire the next generation of clinicians.

DISCOVERING MEDICINE @STANFORD

Discovering Medicine @Stanford is offered for 50 high school students by the Stanford Medical Youth Science Program (SMYSP) in association with the Stanford Pre-Collegiate Studies (SPCS) program. The two-day program is interactive, with small group workshops, and direct interactions with a variety of health professionals. CISL participated in leading several sessions, where students learned and practiced the basics of CPR, how to talk with a patient (who was played by one of the actors from the Standardized Patient Program), and then previewed what it takes to be a successful surgeon by practicing the art of surgical knot-tying.

HEALTH MATTERS

In collaboration with the Division of Anatomy, CISL presented an interactive session at Health Matters, a free community event hosted by Stanford Medicine exploring the latest advancements in medicine and other health topics. There was a special session for approximately 100 students who are interested in becoming healthcare professionals. The students observed and practiced surgical knot tying. This interactive session was hailed by students as a highlight of their day.

Please visit www.healthmatters.stanford.edu for more information.





7

Leadership & Advocacy

Provide leadership in advocating the future vision of immersive and simulation-based learning in healthcare for the nation and the world.

CISL leaders continue to create and deliver innovative immersive curricula and expand their leadership roles in the world's community of immersive learning in healthcare through publications, lectures and enduring materials. Below are just a few examples of how the CISL is a touchpoint to the world.

Grants, Awards, Recognition, Publications & Presentations

CISL faculty and staff continue to be very active in the national and international simulation communities; the following represent only a sample of the many activities by CISL affiliates over the past year.

GRANTS

David Sirjani, MD, FACS – Received a \$10,000 simulation grant from the Center for Integration of Medicine & Innovative Technology (www.cimit.org) for developing a parotidectomy surgical simulator.

CISL MiniGrants:

- Simulation of Otolaryngology (airway management) - **Jennifer Lee, MD**
- Scrub Training for Medical Students - **James Lau, MD**
- Pallitalk, Discussing Goals of Care - **Joshua Fronk, DO & Stephanie Harman, MD**

AWARDS & RECOGNITION

James Lau, MD

- Henry J. Kaiser Family Foundation Teaching Award for Clerkship Instruction
- Excellence in Promotion of the Learning Environment and Student Wellness

Cara Liebert, MD

- Arnold P. Gold Foundation's Humanism and Excellence in Teaching Award



Strategic Goal 7

7 (CONTINUED)

PUBLICATIONS

Beraud AS, Rizk N, et al. Focused Transthoracic Echocardiography During Critical Care Medicine Training: Curriculum Implementation and Evaluation of Proficiency. *Critical Care Medicine*, August 2013.

Gaba DM, Fish KF, Howard SK, Burden A. Crisis Management in Anesthesiology, 2nd Edition. Philadelphia, Elsevier Saunders, 2015.

Goldhaber-Fiebert SN, Howard SK. Implementing Emergency Manuals: Can Cognitive Aids Help Translate Best Practices for Patient Care During Acute Events? *Anes Analg* 117, October 2013.

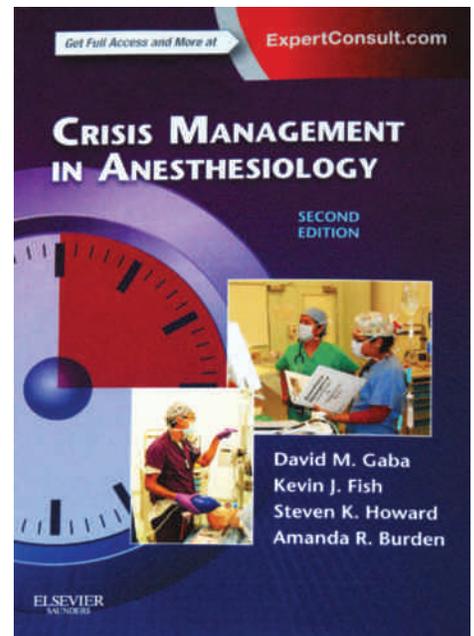
Knight L, Gabhart J, et al. Improving Code Team Performance and Patient Survival Outcomes: Implementation of Pediatric Resuscitation Team Training. *Critical Care Medicine*, Feb, 2014.

Keskitalo T, Ruokamo H, Gaba DM. Towards Meaningful Simulation-Based Learning with Medical Students and Junior Physicians. *Med Teach* 2014; 36:230-239.

Weinger MB, Gaba DM. Human Factors Engineering in Patient Safety (editorial). *Anesthesiology* 2014; 120:801-806.

Weinger M, Burden A, Steadman R, Gaba DM. This is Not a Test! Misconceptions Surrounding the Maintenance of Certification in Anesthesiology Simulation Course. *Anesthesiology*, 2014; 121:655-9.

Annotated bibliography concerning patient safety issues can be found at <http://cisl.stanford.edu/news/research/output.html>.



PRESENTATIONS & POSTERS

Chung JK, Roman-Micek T, Mayette M, Mohabir P. Multidisciplinary ACLS Training with High Fidelity Simulation and an Electronic Evaluation System. International Meeting on Simulation in Healthcare. January 2014, San Francisco, California. (Poster Presentation)

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8

Faculty Development

Recruit, train, and sustain faculty to become effective ISL educators.

Among other faculty development activities, CISL has expanded its pool of interprofessional ISL instructors in Stanford Medicine with a two-day intensive CISL Instructor Training Course with theoretical training in the pedagogy of experiential learning. Graduates of the 2014 courses include:

- **Naola Austin, MD** – Obstetrics/Anesthesia
- **Courtenay Barlow, MD** – Pediatrics/Pediatric Critical Care
- **Eileen Carroll, RN** – LPCH, Ambulatory Center/Procedure Unit
- **Adrienne Duffield, MD** – Obstetrics/Anesthesia
- **Peter Gilbey, MD** – Visiting Professor, Anesthesia
- **Gillian Hilton, MD** – Obstetrics/Anesthesia
- **Michael Jacobs, EMT-P** – LPCH Stanford American Heart Association Training Center
- **Lynda Knight, MSN, BSN, RN, CPM** – LPCH, Nursing Education
- **Jennifer Lee, MD** – Otolaryngology/Head & Neck Surgery
- **Steve Lipman, MD** – Obstetrics/Anesthesia
- **Javier Lorenzo, MD** – Anesthesia/Critical Care
- **Jordan Newmark, MD** – Anesthesia/Pain Medicine
- **Kieley Schmidt, PT, DPT** – Department of Rehabilitation Services
- **Amit Singh, MD** – General Pediatrics
- **Deb Updegraff, RN, MSN, PNP, CNS, CCRN, CPEN** – Emergency Medicine
- **Lisa Vischer, RN, DNP, CNS, CCRN** – LPCH Center for Nursing Excellence
- **Carolyn Fiona Weiniger, MD** – Visiting Professor, Anesthesia
- **Michael Yashar, MD** – Emergency Medicine

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Sustainability

Provide financial and program planning and analysis of ISL programs, and to support the Office of Medical Development fundraising and ensure long-term financial viability of ISL activities.

CISL continues to provide excellent educational activities for all of its learner population. Primary funding is provided by the Dean's office. The ILC continues to look at alternatives to augment funding sources and provide visibility nationally and internationally for its work. The ILC hosted 66 tours for visitors around the globe in 2013-2014. The ILC has been used frequently as a site for the testing or production of high visibility enduring materials, including but not limited to:

- Stanford Anesthesia Cognitive Aids at <http://emergencymanual.stanford.edu> (made available to the world via a Creative Commons license).
- Filming of video vignettes and educational modules for clinical medical students, staff and faculty for the online-blended learning curriculum titled: Introduction to the Clerkship Educational Environment and Mistreatment. This project, led by James Lau, MD, was funded by a Vice Provost for Online Learning (VPOL) grants.
- Filming of the television commercial concerning cardiac surgery at Stanford Health Care.
- Video exemplars for the TRANSFORM Program.
- Video games -- SEPTRIS and SICKO.

Technology in Academic Medicine: Video Games Take Increasing Role in Medical Education, *AAMC Reporter*. June 2014. <https://www.aamc.org/newsroom/reporter/june2014/384790/technology-medical-education.html>



Strategic Goal 10

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Management

Create management infrastructure and procedures that effectively coordinate and integrate the Center's priorities, activities and resources among its constituent units and within the School and University.

Since academic year 2012, CISL has been comprised of both a Simulation Program and a Standardized Patient Program (SPP). In academic year 2013, the SPP Medical Director, Andrew Nevins, MD, joined the CISL administrative team. The entire group is now housed in the LKSC, which adds to synergy and workflow improvement. CISL team members include:

David M. Gaba, MD – Associate Dean

Sandra J. Feaster, RN, MS, MBA – Assistant Dean

Andrew Nevins, MD – Standardized Patient Program Medical Director

Susan Eller, RN, MSN – Director, Immersive Learning Center

Karen Thomson-Hall – Standardized Patient Program Manager

Elias Escobedo – Standardized Patient Program Trainer

Teresa Roman-Micek – Lead Simulationist

John Fell – Simulation Technology Specialist

Michelle Otis – Education Program Manager

Katt Clark – Administrative Assistant



This is an exciting year at Stanford School of Medicine as we celebrate 20 years of the Standardized Patient Program (SPP).

The use of an individual trained to act as a real patient, in order to simulate a set of symptoms or problems, has evolved since Howard Barrows first started his program at USC in 1963. We at Stanford have been advancing our own technological capabilities, program development, and learner populations since our program began in 1994.

The program started by using clinic spaces in the Blake Wilbur Building on evenings and weekends, with no audio/visual recording capabilities. When the SPP moved to the modular trailers on Welch Road in 1998, four VHS camcorders on tripods recorded exercises that were conducted on portable exam tables. Two years later, ten rooms were created in the modular trailers with standard exam tables and basic AV capability. In 2010, the program moved into our current home in the Hon Mai & Joseph Goodman Immersive Learning Center (ILC), located on the ground floor of the Li Ka Shing Center for Learning and Knowledge (LKSC). In the ILC, the Serge Klotz Clinical Skills Suite has ten fully equipped clinic rooms (plus two hospital rooms that double as clinic rooms) each outfitted with cameras and microphones that feed directly into a software system that is used to record and analyze performance data.

The first programs of the Stanford SPP were formative exercises for Internal Medicine and Family Medicine Clerkships. By 2000, Stanford was one of ten sites working with the National Board of Medical Examiners (NBME) on the development of the Clinical Skills portion of the United States Medical Licensing Examination (USMLE), which was instituted in 2004. In 2001, the Stanford SPP worked with the other seven California medical schools to create the California Consortium for the Assessment of Clinical Competence (CCACC) to implement the annual Clinical Performance Examination (CPX). The CPX is an SP-based examination administered as a graduation requirement to all medical students in the state of California. Overall Stanford now conducts a wide variety of medical student exercises, training generations of future doctors to better communicate with and diagnose patients by providing deliberate practice and expert feedback.

Since moving into the ILC, the SPP has expanded its role while continuing to support the education of medical students. Graduate Medical Education programs have excelled in using SPs to train residents and fellows in delivering difficult news to oncology patients, helping to make end-of-life decisions in palliative care, and other shared decision-making exercises. The SPP has also consulted on Patient Centered Outcomes Research, Social Work Advanced Directive Training, and Physical Therapy Competency Assessment. The space and the outstanding team led by Associate Dean for Immersive and Simulation-based Learning, David Gaba, MD and Medical Director Andrew Nevins, MD will allow the SPP to develop new programs and expanded roles across the spectrum of medical education at Stanford in the years to come.



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Updates from CISL Affiliates

Goodman Education Center

<http://goodmancenter.stanford.edu>

The Goodman Surgical Simulation Center has introduced many new aspects to its educational curriculum for medical students and General Surgery residents this past academic year. Highlights are listed below.

Surgery Core Clerkship Flipped Classroom Curriculum: A simulation-based online-blended learning curriculum for the SURG 300A Surgery Core Clerkship, this “flipped classroom” model replaced the traditional didactic portion of the curriculum with eight online video modules paired with eight interactive clinical reasoning and simulation-based skills sessions.

Mistreatment Trigger Videos for Medical Students: These video vignettes were developed on the topic of medical student mistreatment for use with medical students, residents, and faculty. The videos are part of a larger project funded by the Vice Provost for Online Learning and Stanford School of Medicine for development of an online-blended learning curriculum spanning multiple clinical departments including Surgery, Emergency Medicine, Family Medicine, and Obstetrics and Gynecology.

Surgery Capstone Course: Drs. James Lau, Dana Lin, and Cara Liebert successfully introduced a one-week Surgery Capstone program in May 2014 for graduating Stanford medical students entering procedural-based specialties. Eight students participated in the capstone course, representing General Surgery, Anesthesia, Plastic Surgery, and Obstetrics and Gynecology. The course incorporated multiple simulation paradigms to teach technical skills.

Stanford Center for Medical Education Research and Innovation (SCeMERI)

<http://mededresearch.stanford.edu>

SCeMERI was involved with many new research collaborations, including several institutionally driven initiatives. SCeMERI also offered a new summer series crash course in Medical Education Research in Teaching (MERIT) and expanded faculty/staff and career development offerings. SCeMERI, in collaboration with CISL and the Division of Evaluation, is looking at the impact of school-wide curricular projects on student performance in the statewide Clinical Performance Examination (CPX). SCeMERI has also collaborated with several faculty members on their simulation-based projects. Dr. Goldhaber-Fiebert recently completed a successful simulation-based training module to teach OR staff about how and when to use Emergency Manuals. SCeMERI team member Katy Nandagopal, PhD along with Drs. Ankeet Udani, Pedro Tanaka, and Candace Pau conducted a workshop at the Simulation Summit in Vancouver, BC on how to use deliberate practice to design your simulation-based curriculum.

Center for Advanced Pediatric and Perinatal Education (CAPE)

<http://cape.lpch.org>

Over a decade into its partnership with Lucile Packard Children’s Hospital to promote a world-class healthcare system, CAPE continues to use simulation as a strategy for advancing safe, effective and efficient patient care through highly realistic multidisciplinary team training and human performance research. Recent unique interactive training programs tailored to meet the specific needs of professionals at Stanford Children’s Health include but are not limited to the following:

- frontline management of reactions to radiographic contrast agents in pediatric patients in an outpatient setting
- team training for professionals responding to emergency delivery room situations
- management of emergencies in patients on ECMO.

CAPE’s research and development program benefits from relationships that have been established with colleagues at the federal Aviation Administration, National Aeronautics Administration, Boeing and colleagues in other high-risk industries. After a year-long faculty appointment at CAPE, Dr. Su Jin Cho (Neonatal-Perinatal Medicine) returned to Seoul, South Korea to promote simulation-based training in her region of the world.

VA Palo Alto Health Care System Simulation Center

www.paloalto.va.gov

The VAPA Health Care System Simulation Center continues to be the leading creator of instructor courses and the primary instructor-training site for VA simulation faculty for the VA's national SimLEARN program. Three different courses are taught, for a total of 16 sessions (about 150 people) per year: A General Simulation Instructor Course (2.5 days); a Code Team Simulation Instructor Course (2 days); and an Out of OR Airway Management [OORAM] Simulation Instructor Course (2 days). Instructor candidates have come from nearly all of the fifty states, and from VA institutions small and large, rural and urban. The VAPAHCS simulation staff have now instructed faculty from the SimLEARN headquarters in Orlando to teach the Code Team and OORAM instructor courses, which will significantly expand the reach for simulation for VA clinicians.

The Simulation Center at the VA hospital has extended its scope over the past few years to include inter-professional education and in-situ training. Nurse Educator for the center, Cynthia Shum, RN, BScN, MEd, CHSE has aligned with the Nursing Education department and created several curriculum. The VA Palo Alto hires new graduate RNs on a biannual basis and offers a robust residency program. Simulation was added to this program three years ago. The nurses spend six sessions in the center where they experience complex scenarios that challenge their assessment skills and critical thinking. A four-case unfolding scenario was created to expose the new grads to a variety of situations including: critical illness, new cancer diagnosis, cardiac arrest, delivery of bad news and end-of-life. Another key accomplishment is the GO! Program. Modeled around other trademarked curricula such as the "First Five Minutes[®]", this program offers in-situ customized training to nurses for management of patients in cardiac arrest.

Other CISL Affiliates include:

- Cardiac Surgery Simulation at the Stanford Cardiovascular Institute (cvi.stanford.edu)
- Stanford Health Care TRANSFORM Program
- American Heart Association Training Center at Stanford Children's Health





CENTER FOR
IMMERSIVE AND
SIMULATION-BASED
LEARNING

STANFORD MEDICINE

The Goodman Immersive Learning Center
Li Ka Shing Center for Learning & Knowledge
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Stanford, CA 94305-5217

CISL Mission

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

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