Simulation-based Training as a Cultural Change Vehicle of the 21st Century Patient Safety and Quality Care

Amitai Ziv MD, MHA
Deputy Director, Chaim Sheba Medical Center
Director, Israel Center for Medical Simulation
Professor and Chairman, Medical Education, Tel-Aviv University School of Medicine

Hospital Authority Convention
Hong-Kong, June 7, 2011
Simulation in Medical Education
- Personal simulation story
- Driving forces / Modalities / Applications / Trends

MSR - The Israel Center for Medical Simulation
- The vision & mission / operational model
- Simulation-based Training and Assessment as a cultural change vehicle on a National level

Lessons learned and New Frontiers
- Paradigm shift
- Challenges
Aviation and Medicine

Similarities
- High-risk and high-tech industries
- Low tolerance to errors
- Intolerance to not learning from errors
- Diverse skills / personality characteristics required

Differences
- Admission and screening culture
- Training and certification culture
- Reporting and debriefing culture

Assessment & Safety Culture
Personal Simulation Story

- Israeli Air Force > 20 years
  - Simulation-based training / Instructor (of instructors…)

- Hadassah / Jerusalem – Med. School & Pediatric Residency
  - CHOP / Philadelphia – Adolescent Medicine / Med Education

- Simulated Patients (SPs) – Consultant, ECFMG’s CSA Programs (USMLE cs)
  - SP-based Test Center, Philadelphia

- Medical Director - MedSim
  - MedSim – TJU Medical Simulation Center

- Sheba Medical Center, Deputy Director
  - Director, Risk Management, QA, Medical Education – Patient Safety
  - Founder & Director, Israel Center for Medical Simulation (MSR)

- Chairman Med. Education – TAU Medical School
The Chaim Sheba Medical Center
The Chaim Sheba Medical Center

- Largest in Israel
- Affiliated to Tel-Aviv University
- Almost 2000 beds (1000 Acute + 900 Chronic)
  - Disaster capacity – 3000 beds
- 120 Departments and clinics (3 hospices, 4 hotels)
- >7,000 Employees
- 85,000 Admissions
- 750,000 OP visits
- 150,000 ER visits
- 35,000 Operations
- 10,000 Deliveries
- 850 MDs / 2000 RNs
- $350M Budget
The General Hospital
The Rehabilitation Hospital
Sheba – National Roles

- National Institute for Epidemiology & Health Policy
- Spinal cord injuries
- Hemophilia
- Multiple Sclerosis
- Newborn Screening
- Tay-Sacs
- Blood Bank
- Glaucoma
- National Burn Unit
- Virology Lab
- Medical Education
Safety Deficiency is a System Failure
Major Gaps in Cultural Appropriateness in Healthcare
The Swiss Cheese Model

- Deficient CRM, Com & Handover skills
- Inadequate Training & Assessment
- Lack of Cultural Competence
- Need for Patient Empowerment

Triggers
- Institution
- Organization
- Profession
- Team

Defences
- Individual
- Technical

Latent Failures
- Accident

Modified from Reason, 1991 © James Reason
Safety and Quality in Medicine

NIOM Report “To Err is Human”
- Over 100,000 annual deaths (US) – Boeing 747/d

Unequal Treatment NIOM Report
- Major Gaps in Cultural Appropriateness in Healthcare

Central Educational Deficiencies:
Communication, Team Work Skills

Simulation: important complementary safety tool

Need for Cultural Change/Paradigm Shift in Medical Education & Medical Practice
customized simula
The Flexner Report (1910)

“Birth of Modern Medical Education”
Set Standards – admission, curriculum, duration...

Unchanged Educational Paradigm - 100 Years

Pre-Clinical Phase
Basic Scientific Knowledge
Traditional Educational Tools (lectures)

Clinical Phase
Basic Clinical Skills
Apprentice-based Learning (bed-side)

Missing Components:
Standards for Proficiency Assessment
Continuum of Medical Education
WORLD ALLIANCE FOR PATIENT SAFETY  Led by NHS CMO

WHO PATIENT SAFETY CURRICULUM GUIDE FOR MEDICAL SCHOOLS

TAU's 4 Year Program - a Pilot Site

Released - 4/2009  FIRST EDITION DRAFT
Why Simulation?

- Safe environment - mistake forgiving
  - Error driven education

- Proactive and controlled training
  - Nightmare driven education / Just in Time

- Trainee/ Team / System centered education
  - Experiential / Emotional learning - IPE

- Feedback and debriefing-based education
  - Reflective learners / Process-based education
  - To be applied in real life...(check-list...)

- Reproducible, standardized, objective (CSA)
  - Assessment driven education
McNamara’s Fallacy

- The first step is to measure whatever can be easily measured.

This is OK as far as it goes.

- The second step is to disregard that which can't easily be measured or to give it an arbitrary quantitative value.

This is artificial and misleading.
McNamara’s Fallacy (cont.)

- The third step is to presume that what can't be measured easily really isn't important.
  
  This is blindness.

- The fourth step is to say that what can't be easily measured really doesn't exist.
  
  This is suicide.
McNamara’s Fallacy

The Consequence…

We start out with the aim of making the **important** measurable, and end up making only the **measurable important**.

The Empty Raincoat (Charles Handy, 1994 p219)
Professionalism - Hierarchy

- Competent knowledge base
- Technical skills
- Non-technical skills
  - Safety Skills
- Professional Behaviour
Higher Order Competencies / Skills

**Safety Skills** (Error = Unasked Question)
- Handover, Adherence to Guidelines, **Error Recovery**, Calling for Help, Documentation, EMR: Doc/Pat/Comp Skills

**Team Work Skills** / **“Microsystems Skills”**
- Leadership, Followership, Communication, Counseling, IPE: Inter-professional Skills

**Multi-Cultural Skills**
- Cultural, Use of Interpreter, Language Skills / **Geriatric Care**

**Reflective Skills**
- Debriefing, Self assessment, Feedback Provision Skills

**Personal Traits**
- Integrity, Motivation, Capacity, Humility, Risk Taking Traits
Driving Forces of Simulation

- **Patient safety movement** (NPSF, CPSI, NPSA)
  - Simulation as a complementary training tool
- **Accreditation bodies / professional boards**
  - Performance Assessment / **Migration “Gate Keeping”**
- **Accountability of Medical Education** – **BMJ 10/09**
  - Readiness / Duration-based training Vs. Competency-based (individualized / personalized) Education (Ontario, Canada)
- **Ethics - patient ( & animal) rights - “First Do No Harm”**
- Reduced patient accessibility
- Reduced work hours / Increased training duration
- **Liability and economics** (teaching Vs. practice)
- **Simulation industry**
Simulation Modalities
Synthetic Models (for procedural Skills)

Large variety of models
Tissue properties continuously improving

Lipoma

Sebaceous Cyst
Task Trainers

GI Mentor™ II
URO Mentor™
PERC Mentor™
LAP Mentor™
ANGIO Mentor™

MSR Israel Center for Medical Simulation
Customized / Personalized Simulation
Radiotherapy / Dentistry / Stenting...

Patient Diagnosed
Imaging Center
3D Reconstruction
Surgical Modeling and Planning
Simulation Mission Rehearsal
Patient Treated

Israel Center for Medical Simulation
Sim Movement - Trends

- Industry - more dynamic / mature / secure / 3G…
  - Merges, Acquisitions & Alliances - Multi-product companies
  - Built-in proficiency Metrics (often-not validated…)
  - Aviation sim companies - back to the scene (LM, CAE)
  - Virtual World – 2nd Life….
    - CAREN – Virtual Rehabilitation

- Surgeons are Joining the revolution – ACS / FLS…

- Simulator as an FDA pre-release requirement

- Growing collaboration (in Training & Assessment):
  - Low-Tech (High Touch) and High-Tech - Hybrid Model

- Multi-Professional Sim Societies/Networks/Confer.
  - IMSH, MMVR, Ottawa, AAMC, AMEE, APMEC, HKHAC…
IMSH Participants’ Growth

- 2004: 100
- 2005: 200
- 2006: 1000
- 2007: 2000
- 2008: 2500
- 2011: 3000

Society for Simulation in Healthcare

Israel Center for Medical Simulation
PLAN NOW TO ATTEND THE
ASIA-PACIFIC MEETING ON SIMULATION IN HEALTHCARE

Asia-Pacific Meeting On Simulation In Healthcare (APMSH)
May 19-22 2011, Hong Kong

The Society for Simulation in Healthcare (SSH) and the Australian Society for Simulation in Healthcare (ASSH), in conjunction with their regional partners in the Asia Pacific, are delighted to announce the first Asia Pacific Meeting on Simulation in Healthcare. Join your colleagues and health care leaders from around the world at this meeting convened specifically for simulation enthusiasts in the Asia Pacific region. During this exciting 3.5 day event, you will have the opportunity to interact with international health care simulation experts in plenary lectures, workshops, panel discussions, and poster sessions, as well as participate in a full day of pre-conference courses and "Meet the Expert" lunch sessions. The program will highlight the important practical elements required to build a successful simulation program.

WHO SHOULD ATTEND APMSH:
Simulation professionals, healthcare providers, educators, and staff who are committed to delivering reliable, patient-centered and evidence-based care for their patients. You and your team will leave with the energy, optimism, ideas and solutions necessary to successfully manage, build and enhance your simulation programs in 2011.

For complete program details and sponsorship opportunities, contact Co-Chairs: Adam Cheng (ACheng@cw.bc.ca) and Katie Walker (k walkerson67@gmail.com). Local Hong Kong co-chairs: Chor-Chih Lau (cclau@ha.org.hk) and Tsun-woon Lee (bestwha.org.hk)

Website: www.ssh.org
E-mail: admin@ssh.org
Phone: 062-369-3410

Keynote Speaker:
Don Pasztor, Center for Medical Simulation, Harvard University

Presented through a collaboration of:
Additional Trends

Growing Interest by Risk management
- **Premium reduction** for SBME (Harvard) / Israel…

Growing Federal Funding opportunities
- AHRQ (>5 $ Annually), CPSI, Canada Aid
- **US Congressional 2008 Simulation Bill** (>50 M $ Annually)
  - Australia Federal Funds > 90 M$ over 5 years

Associate Deans for Simulation
- e.g.: **David Gaba** - Stanford ; **Ian Curran** - London Deanery

Multiple Sim-centers worldwide – multiple models
- Single Profession / Modality
- **Networks of Multiple Silos** (Toronto’s – SIM1)
- Joint Ventures Model like the - **CAE / Michener**
- Institutional (NUS) / National (MSR) Models
SBME - Applications

- “Hands-On” Skills Training (Basic & Advanced)
- Simulation-Based CME
- Enhancement of Cognitive Learning
- Teamwork and “Human Factor” Training
- Performance Assessment of Individuals / Teams
  - Readiness for Practice / Formative / Summative
- Patient Safety / Risk Management / QA
- Structured Exposure to New Medical Technologies

Screening, Licensure, Certification
MSR – The Israeli Vision

National resource for comprehensive inter-disciplinary, multimodality medical simulation center dedicated to:

- Patient safety and quality care
- Hands-on training
- Readiness to clinical practice
- Performance assessment

Cultural Change Vehicle
MSR - Virtual Medical Environment

- Broad-spectrum simulation modalities
  - Simulated patient section
  - High-tech simulators
  - Task trainers / Skills lab

- Clinical environments
  - Home, Field, ER, OR, clinic
  - Customized - EMR

- Debriefing capabilities
  - One-way mirrors
  - Digital A-V equipment
  - Debriefing software

- Multidisciplinary staff
Guidelines and Principles

- **National exposure / collaboration**
  - Identify national needs – high impact factor
  - Involve **Regulators** (IMA, MOH, IDF, HMO) – **Certification**

- **Link with RM and Patient Safety database / “real world”**
  - Stress error reduction / adherence to guidelines

- **Non for profit - fee for service** – operationally balanced
  - Financial stability (autonomy) – Business Model
  - Long term contracts – ongoing budget items
  - Partnership with industry / foundations / grants / donations

- **Focus on debriefing / assessment**
  - “Train the Trainer / Rater” – instructors / raters’ courses
  - Bottom-up & top-down approach

- **Assessment - Expertise in testing and evaluation**
  - Strategic partnership with NITE (“Israel’s ETS”)

MSR
Israel Center for Medical Simulation
MSR > 9 Years of Activity

- > 100,000 Trainees / Examinees ( >30% as teams)
  - Medicine (38%), nursing (33%) Para-medicine (30%)
- Multimodality courses (> 50%)
  - in collaboration with prof. assoc., HMOs, IDF, RM, MOH…
  - > 100 national programs
  - >150 SPs -16-80 y.o. / > 100 simulators / models
- Dedicated Multidisciplinary staff (>50 = >30 FTEs)
  - > 1500 trained Trainers
  - > 2500 trained Raters
- Research – publications
  - 7 PhDs (e.g. - Handoffs, Predicting Psychomotor Skills…)
- > 50 Basic science fellowships (6 months each…)

Mandatory TTT / TTR Policy
National Change Agents
SBME as Translational Science

| T1 science — laboratory discovery ➔ clinical research | T2 science (clinical effectiveness) — comparative impact translated into practice guidelines |

| Contributions of medical education interventions to T1, T2 and T3 outcomes |
|---|---|---|
| **T1** | **T2** | **T3** |
| **Increased or improved** | Knowledge, skill, attitudes, and professionalism | Patient care practices | Patient outcomes |
| **Target** | Individuals and teams | Individuals and teams | Individuals and public health |
| **Setting** | Simulation lab | Clinic and bedside | Clinic and community |

McGaghie: Science Translational Medicine 17 February 2010 Vol 2 Issue 19

T3 science — health care delivery systems ➔ measurable impact in health of individuals and society

Simulation-Based Objective Assessment Discerns Clinical Proficiency in Central Line Placement
A Construct Validation

Yue Dong, MD; Harpreet S. Surti, MBBS; David A. Cook, MD, MHPE; Kienoush B. Kashani, MD; John J. Mullon, MD; Felicity F. Enders, PhD; Orit Rubin, PhD; Amitai Zeit, MD; and William F. Dunn, MD, FCCP

Background: Central venous catheterization (CVC) is associated with patient risks known to be inversely related to clinician experience. We developed and evaluated a performance assessment tool for use in a simulation-based central line workshop. We hypothesized that instrument scores would discriminate between less experienced and more experienced clinicians.

Methods: Participants included trainees enrolled in an institutionally mandated CVC workshop and a convenience sample of faculty attending physicians. The workshop included several experiential learning techniques, including practice on cadavers and part-task trainers. A group of clinical and education experts developed a 15-point CVC Proficiency Scale using national and institutional guidelines. After the workshop, participants completed a certification exercise in which they independently performed a CVC in a part-task trainer. Two authors reviewed videotapes of the certification exercise to rate performance using the CVC Proficiency Scale. Participants were grouped by self-reported CVC experience.

Results: One hundred and five participants (98 trainees and 13 attending physicians) participated. Interrater reliability on a subset of 40 videos was 0.71, and Cronbach’s α was 0.81. The CVC Proficiency Scale Composite score varied significantly by experience: mean of 85%, median of 87% (range 47%-100%) for low experience (0-1 CVCs in the last 2 years, n = 27); mean of 88%, median of 87% (range 60%-100%) for moderate experience (2-40 CVCs, n = 62); and mean of 94%, median of 93% (range 73%-100%) for high experience (≥40 CVCs, n = 16) (P < .002, comparing low and high experience).

Conclusions: Evidence from multiple sources, including appropriate content, high interrater and internal consistency reliability, and confirmation of hypothesized relations to other variables, supports the validity of using scores from this 15-item scale for assessing trainee proficiency following a central line workshop.

CHEST 2010; 137(1):1-7

Abbreviations: CVC = central venous catheterization; IJ = internal jugular; SC = subclavian
Composite score stratification by experience level

Group 1 (0-1 CL)  Group 2 (2-49 CL)  Group 3 (>50 CL)

Baseline  (N=3)  Baseline  (N=15)  Baseline  (N=14)

CLW  (N=17)  CLW  (N=45)  CLW  (N=14)

P < 0.01

Unpublished data, Dong & Dunn
Skill Acquisition Curve
Impact of Zero-Risk Training

- Traditional training
- Simulation-based training
- Metric assessment (e.g., composite score)
- Clinical competence
- Safety standard
- Experiential reinforcement

Dong et al: Chest 2010
Simulation as process engineering tool improves communications... teamwork... safety... healthcare delivery research opportunity.
National Programs (Sample)

National Emergency Preparedness Programs

- Trauma / ER Training
- On-site (in-Situ) Training – MSR on Wheels
- “Simulation as a Bridge for Peace”
  - Trauma Training for Palestinian Physicians & Paramedics in Collaboration with “Physicians for Human Rights”

National SP-based Ethical / Com Skills Programs

- Transparency / Apology (error disclosure)
- Handling Tough Patients / Cultural Humility
  - CEOs / Dep. Heads (MDs & RNs)
- RM / Com skills - Pharmacists
- Role Modeling - Conveying bad News
Multiple Mandatory (Formative) Programs (sample) + Indicators for Improved Safety / Quality

Interns – transition into hospitals (Driven by Job Analysis)
- 5 d “nightmare course” > 800 interns annually (> 4000 tot)
- MOH + MS Deans’ regulation

Conscious Sedation for Non-Anesthesiologists
- Pediatrics – Improved adherence to Guidelines

Institutional Mandatory Certification
- e.g. – Charge Nurses / RM Officers etc / Ob-Gyn (national…)
- Simulation-based Bed-Side Teaching / Tutorship Skills

Domestic abuse (multidisciplinary)
- Old age, women, child – improved health professional skills

Physician / Patient / Computer Skills
- For primary care HMO physicians / Customized EMR
National Simulation-Based High-Stakes Assessment at MSR – In Collaboration with NITE

- **Anesthesiology board exams** (since 2003)
  - > 70 examinees annually
  - In collaboration with the Israel Board of Anesthesia

- **Paramedics certification exams** (since 2004)
  - >150 examinees annually
  - In collaboration with the Israel EMS (Magen David Adom)

- **Advanced nursing licensing exams** (since 2008)
  - >1000 examinees annually (15 different clinical domains)
  - In collaboration with the Israel MOH Nursing Authority

- **MOR - Screening of medical school candidates** (since 2005)
  - > 900 examinees annually
  - In collaboration with Technion, HU, TAU Medical/Dental Schools
## Desired Personal Attributes

<table>
<thead>
<tr>
<th>Ethical attitude</th>
<th>Honesty</th>
<th>Service awareness</th>
</tr>
</thead>
<tbody>
<tr>
<td>Attitude towards authority</td>
<td>Empathy</td>
<td>Integrity</td>
</tr>
<tr>
<td>Self awareness</td>
<td>Sensitivity</td>
<td>Self confidence</td>
</tr>
<tr>
<td>Maturity</td>
<td>Responsibility</td>
<td>Motivation</td>
</tr>
<tr>
<td>The ability to function under stress</td>
<td>The ability to identify a need for help, search for help and accept help</td>
<td>Inter-personal communication skills</td>
</tr>
<tr>
<td>Self confidence</td>
<td>Openness</td>
<td>........</td>
</tr>
</tbody>
</table>
Structure of Assessment Center (MOR)

- **Simulations**
  - 120 minutes
  - 9 Behavioral stations
  - Communication skills
  - Handling of stress
  - Initiative & responsibility
  - Consciousness & self-awareness

- **Biographical Questionnaire**
  - 90 minutes
  - 21 Questions
  - Essay questions related to candidate’s past experiences

- **Judgment and Decision-Making**
  - 45 minutes
  - 3 Dilemmas
  - Short descriptions of dilemmas that require candidate to make decisions
Consequences

- The make-up of the student body changed by 20% each year (stable)
- Dramatic change in atmosphere at the faculty
- Very high national (and international) interest - two other faculties joined the process in 2006/7
  - Publication: A Ziv, O Rubin, et al, Medical Education; 2008
- #s (2004-2010)
  - > 4300 candidates
  - > 1500 Faculty trained as Raters
- Moral message to candidates, faculty & public
National (Cultural) Impact

High penetration rate
- Vertical - MDs: Admission / MS / Interns / Residents / Seniors
- Horizontal - RNs / OT / SW / Dieticians / Pharmacists / etc.
- Health care institutions – HMOs and Hospitals

Multiple sectors experience assessment (Full Cohorts)
- ALL interns / graduating paramedics / military docs / advanced nurses / > 80% MS candidates
- Exposure / Involvement of > 50% of registered paramedics / Anesthesiologists / medical schools’ faculty (as Raters!)

Significant increase in SBME
- Multiple peripheral sim-initiatives (in collaboration with MSR)
- Multiple revisions in educational curricula

National Awards
MSR’s International Activities

### Sister Centers

- **Mayo Clinic, Case Western, McGill University, Michener Toronto** - Consulting in the establishment of their facilities & Faculty development
- **Albert Einstein Brazil** – 3 year Comprehensive Consulting
- **Collaborative Research & Educational projects**

### Faculty Development (on & off Site)

- **Ottawa, Kansas, Michener, U. Mass, NESCTL Toronto, Santander Spain, Groningen Holland, Hong Kong, Singapore, Riga University**
- **Annual international summer courses at MSR (TTT, TTR...)**

### International Sim-based Training at MSR

- **Emergency Preparedness** - Teams from North America (APF, Taglit, NY, Europe, India, Russia, Kazakhstan)
- **Delegations from Africa** – HIV / AIDS / Adult Circumcision
“Side” Benefits

- High level of content validity / relevancy
- Value message to the whole system
- Forces revisions in educational curriculum
- Increases awareness to patient safety / common errors / skills deficiencies
- Enhances interdisciplinary collaboration (IPE)
- Increases objectivity / standardization
- Faculty Development opportunity
  - patient safety & competency-based training
  - Enhances educational accountability
# Simulation: a Paradigm Shift Tool

## Traditional approach
- Safety - Personal Value
- Secret / Close Guild
- Inaccessible Information
- Reactive System
- Professional Autonomy
- High Variability
- Assessment of Knowledge
- Duration-based education
- Apprentice-based learning

## 21st Century Cultural Shift
- Safety - System Value
- Transparency - Debriefing
- Free Flow of Information
- Proactive Approach
- Pt. Autonomy/Empowerment
- Evidence-based Norms
- Performance/Readiness Ass.
- Proficiency-based education
- Simulation-based Training

## Medical Education as one Continuum...
Lessons / Challenges / New Frontiers

Transition from “Wow” to “Mature” Phase
- Link Sim-based training with Risk Management data
- Structured Incorporation into Continuum of Medical Education - Bottom-up & Top Down / horizontal & vertical
- Prioritization of SBME Activities

Educational Challenges - Leadership
- Train the Trainers / Raters / Video-based Debriefing
  - New expertise / Maintenance of Instructors’ Skills
- Develop the Pre & post simulation components
- Integration of Sim-based training into curriculum
- Validation Research - transferability / sustainability
- Resistance to change – conservatism…
Lessons / Challenges / New Frontiers

Performance Assessment Measures of Skills
- Apply Preparedness / Readiness Concepts
- Measuring the “un-measurable”/“the important”
- Simulation is only one of many tools....

Regional / National / (& global) collaboration
- Crucial for success - international partnerships
- Sister Center-ship - MSR-Mayo-Clinic; Case Western (US), A-Einstein (Brazil), McGill, Michener-CAE (Canada)

Sim-Technology – Need for Improvement
- Reliability / Fidelity / Clinical Features / Mobility
- Curriculum Driven R&D / Metrics
Lessons / Challenges / New Frontiers

- **Delivery Model / Cost Effect. / Funding**
  - Fee for Service / Financial Stability
  - Sustainable Philanthropy
  - Alliance with Commercial World
  - Centralized sites + Peripheral Satellites + Mobile
  - Distant Simulation-based Education

- **Continuum Medical Education Paradigm**

- **Recognition by Regulators: RM/QA/Boards**

  **Accreditation / Licensure**

  **Certification**
The Safety Message

Humility

“To Err is Human”
Amitai Ziv, MD, MHA
zamitai@sheba.health.gov.il

MSR – The Israel Center for Medical Simulation
www.msr.org.il
## Impact of Simulation-based training on Nurses’ Handoff Practice (step-down ICU)

<table>
<thead>
<tr>
<th>Indicating</th>
<th>Before intervention</th>
<th>Following intervention</th>
<th>$(1)^2 \chi$</th>
<th>p value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Patients' name</td>
<td>108/224 (48%)</td>
<td>159/166 (96%)</td>
<td>99.9</td>
<td>p&lt;0.0001</td>
</tr>
<tr>
<td>Patients' age</td>
<td>42/224 (19%)</td>
<td>105/166 (63%)</td>
<td>80.4</td>
<td>p&lt;0.0001</td>
</tr>
<tr>
<td>Patients' diseases</td>
<td>134/224 (60%)</td>
<td>162/166 (98%)</td>
<td>74.3</td>
<td>p&lt;0.0001</td>
</tr>
<tr>
<td>The reason for admission</td>
<td>136/224 (61%)</td>
<td>166/166 (100%)</td>
<td>84.2</td>
<td>p&lt;0.0001</td>
</tr>
<tr>
<td>Refer to</td>
<td>Before intervention</td>
<td>Following intervention</td>
<td>((1)^2 \times)</td>
<td>p value</td>
</tr>
<tr>
<td>----------------------------------</td>
<td>---------------------</td>
<td>------------------------</td>
<td>------------------</td>
<td>---------</td>
</tr>
<tr>
<td>Heart rate during handoff</td>
<td>85/224 (38%)</td>
<td>115/166 (69%)</td>
<td>30.5</td>
<td>p&lt;0.0001</td>
</tr>
<tr>
<td>Blood pressure during handoff</td>
<td>109/224 (49%)</td>
<td>110/166 (66%)</td>
<td>52.7</td>
<td>p&lt;0.0001</td>
</tr>
<tr>
<td>Oxygen saturation during handoff</td>
<td>120/224 (54%)</td>
<td>140/166 (84%)</td>
<td>60.6</td>
<td>p&lt;0.0001</td>
</tr>
<tr>
<td>Fluids balance</td>
<td>146/224 (65%)</td>
<td>151/166 (91%)</td>
<td>34.9</td>
<td>p&lt;0.0001</td>
</tr>
</tbody>
</table>
### Results (cont)

<table>
<thead>
<tr>
<th>Refer to</th>
<th>Before intervention</th>
<th>Following intervention</th>
<th>((1)^2 x)</th>
<th>p value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mechanical ventilation orders</td>
<td>25/88 (28%)</td>
<td>34/38 (89%)</td>
<td>39.8</td>
<td>p&lt;0.0001</td>
</tr>
<tr>
<td>Sedation orders</td>
<td>48/75 (64%)</td>
<td>30/30 (100%)</td>
<td>14.5</td>
<td>P=0.0001</td>
</tr>
<tr>
<td>Orders for medications administered in continuous infusion</td>
<td>71/109 (65%)</td>
<td>31/31 (100%)</td>
<td>14.8</td>
<td>P=0.0001</td>
</tr>
<tr>
<td>Feeding orders</td>
<td>120/224 (54%)</td>
<td>145/166 (87%)</td>
<td>49.9</td>
<td>p&lt;0.0001</td>
</tr>
</tbody>
</table>
Proactive Risk-management Process

- Intervention stemmed from a root-cause analysis of a routine near-miss event (Error in insulin administration)
- Documented common deficiencies which led to a more valid intervention (better linked to the actual medical practice).

Handoff as an opportunity to diagnose and correct errors

The intervention included the development & implementation of an Handoff Checklist & Simulation-based Handoff Training

- Decreased incidents of mistakes performed during handoff
- Improved adherence to guidelines – mostly on Verbal Behavioral Front
Overall assessment

percentage ranking 3-4 of all responders

- Total N = 735
- Pre internship N = 55
- Interns N = 290
- Residents N = 380
Acquisition of professional skills
total percentage ranking 3-4 of all responders

- Total N = 735
- Pre internship N = 55
- Interns N = 290
- Residents N = 380
Safety Questions
percentage ranking 3-4 of all responders

- Total N = 735
- Pre internship N = 55
- Interns N = 290
- Residents N = 380
“The workshop is superb, most essential and highly beneficial. On my second day of internship I had to escort a patient (to an exam). Without the workshop, I never would have thought I should make preparations or to check the oxygen balloon (which was, indeed, closed).

“..Asking a woman if she feels safe at home, or asking a woman who had recently gave birth how she manages… are things I’ve done during internship, and never would have occurred to me if it wasn’t for the workshop”.

“The workshop is brilliant, one cannot overstate its value. In fact, it is one of the most useful experiences during our studies”

“An outstanding workshop… the clinical skills acquired in emergency care are vital, and cannot be attained in any other manner”
Main insights

- The vast majority of trainees view the workshop as highly essential, and opt to mandate it before internship.
- The evaluation of its significance is maintained even in a 3-4 year perspective.
- The workshop is conceived important to acquiring safety and emergency skills.
- The workshop greatly contributes to both awareness to safety and to student’s acknowledgement of his/her true clinical skills upon embarking to hospitals.
The Learning Pyramid

- Lecture: 5%
- Reading: 10%
- Audiovisual: 20%
- Demonstration: 30%
- Discussion group: 50%
- Practice by doing: 75%
- Teach others: 80%

National Training Laboratories, Bethel, Maine, USA
6 months Later – Improved Perceived Skills in managing Domestic Abuse

<table>
<thead>
<tr>
<th>p</th>
<th>Diff</th>
<th>Ave</th>
<th>N</th>
<th>T</th>
<th>Skills</th>
</tr>
</thead>
<tbody>
<tr>
<td>0.005</td>
<td>0.29</td>
<td>2.6</td>
<td>73</td>
<td>0</td>
<td>Ability to Diagnose Domestic Abuse</td>
</tr>
<tr>
<td>0.0001</td>
<td>0.49</td>
<td>2.7</td>
<td>73</td>
<td>0</td>
<td>Skills to Intervene for the benefit of the Victim</td>
</tr>
<tr>
<td>0.0001</td>
<td>0.56</td>
<td>2.6</td>
<td>73</td>
<td>0</td>
<td>Communication Skills related to Domestic Abuse</td>
</tr>
<tr>
<td>0.0001</td>
<td>0.6</td>
<td>2.6</td>
<td>73</td>
<td>0</td>
<td>Overall Knowledge of Domestic Abuse management</td>
</tr>
</tbody>
</table>

Likert Scale – 1 (low) to 4 (high)
### Increase in – Suspecting / Inspecting / Reporting of Domestic Abuse

<table>
<thead>
<tr>
<th>Report</th>
<th>Inspect</th>
<th>Suspect</th>
<th>N</th>
</tr>
</thead>
<tbody>
<tr>
<td>74</td>
<td>102</td>
<td>137</td>
<td>74</td>
</tr>
<tr>
<td>(54%)</td>
<td>(74%)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>116</td>
<td>155</td>
<td>174</td>
<td>74</td>
</tr>
<tr>
<td>(66%)</td>
<td>(89%)</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Shefet, Ziv et al, Medical Teacher, 2007
### The Impact of SBT on Adherence to Guidelines in Pediatric Conscious Sedation

#### Table. Comparison Between Trained and Not Trained Nonanesthesiologists

<table>
<thead>
<tr>
<th>Variable</th>
<th>Trained Group *</th>
<th>Not Trained Group *</th>
<th>Adjusted Odds Ratio (95% Confidence Interval)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Presedation evaluation</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>History of operations or procedural sedation</td>
<td>14 (88)</td>
<td>2 (12)</td>
<td>49.0 (6.0-398.3)</td>
</tr>
<tr>
<td>Time of last meal</td>
<td>16 (100)</td>
<td>10 (62)</td>
<td>20.4 (1.0-401.7)</td>
</tr>
<tr>
<td>History of known adverse effect to medication</td>
<td>16 (100)</td>
<td>2 (12)</td>
<td>191.4 (8.5-4322.9)</td>
</tr>
<tr>
<td>Measurement of vital signs before drug admin</td>
<td>12 (75)</td>
<td>4 (25)</td>
<td>9.0 (1.8-44.6)</td>
</tr>
<tr>
<td>Participant performance during sedation</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Maintaining eye contact with patient throughout the procedure</td>
<td>12 (75)</td>
<td>6 (38)</td>
<td>5.0 (1.0-22.8)</td>
</tr>
<tr>
<td>Titration of medication</td>
<td>14 (88)</td>
<td>6 (38)</td>
<td>11.7 (1.9-70.2)</td>
</tr>
<tr>
<td>Monitoring</td>
<td>16 (100)</td>
<td>12 (75)</td>
<td>11.9 (0.6-241.7)</td>
</tr>
<tr>
<td>Participant performance in recovery time</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Monitoring</td>
<td>14 (88)</td>
<td>6 (38)</td>
<td>11.7 (1.9-70.2)</td>
</tr>
<tr>
<td>National guideline–recommended discharge criteria</td>
<td>14 (88)</td>
<td>6 (38)</td>
<td>11.7 (1.9-70.2)</td>
</tr>
</tbody>
</table>

*Data are given as number (percentage) of each group. For both groups, there were 16 physicians (6 pediatricians practicing emergency medicine and 10 pediatric gastroenterologists).
CAE signs service contracts and alliances in simulation-based healthcare training

CAE has signed contracts and alliances in simulation-based healthcare training. They are with the Michener Institute for Applied Health Sciences in Toronto, the Université de Montréal and the Winnipeg Regional Health Authority. The contracts have an initial total value of approximately C$5 million.

“The aviation simulation-based training model is becoming universally recognized as one of the effective ways to prepare healthcare professionals to care for patients and respond to critical situations while reducing the overall risk to patients,” said Robert E. Brown, President and Chief Executive Officer of CAE. “CAE has already applied its technology and capabilities developed for the civil aviation and military markets to public safety and emergency response. Healthcare simulation is a natural extension of this know-how. By partnering with experts in the healthcare field, we will leverage our knowledge, experience and best practices in simulation-based aviation training to work with healthcare experts to deliver innovative education, technologies and service solutions in order to improve the safety and efficiency of the healthcare industry.”

CAE estimates the global market for simulation-based healthcare training will be in excess of $1.5 billion by 2012*. CAE’s healthcare services will range from providing simulation-based training solutions to managing simulation-based training centres.
Impact of Simulation-based Tutors’ Training on their perceived skills

Pre-workshop Post Workshop Post Tutorship
## Students’ Evaluation of Tutors

<table>
<thead>
<tr>
<th>P Value</th>
<th>Delta</th>
<th>Study (N=20)</th>
<th>Control (N=30)</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>NS</td>
<td>0.07</td>
<td>3.77</td>
<td>3.6</td>
<td>Tutor’s overall teaching skills</td>
</tr>
<tr>
<td>NS</td>
<td>0.15</td>
<td>3.66</td>
<td>3.56</td>
<td>Tutor’s bedside teaching skills</td>
</tr>
<tr>
<td>NS</td>
<td>0.14</td>
<td>3.38</td>
<td>3.66</td>
<td>Tutor’s overall attitude to students</td>
</tr>
<tr>
<td>NS</td>
<td>0.06</td>
<td>3.34</td>
<td>3.83</td>
<td>Tutor’s ability to engage students in further learning</td>
</tr>
</tbody>
</table>

**Bottom-line re-Tutors’ training**

**mandatory requirement**

by Sheba’s Management
The American Recovery and Reinvestment Act to promote “meaningful use” of electronic health records (EHRs) by all individuals in 2011, and to support the development of mechanisms for information sharing through EHRs in the US. (2009 - $1.2 billion in new federal grants)

Figures from: Frankel et al., 2005
Train the Trainer Workshop

July 31, 2011-August 3, 2011

MSR's International
Train the Trainer
Workshop
Israel

SAVE THE DATE

What
The 1st International Train the Trainer Workshop in Israel

Where
At MSR, the Israel Center for Medical Simulation at the Sheba Medical Center

Who for
Professionals who are involved in simulation-based medical education

MSR

- A world leader in simulation-based medical education (SBME) and patient safety education
- A national multi-modality, interdisciplinary simulation center
- Conducts simulation-based mandatory courses and regulatory licensing exams
- Trained over 40,000 healthcare professionals since its establishment in 2001
- Trained over 800 trainers and raters in multiple clinical domains

TRAIN THE TRAINER PHILOSOPHY

Learn It, Live It, Pass It Forward

Our train the trainer philosophy is about mentoring, inspiring, and empowering trainers so they can pass forward the educational and safety messages in their organization.

This is our way to make a cultural change in the world of medical education.
Faculty Development Program

Faculty development in Simulation-Based Medical Education (SBME) has become a growing necessity. To significantly improve the level of simulation-based instruction, it is essential to provide comprehensive training that is based on well-established educational principles, methods and techniques.

MSR offers an array of faculty development workshops for healthcare teams and individuals who are interested and involved in simulation-based education. These workshops are tailored for professionals with limited time and resources. By the end of the workshops participants will be able to use and implement the methodologies and techniques in their own training programs.

- Provides practical tools simple to implement
- Standardizes curriculum development, training, debriefing and assessment methodologies
- Applies to team work, clinical and interpersonal / communication skills training
- Enhances development of simulation-based training and curriculum
- Meets the needs of participants of diverse backgrounds
- Empowers faculty to lead changes in their educational environment
- Conducted either at MSR or at customers’ sites
- Provides opportunity for networking and sharing of experiences

Train the Trainer
Train the Rater
Train the SP Trainer

For more information about MSR’s faculty development program or consultation services visit our website at: www.msr.org.il/faculty_development