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14. ABSTRACT With patient safety and improved outcomes as its focus, the Institute for Surgical and Interventional Simulation (ISIS), is dedicated to the training of medical professionals in technical and procedural skills, and research and development of emerging simulation technologies and educational strategies. ISIS is a collaborative institute of the University of Washington School of Medicine. It connects fifteen departments within the School of Medicine, the School of Nursing, the School of Dentistry, the Biorobotics Laboratory, the Human Interface Technology Lab, and the Center for Videoendoscopic Surgery. ISIS has active MOUs with other simulation centers at University of British Columbia, Oregon Health and Sciences University, and Madigan Army Medical Center, and a presence in Washington, Wyoming, Alaska, Montana, and Idaho. This model has applicability in civilian and military settings, as the collaboration with Madigan Army Medical Center (Andersen Simulation Center) demonstrates.					
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Table of Contents

Introduction.....	4
Body.....	4
Key Research Accomplishments.....	10
Reportable Outcomes.....	14
Conclusions.....	14
References.....	15
Appendices.....	15
Supporting Data	

INTRODUCTION:

The University of Washington Patient Safety Center was established in March, 2005 with approval of a business plan and internal funding from the UW School of Medicine. It has been internally termed the **Institute for Surgical and Interventional Simulation (ISIS)** because our charter focuses our work on computer-based training, skills, and procedural simulation for multidisciplinary healthcare training at the University of Washington. Coincidentally, Isis, the Egyptian goddess of magic and medicine, has come to effectively serve as our iconographic inspiration. The 3 tasks outlined in our "Statement of Work" for award W81XWH-05-2-0056 have been successfully achieved, with an emphasis this second year on Task 3: Reiterate and refine the models generated during year 1

BODY:

The University of Washington Patient Safety Center has focused its efforts in a number of areas relative to our Statement of Work.

Task 1. Develop a model structure for the organization of personnel and functions within the center (Months 1 - 3):

ISIS has developed a stable administrative structure, created a strong scholarly basis for recruiting talented faculty, and created and outfitted our training laboratory, and is poised to move into our new facility in July 2007.

A first step in creating ISIS was the formation of a stable administrative structure that includes an executive leadership that links us to the School of Medicine and UW Medical Center, an administrative group (financial, personnel, space, grants & contracts), a full-time manager, a full-time research engineer, a part time curriculum specialist, two part -time technicians, and a core group of clinician scientists with dedicated time leading the training and further R&D efforts. Drs. Sinanan (PI) and Rosen, both receiving salary support from W81XWH-05-2-0056, are members of this team. As an extension of this work, we have worked to achieve initial agreement with our School of Medicine Academic Promotions Committee on a set of guiding principles that mesh the Center within the academic promotion pathway of the University. This work establishes the principle that curriculum development, validation studies, and experimental evaluation of the simulation and the technical education process itself will be

formally recognized as relevant scholarly activity. With increasing time-constraints and interest in clinician-teacher tracks, this has proven to be a very attractive recruiting tool for talented junior faculty from surgical and interventional disciplines, allowing us to account for their efforts in ISIS as part of an academic promotion portfolio. Ten junior faculty and two fellows have been officially appointed. These faculty form our Faculty and Experts Group; some also are involved in the Research and Development Committee.

The Center has refurbished and outfitted our ISIS-I laboratory complex (1200 sq ft) with separate rooms for skills and computer-based simulators, group work areas and conferencing, and a dedicated Human Patient Anesthesia simulator (METI and Laerdal). Current simulation training is ongoing in these areas. We have also established a collaboration with skills training areas in the UW Schools of Nursing and Dentistry, with Harborview Medical Center, with the Seattle Children's Hospital and Medical Center, and Memoranda of Understanding with regional partners at Madigan Army Medical Center (Andersen Simulation Center), University of British Columbia (Centre of Excellence for Surgical Education and Innovation, and Oregon Health and Sciences University (Simulation and Clinical Learning Center) to extend our training opportunities to the northwest geographic region. ISIS has initiated training relationships within the Washington, Wyoming, Alaska, Montana, and Idaho (WWAMI), and has conducted telemedicine activities with the Boise Veterans Administration Medical Center. A new ISIS-1 laboratory complex (1750 sq ft) has within the University of Washington Medical Center's Surgery Pavilion complex will open in July, 2007. Although completing this process exceeded our timeline, the new ISIS-1 and collaborative regional training sites will provide an optimal venue for surgical and interventional skills training immediately adjacent to patient care areas and in proximity to the trainees for whom this training is targeted.

Task 2. Facilitate the development of methodologies to establish the 5 principal needs for each course that needs to be taught (months 3 - 12)

We have explored in depth, the optimal organization and task formulation for skills training centers in anticipation of selecting, designing, and ratifying curricula for ISIS. In achieving accreditation as a Level 1 Comprehensive Education Institute of the American College of Surgeons, ISIS has been able to exchange best practices and develop new standardized processes with other accredited simulation centers. In this regard, local and invited visiting experts, ongoing literature reviews, site

visits to other simulation and skills centers nationally over the period of this contract, close collaboration (site visits, meetings, conferences) with industrial partners, and scholarly presentations and interaction at national meetings have supported our efforts to establish where the state of the art in skills training centers is, and to focus our efforts on and beyond that horizon. Through this highly interactive process, participating departments with curricula vested in ISIS have committed their junior residents to training in the Center.

We have developed and refined a set of initial skills and procedures for the Patient Safety Center and have developed standardized curricula around them. Course faculty meet with the ISIS Education and Curriculum Director for 1:1 consultation throughout the process of writing, delivering, and refining curricula as well as reviewing course evaluation data. ISIS also conducts faculty workshops, where pertinent subjects, i.e., peer review process, are present by subject matter experts. Procedures for which curricula has been or is being developed were selected by ISIS member departments because of their key importance in the workflow and routine patient care of junior residents, and also because for these procedures, the tradition of bedside training appears to be neither efficient nor as safe for patients as it could be. ISIS faculty are actively teaching these curricula:

COURSE NAME	DEPARTMENT
Anaphylaxis	Anesthesiology
Bronchospasm	Anesthesiology
Conscious sedation	Anesthesiology
Malignant hypothermia	Anesthesiology
Myocardial ischemia	Anesthesiology
Oxygen line failure	Anesthesiology
Pericardial tamponade	Anesthesiology
Pneumothorax	Anesthesiology
Unanticipated difficult airway	Anesthesiology
Venous air embolism	Anesthesiology
Ventricular fibrillation	Anesthesiology
Central venous catheter placement	Medicine, Surgery
Lumbar puncture*	Medicine
Thoracentesis*	Medicine
	Obstetrics & Gynecology
Shoulder dystocia	Pediatrics
Mock code-depressed newborn	
Mock code-meconium and depressed newborn	Pediatrics
EVATS	Surgery

* In standardized curriculum format

Competency in clinical practice is no longer the province of the solo practitioner. Increasingly we recognize that depth, redundancy, and safety must come from a team concept of practice, especially in a complex inpatient setting. To address this issue, we have developed a collaborative relationship with allied health professionals, particularly the School of Nursing, to offer team training as part of the systems-based practice envisioned as a core competency by the ACGME. Collaborative space and curricula are being developed in 2500 sq ft of additional, newly identified space, and team training around urgent and emergent OR and hospital events such as airway loss or Code 199 and specific procedures such as surgical robotics are ongoing within the laboratory and in actual medical center inpatient units.

Although the initial focus of the ISIS center was toward training of resident physicians, skills training opportunities for medical students have also been identified and developed. Two medical student groups have been approached. The first group, graduating medical students, received an essential procedural skills module based on survey data from residency training programs for which the curriculum was developed and taught by ISIS. This training was offered as part of the "Capstone" program summary that orients the finishing medical students just prior to residency. Courses taught by ISIS faculty include: 1) Airway 2) Team Training (using SimMan), 3) Endoscopy, 4) Shoulder Dystocia, 5) Episiotomy, and 6) Central Line Placement. The second group is comprised of medical students in their third year taking their surgical clerkships. During their orientation to surgery, the students are offered targeted exposure to technical surgical scenarios and basic skills training, such as placement of central venous catheters, as a safe and more efficient method of creating a surgical experience to inform their eventual career choice.

There is promising research using gaming technologies and internet platforms such as Microsoft Xbox© and Second Life© to deliver curricula. ISIS is working with members of the Xbox team, and will soon be deploying an Xbox Developers Kit to achieve this goal.

ISIS has committed a great deal of effort to raising awareness of our training facility within our Medical School and University Community. Presentations and demonstrations have been arranged for members of the Medical Executive Committee, the Office of the President, and key members of the Development Community. ISIS has been showcased as representing the technological vanguard of medical care and medical education at the University of

Washington, and figured prominently in the Development efforts of the University. This work, in addition to a close collaboration with our industrial partners (METI, Simulab, Stryker, and Tyco-United States Surgical) has both supported the concept of the Patient Safety Center, and provided the basis for ongoing fund raising activities for ongoing support of ISIS. Other funding opportunities pursued have included cooperative agreements to support training by member departments, and grant submission to AHRQ (Central Venous access training) and the Stemmler Fund (National Board of Medical Examiners).

Task 3. Reiterate and refine the models generated during year 1 (months 12 - 24)

These goals have been achieved during the period of this contract:

Goal 1: Define and apply the role of ISIS with University of Washington Health Sciences Schools

General Objectives: Increase awareness of ISIS with UW Health Sciences Schools; Formalize ISIS contributions to Appointment & Promotion Committee process

What Has Been Done: Sponsored 3-day Harvard taught "Simulation as a Teaching Tool" instructor course with students from School of Medicine, School of Nursing, WWAMI and other partner and neighbor institutions in March 2007. The School of Medicine (Objective Structured Clinical Exam facility and staff) and School of Nursing (Learning Lab facility and staff) supported the course. Active membership in UW Interprofessional Simulation Center for Health (UWISCH). Initial meetings for expansion to Harborview Medical Center 9th and Jefferson Building. Formalized faculty portfolio, peer review, appointment & promotion, and problem based learning unit processes. Central venous catheter protocol approved for UW Medicine.

Goal 2: Move operations from the fourth floor of Health Sciences to the first floor of the Surgery Pavilion

General Objectives: First dedicated footprint in ISIS enterprise
Expanded visibility in UW Medical Center showing commitment to simulation's goals - patient safety, reduced costs.

What Has Been Done: Expected occupancy in June 2007? OR

equipment will mimic actual UWMC OR. Maximized space for flexibility to suit many different training needs.

Goal 3: Add personnel

General Objectives: Demonstrate excellence and expertise through depth of services available from ISIS.

What Has Been Done: Hired part time Ph.D. curriculum specialist. Posted opening for information technology specialist and Administrator. Twelve faculty formally appointed.

Anesthesiology:	5
Surgery:	2 (including 1 Fellow)
Internal Medicine:	1
Family Medicine:	1
Obstetrics & Gyn	1 (Fellow)
Otolaryngology	1
School of Dentistry	1

Goal 4: Formalize infrastructure

General Objectives: Generate revenue by charging for services and courses. Standardize and streamline operations through established processes

What Has Been Done: Fee structure developed and reviewed by UW Management Accounting and Analysis. Off the shelf software selected for learning management system, resource management and scheduling, and e-learning templating. MSAccess being utilized for course evaluations, data capture and reporting.

Goal 5: Obtain long term funding for operations

General Objectives: Identify funding streams – endowments, sponsorships, grants, government sources

What Has Been Done: Featured at Turner Event April 2007. Continued Development efforts. One of Dean's and President's top initiatives. Congressional line item submitted to House Appropriations Committee.

Goal 6: Collaborate with partner institutions for the promotion and standardization of medical simulation.

General Objectives: Establish role as simulation leader;
Standardize curricula and practices

What Has Been Done: Memoranda of Understanding signed with University of British Columbia, Oregon Health and Sciences University, and Madigan Army Medical Center to form a Northwest Simulation Consortium. Conducted first telemedicine courses within WWAMI – Boise VA. Participated in American College of Surgeons Think Tank sessions for accredited simulation centers. Draft MOU with Virginia Mason Medical Center. Initial meetings held with Seattle Science Foundation. Planning meetings held with Director of Boeing Training Simulation Center. Designing standardized curricula using gaming platform for delivery to remote learners, incorporating live-chat interaction with Seattle-based UWMedicine expertise.

KEY RESEARCH ACCOMPLISHMENTS:

Research Report

Biorobotics Laboratory Collaboration
ISIS (Institute for Surgical and Interventional Simulation)

Summary of Biorobotics Work

Collaborators

Mika Sinanan MD, PhD
Smita De, PhD
Mitch Lum, PhD
Jacob Rosen, PhD
Andrew Wright, MD
Blake Hannaford, PhD

Building on prior work, the ongoing collaboration between the Department of Surgery and the Biorobotics Laboratory based in Electrical Engineering continued this year at an active pace. Andrew Wright joined the team and immediately initiated an active investigation program. ISIS, the subject of last year's Research Report, also initiated several major collaborative research studies in simulation-based training.

Collaborative research with the Biorobotics Laboratory focused on three areas. Further development and refinement of the UW Surgical Robot, now named RAVEN (Figure 1), was a major effort with several on-campus demonstrations of the surgical telerobotic system, a major demonstration for the MPMC / TATRC Sponsor in Simi Valley, CA as a simulation of an actual field deployment of the robot in a military extreme environment (Figure 2), and most recently, a clinical demonstration in the CVES laboratory using an animate porcine model for a variety of surgical maneuvers (Figure 3,4).

The second area of focus was a correlation of the performance metrics of the Red Dragon system with the objective scoring system built into the FLS (Fundamentals of Laparoscopic Surgery) training and assessment system ratified by SAGES and the ACS. The Red Dragon is a second generation passive tracking device developed in the Biorobotics Lab based on a similar design of RAVEN - surgical robot (Figure 5). It uses a spherical mechanism with position sensors and force sensors to track forces and torques of two laparoscopic instruments during laparoscopic tasks. These data are captured with video and synchronized at every 1/30 or a second. Pattern analysis of the output from a surgeon of unknown skill can be statistically mapped onto the performance of novices and experts at the same task to derive a score that represents the degree of expertise in the performance by the surgeon, a score that incorporated efficiency, grace, and the specificity of the surgeon in working to complete the task. More importantly, this is an objective score derived automatically without any expert observation or subjective scoring, removing a major hurdle to most scoring systems that are quite subjective in character and costly in terms of physician time. This work builds on the prior work in the Blue Dragon system (Figure 6) where performance of laparoscopic tasks was correlated with skill level using a hidden Markov statistical analysis of the forces and torques and tool velocities captured by the device.

The FLS system which includes 5 tasks that have been independently validated to correlate with MIS surgical skill will be used to compare a nationally accepted objective scoring system of skill with the Markov analysis developed in the Biorobotics Lab, to further refine the discrimination of the Red Dragon and permit direct comparison between Red Dragon scores and other scoring systems. The FLS includes peg transfers, precision cutting, placement and securing of a ligating loop, simple suturing with an intracorporeal knot, and simple suturing with an extracorporeal knot (Figure 7). This work is ongoing and will

later incorporate measures of performance in standardized FLS tasks between RAVEN and the Da Vinci clinical robot in the UWMC OR.

The third area of focus for the biorobotics lab is the PhD work by Smita De in collaboration with all members of the group dealing with damage at the tool-tissue interface in MIS surgery.

The premise of this work has been that in moving to a MIS environment, surgeons have relinquished not only three dimensional depth perception but also an appreciable component of the tactile feedback from handling tissues. This lack of haptic feedback with standard MIS surgical instruments introduces the potential for inadvertent tissue injury during standard procedures, tissue injury that translates into injured bowel, a perforated gastric wall, or a torn, leaking gallbladder in clinical situations. In the studies we have carried out, standard MIS tools mounted on a computer controlled gantry (the Motorized Endoscopic Grasper or MEG) were used to apply graded stresses from 0 to 300 kPa and durations of 10-60 seconds to tissues (liver, small bowel, ureter, and bile duct) in an anesthetized porcine model. The tissues were then photographed and harvested 2 hours later for standard histology and immunocytochemical analysis, evaluating for evidence of direct tissue damage, ischemia, and apoptosis. Further experimental data and a novel finite element modeling and statistical analysis have correlated expected and demonstrated tissue stresses to the degree of damage observed. This work, to be presented at regional and national surgical meetings this year, provides surprising information on the range and severity of stress that tissue is exposed to during normal instrument handling (Figure 8), stresses that certainly influence the risk of perforation, local tissue inflammation, and postoperative healing.

Summary of ISIS Research Work

Collaborators

Mika Sinanan MD, PhD
Jacob Rosen, PhD (Electrical Engineering, Surgery, ISIS)
Andrew Wright, MD
Tom Lendvay, MD (Urology)
Sarah Kim, PhD (History and Medical Education, ISIS)
Moe Hagman, MD (Internal Medicine)
Brian Ross, PhD, MD (Anesthesiology, ISIS)

Research work in ISIS has been concentrated in the R and D committee with Aaron Jensen's work on the role of the surgical

mentor in acquisition of technical surgical skills, Tom Lendvay's work on development and validation of a suprapubic catheter training system, and two other specific research projects.

In collaboration with a commercial partner Red Llama, we have embarked on developing a series of cognitive skills platforms specifically aimed at the cognitive ~~component of specific~~ surgical procedures. Red Llama has contributed a development platform, SimPraxis™, and programming expertise. ISIS has developed a cognitive map (Figure 9) for the first procedure to be addressed, laparoscopic cholecystectomy, that details the steps in patient selection, preparation, instruments, positioning and setup, and then detailed specific steps to the procedure. Errors at each step are included. The cognitive map is being ported into the SimPraxis engine with video commentary, clinical footage, and text prompts. This interactive platform invites the trainee to select instruments and then to choose the location of the next step in dissection or surgical treatment, mimicking the real choices that must be made in the OR (Figure 10). If the trainee chooses correctly, video segments of the procedure are shown that move to the next step. If the trainee chooses incorrectly, the video mentor provides further expert commentary. Metrics captured from these choices during training and the influence on this type of training on the trainee's comfort and perceived expertise in moving through the clinical procedure (separate from his or her skill in actually making the instruments do what he or she wants to do) are important next steps in refining this model of simulation training, and validating the specific modules. If possible, we hope to extend these cognitive training modules to other ACS accredited simulation training centers.

The second research project being actively pursued by the ISIS R and D group is development of a UW Medicine-wide training system for placement of central venous catheters (CVCs). Placement of these catheters in the internal jugular and subclavian venous systems are one of the specific skills that intensivists and general surgeons must acquire and practice during their training. However, it is also a procedure with substantial morbidity and risk associated with it. Well defined technical innovations to the procedure: appropriate patient selection, preparation, and identification, use of sterile precautions, appropriate vital sign monitoring, ultrasound guidance for catheter placement, and appropriate sterile management and prompt removal have been shown to largely ameliorate these risks but have not been systematically included in resident training programs. With the development of ultrasound capable simulators for CVC placement

through our commercial partner, Simulab, we now have the capability to train, in simulation, a generation of surgeons and intensivists with a standard protocol and certify, in simulation, competency in the procedure. Given the demonstrated risks of the procedure, such training and certification is of tremendous interest to our hospital administrations at UWMC and HMC as it should improve patient safety and reduce the cost of infectious, thrombotic, and acute surgical complications from CVC placement.

At the present time, we are developing a FLASH computer-based, interactive training program that will be delivered via the web.

After successful completion of this program including a number of scenarios that require complication avoidance, detection, and management, the trainee will graduate to training on the physical simulator, Central Line Man™ (Figure 11). Once the trainee can complete the entire procedure successfully, they will be certified in CVC procedures by ISIS. All elective CVC procedures will be performed with the assistance of dedicated nursing staff and all catheters tracked with a unique numerical code. Research elements will derive from validating the training and then tracking acute and long term complications of CVC placement to demonstrate that training in simulation has real potential to improve performance and patient safety around technical procedures.

REPORTABLE OUTCOMES:

The key reportable outcome is our accreditation as a Level I Comprehensive Educational Institute of the American College of Surgeons.

CONCLUSION: The University of Washington Patient Safety Center – ISIS – has had a strong year. We are on the cusp of moving into our new facility in the University of Washington Medical Center Surgery Pavilion, have refined and enhanced an administrative support structure with strong links to the School of Medicine and University of Washington Medical Center, and succeeded in the implementation of an academic basis for recruiting and rewarding faculty. We are highly visible within the University, the Pacific Northwest, and the simulation community. Our work and research are highly regarded. We look forward to expanding our activities in our new facility, and are excited about the promise of the Xbox and Second Life curricula project.

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Rosen J., B. Hannaford, Doc at a Distance, IEEE Spectrum, October 2006

APPENDICES:

Annual Report follows

2005-2006 Annual Report



INSTITUTE FOR SURGICAL AND INTERVENTIONAL SIMULATION
AT THE UNIVERSITY OF WASHINGTON

www.isis.washington.edu



UW Medicine
SCHOOL OF MEDICINE

Highlights from First Year: July 1, 2005 - June 30, 2006

2005

- March** Dean Ramsey recognized ISIS as a School of Medicine initiative
- September** Technician and manager hired
- October** Visit by Governor Christine Gregoire
- November** Two-day strategic planning meeting held
- November** Third lab added
- December** Website launched

2006

- February** Received designation as School of Medicine Institute
- March** Conducted first combined team training with School of Nursing
- March** Formal memorandum of understanding with Centre of Excellence for Surgical Education and Innovation (UBC) signed
- May** Featured in UW Foundation's "What If" ad campaign
- May** Hosted display at Health Sciences Open House
- May** Integrated Department of Family Medicine

The Institute for Surgical and Interventional Simulation
University of Washington

Annual Report 2005 - 2006



UW Medicine
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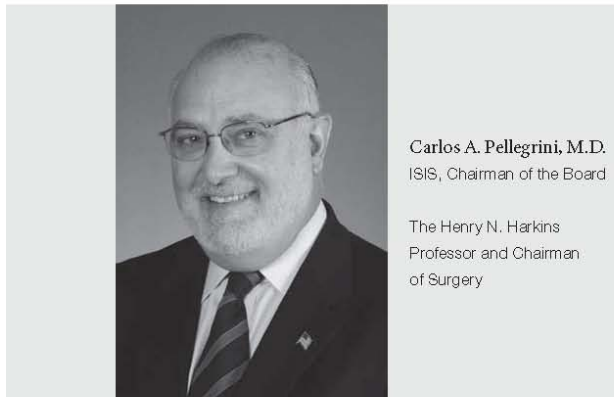


AMERICAN COLLEGE OF SURGEONS • DIVISION OF EDUCATION
ACCREDITED EDUCATION INSTITUTES
ENHANCING PATIENT SAFETY THROUGH SIMULATION

Table of Contents

Welcome from Chairman of the Board	page 1
Executive Committee	
Mission Statement	page 2
Accreditation	page 2
Affiliated Organizations	page 2
Governance	page 2
Staffing and Facilities	page 3
Status of First Year Goals	page 3
Research and Development Committee	
Overview	page 4
Research Projects	page 4
Education and Curriculum Committee	
Overview	page 5
Curriculum	page 5
Conclusion	page 5
Experts Group	
Overview	page 6
Future Strategy	page 6
Faculty and Staff	
Board of Directors	pages 7-9
Faculty and Staff	page 9
Faculty Experts	page 9
Curriculum	
Anesthesiology	page 10
Internal Medicine	page 10
OB/GYN	page 11
Surgery	page 11
Funding	
Active	page 12
Pending	page 12
Transfer	page 12
Communications	pages 12-13
Distinguished Visitors	
Corporate and Major Businesses	page 14
Individuals & Academics	page 14
Community Outreach	page 14
Media and Events	page 14
Publications and Presentations	
Journals	page 15
Conferences	page 15

Report from Chairman of the Board



Carlos A. Pellegrini, M.D.
ISIS, Chairman of the Board

The Henry N. Harkins
Professor and Chairman
of Surgery

Mankind has been performing medical and surgical procedures for over a thousand years, but it was not until mid 19th century that science and technology begun to focus on patient safety. In 1867 the implementation of antiseptics in the operating room greatly improved the life expectancy for surgical patients; however, even as little as one hundred years ago, few standards or controls existed and consequently, surgery was still a dangerous undertaking for a patient. Today, everything from nursing care to anesthesia to surgical technique follows established protocols, resulting in greatly improved patient safety and outcomes. Although it is true that the way we perform both surgical and non-surgical procedures essential to patient care has greatly changed, the manner in which these procedures are taught has not significantly changed. The "See One, Do One, Teach One" apprenticeship model remains, in many places, the standard method of training. In sharp contrast to this, the University of Washington is of the opinion that a new way exists to train doctors: medical simulation.

The Institute for Surgical and Interventional Simulation (ISIS) was created by the School of Medicine as a multi-disciplinary venture that brings faculty from different departments and schools with an interest in the use of simulation for teaching and/or research together under a single roof. ISIS is at the forefront of utilizing simulation technologies to the benefit of both practitioner and patient. In much the same way as airline pilots train on flight simulators, medical students and residents learn procedures on "human patient simulators." These simulators have a heart that beats, lungs that expand,

eyes that dilate and blink, and body systems that metabolize drugs. Students practice techniques using instruments that allow them to mimic the motions and intricacies of an actual procedure. The instructor is able to set precise parameters and determine a desired performance level for the student to achieve. At the end of each simulated procedure, the program provides feedback about accuracy, including the length of time taken to complete the procedure. This objective feedback helps both student and instructor set improvement goals, thereby enhancing the quality of healthcare education.

Equally important, students learn how to be an effective team member. When the patient care team works together on simulated patients, trainees learn how to communicate and interact within the framework of a team setting. For instance, surgery, with all teams members participating, can be simulated in the operating room before any surgery actually takes place. Furthermore, studies indicate that on average surgical teams trained on simulators complete operations faster and with fewer injuries or errors as compared to teams with a standard surgical training background. Simulation provides students with vital hands-on experience and is now an integral part of many UW department curricula including internal medicine, orthopaedics, obstetrics/gynecology, anesthesiology, surgery, and nursing.

ISIS is currently housed in the Health Sciences RR-wing but will be moving to the UW Medical Center Surgery Pavilion, where it will occupy a new simulation skills center, in 2007. We have plans to expand to both Harborview Medical Center and Children's Hospital & Regional Medical Center. Our long-term vision is to be part of a UW simulated hospital, where students will follow a simulated patient from admission through discharge.

The Institute for Surgical and Interventional Simulation is a pioneer in procedural training and is the logical result from a university that already excels in patient care, teaching, and research. Training future generations of healthcare providers and team members to be more efficient, better communicators, and able to handle the unexpected is an exciting initiative that we intend to see fully developed to follow a long-standing tradition of leadership at the University of Washington.

Executive Committee

Mission Statement

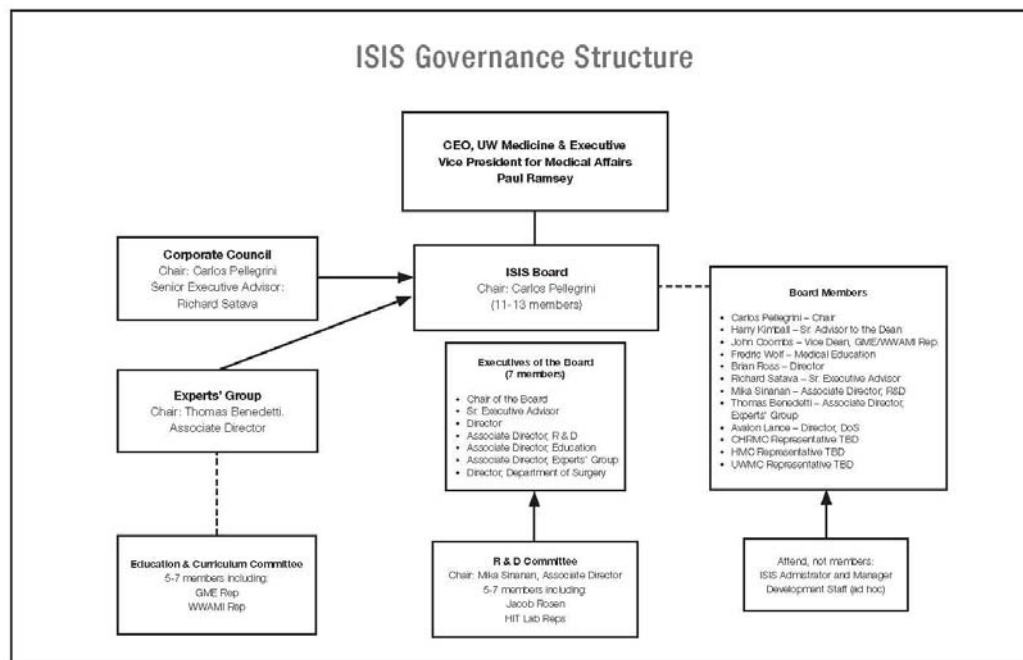
The primary goal of the Institute for Surgical and Interventional Simulation is to provide leadership in the use of simulation technologies to improve the quality of health care education and improve patient safety and outcomes. ISIS will seek highly collaborative alliances in selected projects with other educational and health care delivery systems with similar interests in simulation. The primary impact of ISIS will be upon the citizens of the State of Washington and the greater WWAMI region. Through its research and education efforts and publication of results, ISIS will also have a strong influence and potential impact upon providers and patients in a global fashion.

Affiliated Organizations

In addition to collaborating with UW Medicine institutions (Harborview Medical Center, Children's Hospital and Regional Medical Center, and the University of Washington Medical Center), there is a signed Memorandum of Understanding (MOU) with the Centre of Surgical Excellence and Education at the University of British Columbia (Vancouver, BC), the Simulation and Clinical Learning Center at Oregon Health & Science University (Portland, OR) and in the final stages of review is an MOU with Andersen Simulation Center at Madigan Army Medical Center (Tacoma, WA). MOUs are anticipated soon with Boise VA Medical Center (Boise, ID) and St. Vincent Healthcare (Billings, MT).

Accreditation

ISIS received accreditation by the American College of Surgeons in 2006 as a Level I Comprehensive Education Institute, one of the first seven programs in North America to receive this distinction.



Staffing and Facilities

ISIS will have two dedicated fulltime staff members: a program manager, who was hired in November 2005, and a research engineer who will start in September 2006. Staffing is augmented by a part time technician. Infrastructure support (i.e., information technology, web development, human resources, administrative) is provided by the Department of Surgery. The Department of Anesthesiology provides additional engineering support. Faculty are supported by their respective chairs. ISIS core executive staff include: Dr. Carlos Pellegrini, Chairman of the Board (Department of Surgery); Dr. Brian Ross, Director (Department of Anesthesiology); Dr. Mika Sinanan, Associate Director Research and Development (Department of Surgery); Dr. Richard Satava, Senior Executive Advisor (Department of Surgery); Dr. Thomas Benedetti, Associate Director, Experts' Group (Department of Obstetrics and Gynecology); and Dr. Jacob Rosen (Department of Electrical Engineering). Supplementing these staff are Dr. Robert Stanley (Department of Otolaryngology - Head and Neck Surgery) and Ken Plitt (CRNA). We anticipate the addition of Dr. Sara Kim (Department of Medical Education) as a part time Curriculum Developer in December 2006.

ISIS occupies three labs, administrative offices, and a visiting faculty office on the fourth floor of the Warren G. Magnuson Health Sciences Center, in space provided by the Department of Anesthesiology until ISIS moves into its permanent space on the first floor of the Surgery Pavilion. ISIS curriculum is also delivered in the 960 ft² Center for Videoendoscopic Surgery.

Additionally, there are plans to allocate 6,328 ft² for simulation in the South Campus Center, in close proximity to the University of Washington Medical Center. Harborview Medical Center has committed 4,000 ft² in its 9th and Jefferson Building, currently under construction, to ISIS. Children's Hospital and Regional Medical Center has met with ISIS about establishing a presence there. ISIS and the School of Nursing have collaborated on combined training scenarios for nursing students, medical students, and residents. ISIS technicians assist with maintenance of the patient simulators at the School of Nursing simulation laboratory, and there is a strong alliance between the programs.

Status of First Year Goals

Integrate simulation into more resident programs

Status: Completed, ongoing

These programs currently train at ISIS:

- Internal Medicine
- Family Medicine
- Obstetrics and Gynecology
- Pediatrics
- Orthopaedics and Sports Medicine
- Urology
- Anesthesiology
- Surgery

Integrate ISIS into the School of Medicine

Capstone Program

Status: Completed

Submit grant proposals

Status: Completed, ongoing

1. AHRQ research and evaluation of simulation and the roles it can play in improving the safe delivery of health care: Central Line Placement (not funded).
2. Zimmer Orthopaedic Career Development Award, Lisa A. Taitsman, MD, MPH, Assistant Professor of Orthopedics, Harborview Medical Center (not funded).

Submit professional association accreditation applications

Status: Completed, ongoing

Received Level I Comprehensive Education Institute accreditation by American College of Surgeons in 2006.

Obtain software for scheduling, curriculum development, and validation.

Status: Ongoing

Obtain operational funding

Status: Ongoing

Provide academic credit for simulation experts

Status: Ongoing

Research and Development Committee

Overview

The ISIS Research and Development Committee is charged with the evaluation of commercial simulators being considered for purchase, the development of novel simulation platforms, and the validation of the ISIS simulators for training and assessment. The R & D Committee also is responsible for developing and performing research studies promoting simulation technologies for medical education.

The Committee meets monthly. Agendas have addressed Expert projects, data collection and validation, and server specifications. Vendor demonstrations (Simulab) and industry representatives (METI) have recently been incorporated to bring in outside perspectives and knowledge.



Research Projects

1. Wright, A. (PI) and Rosen, J. – Validation of the Red Dragon passive robotic system for objective skills measurement using the Fundamentals of Laparoscopic Surgery (FLS) skills sets.
2. Jensen, A. (PI) - Resident Research Project - Does the addition of an intensive faculty-supervised basic skills laboratory session as part of a progressive structured curriculum improve (surgical) task acquisition during subsequent laboratory sessions?
3. Weghorst, S. (Co-PI) - Criterion-based training to reduce surgical errors using the Endoscopic Sinus Simulator, with Marvin Fried (PI), Chair of Oto-Head and Neck Surgery, Montefiore Medical Center, NY.
4. Lendvay, T. (PI) - Needs assessment, development, and validation of a suprapubic catheter insertion curriculum and simulator.
5. Sinanan, M (PI), Hagman, M (Co-PI) - Practice standards, curriculum development, and validation of a skills training for internal jugular and subclavian central line placement using CentralLineMan™.
6. Rosen, J. - Database Development: A computer based database is currently specified to collect data of subjects utilizing ISIS simulators.

Education and Curriculum Committee

Overview

Dr. Brian Ross, ISIS Director, has acted as the Associate Director for this committee. The ISIS Executive Board has been actively soliciting candidates to fill the Associate Director position. Sara Kim, Ph.D. was recently selected and will assume this role on a part-time basis in December 2006 pending formal approval per ISIS' governance. Dr. Kim has assisted ISIS informally this year with many projects, including the development of a curriculum template and assessment expertise.

A course catalog and calendar of courses are on the ISIS website. Interested faculty can see when courses are offered, and within the detail of the calendar are specific course objectives, instructor information, technology used, and the lab set-up and disposable supplies required. ISIS technicians are responsible for lab set-up and coordination with faculty prior to the class. Faculty can also use the website to schedule their own courses with the ISIS technicians. There is a curriculum template in pdf and Word format on the site. Faculty can complete the documents, and submit or email them directly to ISIS.

During this first year, it became clear that faculty with an interest in developing new curricula found it difficult to be productive because of the need of consistent mentoring in curriculum development and access to a dedicated space for these academic activities. ISIS has recently acquired a faculty office, with PC and Mac computers. Dr. Kim will be based in this office so that she can be readily accessible to faculty. With the acquisition of a formal academic workspace for ISIS faculty and the appointment of an Associate Director to lead curriculum efforts, it is expected that the Education and Curriculum Committee will meet regularly with tangible goals and outcomes.

A major activity during this first year was to inventory all of the simulation activities and courses that were being held within the member departments.

Curriculum

Ten new curricula have been developed by ISIS faculty. These include:

1. Basic airway management for medical residents
2. Central line placement for medical residents
3. Lumbar puncture for medical residents
4. Cardiac dysrhythmia management (Team Training) for medical residents
5. Difficult airway management and fiberoptic intubation for pulmonary fellows (begun, but not yet completed)
6. Anesthesia machine failure
7. Failed spinal with difficult airway instrumentation anaphylaxis
8. Malignant hyperthermia
9. Pediatric resuscitation and team management skills
10. Combined team training with nursing students, medical students, and residents

The Basic Airway Management curricula has also been modified and used for training of General Surgery residents, and modified yet again for use with Otolaryngology residents. The Pulmonary division will conduct their first Basic Airway course for their fellows in November 2006, followed by a course in difficult airway management and fiberoptic intubation. In addition, the four curricula being used by Internal Medicine will be expanded to Family Medicine residents this month.

Conclusion

Major efforts for this coming year include the selection and implementation of software for curriculum development and a learning management system for distance learning. Under Dr. Kim's leadership, curricula will be reviewed to meet established standardized criteria prior to use. There will be added emphasis on identifying and developing cross-disciplinary curriculum that can serve multiple specialties. This first year has been a busy and productive year for the limited space that ISIS has had available.

Experts Group

Overview

The ISIS Experts' Group continues to expand and develop. Faculty members in eight clinical departments are now actively teaching courses in the ISIS Center. These departments include: Anesthesiology (Brian Ross, Stefan Lombard, & Kenneth Plitt), Obstetrics and Gynecology (Thomas Benedetti, Anne-Marie Amies Oelschlager, Amy Van Blaricom, & Michael Fialkow), Surgery (Karen Horvath, Aaron Jensen, Mika Sinanan, & Andrew Wright), Internal Medicine (Moe Hagman), Pediatrics (Thomas Stranjord), Urology (Thomas Lendvay & Sangtae Park), Orthopaedics and Sports Medicine (Lisa Taitsman & Robert Dunbar), and Family Medicine (Mark Beard).

In addition, faculty members of the Human Interface Lab (Suzanne Weghorst & Peter Oppenheimer), Biorobotics (Jacob Rosen), Anesthesiology (Howard Schwid) and Medical Education (Sara Kim) act as resources for technical enhancement and development, computer simulation, and curriculum development for other ISIS experts.

The Experts' Group has had two meetings this year, one was a tour of the Human Interface Technology Laboratory, and one was a meeting last month featuring a dialogue with David Hananel, Director of Surgical Programs at METI concerning projects at other simulation centers. Attendees found the dialogue very useful and interesting.

The Experts' Group has struggled to attract attendees. Although approximately 54 people have expressed an interest in simulation, and are on the ISIS mailing list, only a cadre of 5-6 experts attend regularly.

Future Strategy

Strategies must be developed to address the goals of the Experts' Group and to increase attendance at these meetings. Considerations of changing the time and place of the meetings may be necessary to better accommodate the clinical schedules of the experts. A second option might be to webcast the meeting so that members can participate from their offices or can view presentations on demand.

The Experts' Group will be sponsoring a three-day intensive Train-the-Trainer course on simulation here presented by the Center for Medical Simulation (Harvard University) from March 26-28, 2007. Three members of the ISIS team have attended the course in whole or in part, and believe it will be of great benefit in training faculty on scenario development and debriefing skills.

With the addition of an Associate Director of Education and Curriculum, a robust Research and Development Committee, and formalization of faculty commitments to ISIS, this Committee should continue to gain momentum.



Faculty and Staff

Board of Directors

Carlos A. Pellegrini, M.D., Chairman

Dr. Pellegrini is professor of surgery, chair of the Department of Surgery, and holder of the Henry N. Harkins Endowed Chair in Surgery at the University of Washington. He received his M.D. in 1971 from the University of Rosario Medical School in Argentina. After training in general surgery in Argentina, he completed a second residency at the University of Chicago.

In 1979 he was appointed to the faculty of the University of California, San Francisco, where he developed and directed the Center for GI Motility. As an active gastrointestinal surgeon at UCSF, he was recognized on several occasions by residents and students for his teaching. In 1993 he became chair of the Department of Surgery at the University of Washington in Seattle. A world leader in minimally invasive gastrointestinal surgery, Dr. Pellegrini is a pioneer in the development of video-endoscopy for the surgical treatment of gastroesophageal reflux disease and esophageal motility disorders, particularly achalasia.

At the University of Washington he developed two major clinical research programs: the Center for Videoendoscopic Surgery and the Swallowing Center. He was a leader in developing the UW Institute for Surgical and Interventional Simulation (ISIS) and is board chair of the institute.

Dr. Pellegrini has been a leader in medical education and was a major contributor to the fundamental reform of residency work hours. In 1996, in recognition of his role in the strengthening of all clinical, teaching, and research programs of the Department of Surgery, he became the first holder of the Henry N. Harkins Endowed Chair in Surgery, named for the first chairman of the UW Department of Surgery.

Currently he is past-president of the American Surgical Association, a regent of the American College of Surgeons, and a director of the American Board of Surgery. He is also chair of the Digestive Disease Week Council and the only person to be elected to this position twice in succession.

Dr. Pellegrini serves on several editorial boards and publishes regularly in the field of minimally invasive surgery for upper gastrointestinal diseases, esophageal cancer, and related areas, as

well as the field of training and new technologies for preparing surgeons in this area. His bibliography lists more than 300 articles, chapters, editorials, and books, as well as 11 surgical videos and movies.

Brian K. Ross, Ph.D., M.D., Director

Dr. Ross is a UW Medicine professor of anesthesiology. He received his Ph.D. in physiology/pharmacology from the University of North Dakota in 1975 and completed his post-doctoral research in respiratory diseases at the University of Washington in 1979, where he also received his M.D. in 1983. In 1984, he completed an internship at the UW School of Medicine. In 1986, Dr. Ross completed a fellowship in Obstetrical Anesthesia from the University of California at San Francisco. In 1987, he completed a residency in anesthesiology, also at the University of Washington.

Dr. Ross has been on the UW School of Medicine faculty since 1987. In 2003, he was appointed full professor status. Dr. Ross has been involved in medical simulation at the UW since 1996, when he developed the initial curriculum for the Department of Anesthesiology. Since then, he has developed 20 courses for medical students, residents, and nurses.

To promote careers in health care, he performs outreach to local high schools, conducting full-scale virtual operating room scenarios using the human patient simulator. Dr. Ross is the energy behind the advancement of medical simulation within the Department of Anesthesiology, reaching throughout the UW schools of medicine, nursing, and dentistry.

He identified equipment and designed the labs that became the cornerstone of the Institute for Surgical and Interventional Simulation (ISIS). Based on his vision and expertise in medical simulation, Dr. Ross was appointed by the dean of the School of Medicine to serve as the first executive director of ISIS in November 2005.

He will take ISIS into its next phase, as it expands into its new offices and labs in the UW Medical Center Surgery Pavilion in early 2007, and as ISIS establishes itself as the medical simulation resource for the UW, community, industry, and the five-state WWAMI region (Washington, Wyoming, Alaska, Montana, and Idaho).

Faculty and Staff Continued

Thomas J. Benedetti, M.D., M.H.A., Associate Director

Dr. Benedetti is Professor and Vice Chairman of the Department of Obstetrics and Gynecology at the University of Washington. He received his M.D. in 1973 from the University of Washington in Seattle and completed his obstetrics and gynecology residency and maternal fetal medicine fellowship at the University of Southern California in Los Angeles. Dr. Benedetti joined the faculty at the University of Washington in 1979, serving as Director of the Maternal Fetal Medicine Division, Department of Ob/Gyn from 1983-2002. He received his masters in Health Administration from the University of Washington in 2000.

Dr. Benedetti has been recognized throughout his academic career by residents and peers for his teaching as well as excellence in research at both the University of Southern California and the University of Washington. His main clinical research interest has been in birth trauma. He spent a recent sabbatical in Bristol, England studying at the Bristol Simulation Center and Southmead Hospital. He has adapted a prototype Birthing Trainer developed in Bristol by Limbs and Things Corporation for simulations at the University of Washington for shoulder dystocia and other obstetric emergencies.

Dr. Benedetti serves on the Editorial Board of the Society for Simulation in Healthcare, presents at Simulation Conferences, and is a guest faculty at other simulation centers, including the University of California, Davis. As a result of his interest and expertise in shoulder dystocia simulation, he was appointed Associate Director and Head of Experts' Group, Institute for Surgical and Interventional Simulation, in January 2006.

Mika N. Sinanan, M.D., Ph.D., Associate Director

Dr. Sinanan is a professor of surgery at the University of Washington School of Medicine and received his M.D. from Johns Hopkins University in 1980. He completed his residency at the University of Washington in 1988 and then joined the faculty of the UW Department of Surgery. Dr. Sinanan received his Ph.D. in gastrointestinal physiology in 1991 from the University of British Columbia. In addition to his School of Medicine appointment, Dr. Sinanan is an adjunct associate professor in the UW Department of Electrical Engineering.

Widely published and recognized as a leader in minimally invasive gastrointestinal surgery, Dr. Sinanan became co-director of the Center for Videoendoscopic Surgery at the UW School of Medicine in 1993. Dr. Sinanan is committed to the advancement of robotic surgery and was the principal investigator of a grant from the Department of Defense, "Studying Mini Robot Design for Military Telesurgery in the Battlefield."

Dr. Sinanan's other positions include medical director of the Surgical Specialties Center and chief of medical staff and associate administrator of quality for UW Medical Center. As chair of the Surgery Pavilion Project Management Committee, Dr. Sinanan was instrumental in the design and planning of the new 160,000 ft² wing of UW Medical Center, where the Institute for Surgical and Interventional Simulation (ISIS) will have its labs and offices in early 2007.

Richard M. Satava, M.D., Senior Executive Advisor

Dr. Satava is a professor of surgery at the University of Washington and senior executive advisor for ISIS. In addition, Dr. Satava is program manager of advanced biomedical technology at the Defense Advanced Research Projects Agency (DARPA) and serves as special assistant in advanced surgical technologies at the U.S. Army Medical Research and Materiel Command in Ft. Detrick, Maryland.

Previous positions include professor of surgery at Yale University and a military appointment as professor of surgery (USUHS) in the Army Medical Corps assigned to general surgery at Walter Reed Army Medical Center. His undergraduate training was at Johns Hopkins University, medical school at Hahnemann University of Philadelphia, internship at the Cleveland Clinic, surgical residency at the Mayo Clinic, and a fellowship with a master of surgical research at the Mayo Clinic.

Dr. Satava has served on the White House Office of Science and Technology Policy Committee on Health, Food and Safety. He is currently a member of the Emerging Technologies and Resident Education Committee and the Informatics Committee of the American College of Surgeons, is past president of the Society of American Gastrointestinal Endoscopic Surgeons, past president of the Society of Laparoendoscopic Surgeons, and is on the Board of Governors of the National Board of Medical Examiners, as well as on a number of surgical societies.

He is on the editorial board of numerous surgical and scientific journals, and active in numerous surgical and engineering societies. He has been continuously active in surgical education and surgical research, with more than 200 publications and book chapters in diverse areas of advanced surgical technology, including Surgery in the Space Environment, Video and 3-D Imaging, Telepresence Surgery, Virtual Reality Surgical Simulation, and Objective Assessment of Surgical Competence and Training.

During his 23 years of military surgery he has been an active flight surgeon, an Army astronaut candidate, MASH surgeon for the Grenada invasion, and a hospital commander during Desert Storm, all the while continuing clinical surgical practice. While striving to practice the complete discipline of surgery, he is aggressively pursuing the leading edge of advanced technologies to formulate the architecture for the next generation of medicine.

Faculty and Staff

Thomas J. Benedetti, M.D., M.H.A. - Associate Director, Experts' Group

Brian Ross, Ph.D., M.D. - Executive Director

Richard Satava, M.D. - Senior Executive Advisor

Mika Sinanan, M.D., Ph.D. - Associate Director, R & D

Alice Acker, M.P.A., C.H.E. - Program Manager

Sean Bailey - Research Engineer

Ryan Kellogg - Technician

Andrew Naluai-Cecchini - Research Engineer

Faculty Experts

Anesthesiology	Brian Ross, Ph.D., M.D. Stefan Lombaard, M.D.
Anesthesiology (CHRM)	Daniel Rubens, M.D.
Anesthesiology (VAPSHCS)	Howard Schwid, M.D.
Dermatology	Daniel Berg, M.D.
Electrical Engineering	Jacob Rosen, Ph.D.
Family Medicine & Medical Education/ Biomedical Informatics	Sara Kim, Ph.D.

Family Medicine	Mark Beard, M.D.
General Surgery	Karen Horvath, M.D. Brant Oelschlager, M.D. Richard Satava, M.D. Mika Sinanan, M.D., Ph.D. Andrew Wright, M.D. Roger Tatum, M.D.
Human Interface Technology Lab	Peter Oppenheimer, M.S. Suzanne Weghorst, Ph.D.
Internal Medicine	Melissa Hagman, M.D.
Interventional Radiology	Sandeep Vaidya, M.D.
Medical Director (CHRM)	Richard Molteni, M.D.
Medical Education	Frederic Wolf, Ph.D. Douglas Brock, Ph.D. Douglas Schaad, Ph.D.
Neonatology	Thomas Stranjord, M.D.
Neurological Surgery	Richard Ellenbogen, M.D.
Obstetrics and Gynecology	Amy Van Blaricom, M.D. Anne-Marie Amies Oelschlager, M.D. Ron Swenson, M.D.
Ophthalmology	Michael Wu, M.D.
Orthopaedics	John Green, M.D.
Orthopaedics (HMC)	Lisa Taitsman, M.D. Robert Dunbar, M.D.
Otolaryngology (HMC)	Robert Stanley, M.D., D.D.S.
Quality Improvement (UWMC)	Julie Duncan, M.A., R.N.
School of Nursing	Gaylene Altman, Ph.D., R.N.
Transplant Surgery	Ramasamy Bakthavatsalam, M.D.
Urology (CHRM)	Thomas Lendvay, M.D.
Vascular Surgery	Mark Meissner, M.D.

Curriculum

Anesthesiology

Airway Management

Instructor: Dr. Brian Ross

This course teaches the basic principles of airway management during surgery. Students first attend a lecture, followed by hands on training on airway simulators. Students will learn about the anatomy of the airway, proper management before, during and after surgical procedures and emergency management. A number of different airway courses are offered and include courses for Anesthesiology residents, Family Medicine residents, Surgery residents, Otolaryngology residents and medical students.

O₂ Line Failure

Instructor: Dr. Brian Ross

This course teaches emergency patient management skills in a scenario where an oxygen line fails during a procedure. The course is designed for Anesthesiology residents.

Anesthesia Machine Failure

Instructor: Dr. Brian Ross

This course teaches emergency patient management skills in a scenario where a power outage occurs and the anesthesia machine fails to work. The course is designed for Anesthesiology residents.

Procedural Sedation

Instructors: Dr. Brian Ross, Dr. Gouri Sivarajan

This course, generally for medical students, walks the students through procedure of putting a patient to sleep for a surgery, intubating them and finally, waking them up. The intubation procedures are first practiced on a torso mannequin and then performed on the METI HPS simulator.

Intra-Op Courses

These situational courses familiarize the students with the correct way to handle complications during an operation. The courses include Intra-Op Bronchospasms, MI, Embolisms and hypotension.

Conscious Sedation

Instructor: Dr. Brian Ross, Dr. Jo Davies

This course is taught two to four times per year and is for nurses. This review class covers a number of important scenarios and emphasizes teamwork and communication skills.

Additional Classes

Anaphylaxis, ACLS/PLS Competency Documentation, Critical Incidents in Anesthesia, Malignant Hyperthermia, Neonatal Resuscitation, Pediatric Resuscitation

Internal Medicine

Lumbar Puncture

Instructors: Dr. Melissa "Moe" Hagman, Dr. Jennifer Best

This course teaches the basic principles and techniques behind a lumbar puncture. Students attend a lecture, review situations in which a lumbar puncture is performed and then perform a lumbar puncture on a mannequin.

Central Line

Instructors: Dr. Melissa "Moe" Hagman, Dr. Jennifer Best

This course teaches the basic principles and techniques for placing a central venous line into a patient. Students first attend a lecture, review situations in which a central line would be used, are instructed in ultrasound use and finally, practice central line placement using the Simulab's CentrallineMan™.

Airway Course

Instructors: Dr. Melissa "Moe" Hagman, Dr. Jennifer Best

This course teaches the basics of performing intubations and cricothyrotomies. The 2.5 hour class starts with a short overview of the procedures including an introduction to the anatomy, tools used and technique, followed by hands on training. Intubation and cricothyrotomy mannequin simulators are used and provide lifelike anatomy and feel.

Ob/Gyn

Basic Skills

Instructor: Dr. Anne-Marie Amies Oelschlager

This course is designed for medical students beginning their OB/GYN clerkship. The four hour class introduces them to instrumentation, anatomy, terminology and basic techniques and procedures.

Hysteroscopy

Instructor: Dr. Amy Van Blaricom

This course is designed for residents and shows the proper use of a hysteroscope during a hysteroscopy. The class runs for four hours and is attended by residents in all four years of training.

Shoulder Dystocia

Instructor: Dr. Tom Benedetti

This course demonstrates the proper way to deal with shoulder dystocia during delivery. The class runs for three hours and is attended by residents in all four years of training.

Surgery

Simulators

Using the laparoscopic trainers mentioned above, student do a wide variety of exercises ranging from using the mirror trainers, which help the user with spatial recognition, instrument dexterity and improved motor control, to advanced computer simulators which simulate surgical procedures.

Suturing

This course teaches the essential elements of surgical suturing. The student will learn a variety of suturing techniques and practice on a variety of artificial tissues that provide realistic texture and suture support.

CVES Courses

The CVES (Center for Videoendoscopic Surgery) lab trains residents in a number of laparoscopic and endoscopic procedures. The classes offered cover a variety of surgeries including laparoscopic chole procedures and Hernia repair. Courses in electrosurgery safety and wound closure are also offered. The CVES is a valuable resource available to ISIS under the leadership of Dr. Brant Oelschlager.



Funding

Active

1. Patient Safety Center Organization: Department of Defense, Department of the Army, US Army Medical Research Acquisition Activity; \$267K; June 2004-June 2007.
2. Developing a Generalized Algorithms for Objectively Assessing Medical and Surgical Skill with Various Modalities - Data Mining Using Markov Models: Department of Defense, Department of the Army, US Army Medical Research Acquisition Activity; \$151K; June 2004-June 2006.
3. The Red Dragon – A multi-modal Experimental System for Objectively Assess Minimally Invasive Surgical Skills: Simulab Corporation, Seattle WA; \$10K; starting date Sep. 2005.
4. Validation of a VR arthroscopic surgical skills simulator – METI. Dept. of Orthopedics Internal funding.

Pending

1. Optimal Assessment of Minimally Invasive Surgical Technical Skills; \$150K. Submitted to Edward J. Stemmler Medical Education Research Fund of the National Board of Medical Examiners.
2. Development of a multidisciplinary basic curriculum in wound closure, suturing, and knot tying. Submitted to SynectureTM and US Surgical – Tyco Educational Division.
3. Collaborative multidisciplinary team training in simulated environments – in preparation for submission Dec. 2006. HRSA-07-093- Nursing Education, Practice and Retention.

Transfer

1. The Red Dragon developed by ISIS was licensed to Simulab Corporation through the UW tech Transfer.

Communications

There has been a solid effort to market ISIS as a top initiative of the University of Washington and the School of Medicine. ISIS was one of three programs in the University of Washington to be highlighted in the annual UW Foundation's "What if?" campaign. Coverage included television spots, print, and electronic media. ISIS was featured on the University's website banner page. The UW School of Medicine Education in Medicine Lecture presented "Simulation in Medical Education, the UW at the (Virtual) Cutting Edge" (Pellegrini, Ross, and Sinanan). ISIS conducted demonstrations and tours for University of Washington events, including a four-page article planned for the Fall 2006 "UW Report to the Community" and has regular coverage in "University Week."

Microsoft aired two health technology webcasts on its <http://www.on10.net> site, and included a spot with Dr. Mika Sinanan for its video lead-in introducing Steve Ballmer, seen by 30,000 viewers. UWTV aired a segment on ISIS on a science show oriented towards middle school students on Brainworks at <http://www.uwvtv.org/programs/displayseries.asp?collid=1113>. Northwest Technology Tour, a cable television show that is aired between coverage of the Washington State legislative sessions, will broadcast a segment on ISIS this fall.

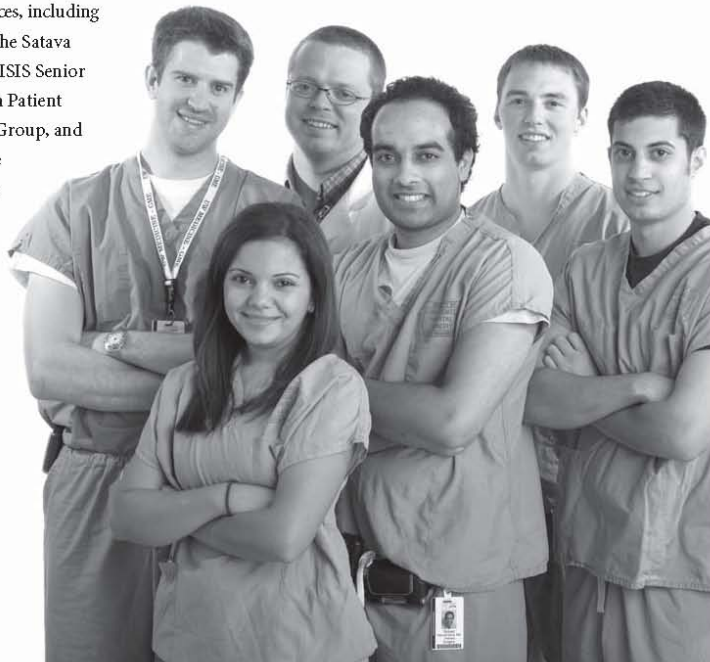
ISIS will host over 50 deans and administrators as part of the Association of American Medical Colleges (AAMC) annual convention in Seattle this October. METI is underwriting the tours and booth displays. Simulab will provide products for the tours. ISIS will be an exhibitor in the 2006 Innovations in Medical Education at the AAMC. Dr. Brian Ross, Director of ISIS, will speak in the plenary session entitled, "Using Simulation to Improve GME." Other local speaking venues for ISIS were the Northwest Regional Human Patient Simulation Network (Ross, Acker), and the Eastside Leadership Conference (Satava). ISIS regularly conducts tours for visiting American and international academics, VIPs, and high school and middle school groups.

Dr. Jesus Savage Camona, the Health Care Policy Administrator for then President Vicente Fox of Mexico visited ISIS.

ISIS has met with local and federal government representatives, including Governor Christine Gregoire (Washington), Dr. Mike Kreidler, Washington State Insurance Commissioner, Mr. Steve Hill, Washington State Health Care Authority Administrator, and Jamie Burgess, legislative assistant to Representative Norm Dicks (6th Congressional District, US House of Representatives).

ISIS staff have visited and conferred with other simulation centers this year, including the National Capital Area Medical Simulation Center (Bethesda, MD), Johns Hopkins Simulation Center (Baltimore, MD), Temple University Institute for Clinical Simulation and Patient Safety (Philadelphia, PA), University of California at Los Angeles Simulation Center (Los Angeles, CA), University of California at Davis Center for Virtual Care (Davis, CA), Stanford University's Center for Advanced Pediatric Medicine (Palo Alto, CA), Southern Alberta Institute of Technology (Calgary, AB), and Seattle University's Clinical Performance Laboratory (Seattle, WA). ISIS staff have participated in simulation conferences, including Medicine Meets Virtual Reality (where the Satava Award, named after Dr. Richard Satava, ISIS Senior Executive Advisor, is presented), Human Patient Simulation Network, Simulation Users Group, and the Society for Simulation in Healthcare (SSH). Dr. Thomas Benedetti, Associate Director, Experts Group, is on the editorial board of the SSH.

An initial web presence has been established with refinements and a professional "look and feel" to reflect ISIS' ongoing mission. The web has generated interest within the University of Washington and beyond. It is a resource for faculty and learners. The schedule, curriculum development form, course listings, and online survey are available. There is a listserv for individuals with an interest in simulation. Email subjects include regular information about new curricula, simulators, demonstrations, and program updates. A synopsis of this information is provided in "ISIS Update," which is emailed and posted on our website. There are planned links to corporate sponsors and partner institutions. There is a review team which will select off-the-shelf web-based resource management, learning management system, and curriculum software that will link to each other, provide exportable data, and best serve the mission of ISIS.



Distinguished Visitors

Corporate and Major Businesses

- American Medical Technologies, LLC
- Ethicon, Inc.
- Haptica, Ltd.
- Jamie Moyer Foundation
- Johnson & Johnson, Inc.
- Laerdal Medical
- Medical Education Technologies, Inc.
- Mentis, Inc.
- MIMIC Technologies, Inc.
- Red Llama, Inc.
- Simulab Corp.
- Karl Storz Endoscopy-America, Inc.
- Stryker Endoscopy Corp.
- Tyco Healthcare Group, LP
- Virginia Mason Medical Center

Individuals & Academics

- Jamie Burgess - legislative assistant to Representative Norm Dicks; 6th Congressional District, US House of Representatives
- Jackie Eder Van-Hook - Government Relations
- Paula Carvalho, M.D. - Boise VA WWAMI
- Governor Christine Gregoire
- Doris Banta - Billings, MT WWAMI
- Drs. John Hunger & Shirin Towfigh - American College of Surgeons Site Survey Team
- Jeff Thompson - CMO WA Medicare
- Steve Hill - Administrator, Washington State Health Care Authority
- Chinese Medical Schools Deans
- TATRC Visit
- Dr. Jesus Savage Carmona; Health Care Policy Administrator of Mexico
- Korean Medical Schools Deans
- Shad Deering, M.D. - Director, Anderson Simulation Center
- Seattle-Netherlands Alliance

Community Outreach

- Anacortes High School
- Bellarmine High School
- Blakely Elementary School
- Franklin High School
- French American School of Puget Sound
- North Kitsap High School
- Rogers High School
- University of Washington undergraduates

Media and Events

- Dr. Michael Seropian Lecture; Director, OHSU Simulation Center
- Microsoft "onten.net" Video Shoot
- TVW show Pacific Northwest Technology Tour video shoot
- Health Sciences Open House (UW Event)
- Dawg Daze (UW Event)

Publications and Presentations

Rosen J., M. J.H. Lum, D. Trimble, B. Hannaford, M. Sinanan.
Spherical mechanism analysis of a surgical robot for minimally
invasive surgery – analytical and experimental approaches.
Stud Health Technol Inform 111: 422-428, 2005.

Fodero K. II., H. King, M. J. H. Lum, C. Bland, J. Rosen, M.
Sinanan, B. Hannaford. Control systems architecture for a
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Lum M. J.H., D. Warden, J. Rosen, M. Sinanan, B. Hannaford.
Hybrid analysis of spherical mechanisms for a minimally
invasive surgical (MIS) robot – design concepts for multiple
optimizations. *Stud Health Technol Inform* 119: 349-354, 2006.

Mackel T., J. Rosen, C. Pugh. Data mining of the E-pelvis
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Generalized approach for modeling minimally invasive surgery
as a stochastic process using discrete Markov model. *IEEE Trans
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of spherical mechanism for a minimally invasive surgical robot:
Theoretical and experimental approaches. *IEEE Trans Biomed
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Lum M. J.H., D. Trimble, J. Rosen, K. Fodero II, H. King, G.
Sankarayanaranan, J. Doshier, R. Leushke, B. Martin-Anderson,
M. Sinanan, B. Hannaford. Multidisciplinary approach for
developing a new minimally invasive surgical robot system.
Proceedings of the 2006 BioRob Conference, Pisa, Italy.
February, 2006.

De S., P. Swanson, M. Sinanan, J. Rosen, A. Dagan, B. Hannaford.
Assessment of tissue damage due to mechanical stresses.
Proceedings of the 2006 BioRob Conference, Pisa, Italy.
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