



## Welcome to the Center for Medical Simulation© (aka Harvard Hospital)

**Course Goal:** To improve your skills in managing a crisis situation including: (1) establishing and maintaining role clarity, (2) communicating effectively with a team, (3) optimizing personnel support, (4) utilizing available resources, and (5) maintaining appropriate focus while assessing the “big-picture”.

**Setting:** You will be doing cases in a simulated clinical environment. That location will appear, sound, smell, and feel as much like the actual clinical setting as we can make it. Though the equipment, supplies, and personnel will not be exactly the same as yours, most of it will be similar and familiar. In each location you will encounter local personnel that might be expected in that situation and place. Although they will be simulation center staff playing nurses, physicians, family, patients, technicians, or others, they will try to act appropriately and consistently knowledgeable, helpful, or unhelpful according to their assignment. We take our roles seriously and remain “in-character” throughout.

**Person:** The patients you encounter will be different individuals although they look very similar because they are sophisticated computer controlled mannequins. Each patient has a name, age, medical and social history and a personality. All patients have a voice and will be able to converse with you in a normal fashion although the mouth does not move when the patient speaks. In some cases you may encounter a live patient.

**Eyes:** Some patients have working eyes and others do not. It will be obvious to you whether the eyes work or not. If the patient has working eyes, they open and close voluntarily and involuntarily. The pupils are reactive to light and their diameter is affected by neuraxial pathology and by medications.

**Airway:** The patient’s airway has reasonably correct anatomy and can be managed using mask, tracheal tube, and LMA. Depending on the patient’s anatomy and condition, direct laryngoscopy and intubation can be easy, difficult, very difficult, or nearly impossible. The patient can produce secretions, swell, and even bleed. The degree of difficulty can change from airway manipulations or from ongoing swelling. Harvard Hospital is equipped with a “difficult airway cart” that contains a fiber-optic bronchoscope, various size MacIntosh and Miller laryngoscope blades, assorted sized tracheal tubes, regular and intubating LMAs, and other airway supplies. You can perform a needle or surgical cricothyroidomy.

**Breathing:** The patients actively breathe (except some newborn mannequins). When breathing spontaneously there is visible chest movement and gas exchange. When patients are unable to breathe, you must ventilate them using positive pressure. The chest will rise and fall, as you would expect. The compliance of the lungs and chest wall are well modeled

and the “feel” that you experience when breathing for the patient is similar to a real patient. The compliance can change due to pathology or injury as appropriate. The lungs are independent, so you could have breathing on one side or the other due to misplacement of a tracheal tube or a pneumothorax, or other anomaly. The anatomy of central structures does not shift due to unequal pressure in the thoracic hemispheres. The patients expire CO<sub>2</sub> but do not produce water vapor.

**Sounds:** The patients have heart and breath sounds that can be auscultated using a stethoscope. The quality of the sounds is poor and they can easily be missed or misinterpreted. In addition they are binary. That is, the sounds are “absent” or “present” – it is difficult to distinguish “diminished”. Also, when the sounds are supposed to be abnormal they are decidedly so – there is just normal or abnormal – nothing in between.

**Pulses:** Patients have carotid and radial pulses that can be palpated by pressing normally. Some of the patients have brachial, femoral, and pedal pulses as well. If you cannot appreciate a pulse, ask one of the local personnel in the environment for their opinion and they will give you accurate feedback.

**Vital Signs:** All the vital signs that can be typically monitored on a patient in an operating room or critical care setting can be displayed for your patient. We avoid having you connect the monitors or make major adjustments assuming that you might be unfamiliar with the equipment. However, note that a pulse oximeter probe, ECG cable, and blood pressure cuff must be in place to produce signals from these monitors. An elaborate physiological model produces realistic vital signs that are responsive to the situation, treatments, and medications that you administer.

**IV access:** It is very unusual to find a patient at Harvard Hospital who does not have at least one working large-bore IV. A second IV can usually be started easily by attaching an administration set to a port permanently affixed to the patient’s arm, neck, or groin. You must run real fluid into a working IV to provide hydration for the patient. Blood products, colloid, or crystalloid solutions must be obtained from the supply carts, blood bank, or pharmacy as appropriate and administered to have the desired effect. You may not just announce something for it to happen!

Some patients at Harvard Hospital will have a radial arterial line for monitoring and sampling in place, even though they might not be expected to be candidates for invasive monitoring in your home institution.

When you take blood samples you must go through the motions of obtaining the appropriate syringe and drawing back on the lines. You will only get air, but that is ok. Label the syringe and hand it off to one of the local personnel and they will get it to the lab. The results will come back in a reasonable time.

**Exams:** Physical exam is limited. Asking a local person will elicit information about physical signs (ex. *the surgical junior was just in here and he found that the belly is tense with guarding...*). The patient will be room temperature to the touch, but a measurement with a thermometer (temperature probe) or an inquiry to a local person will yield appropriate information.

**Medications:** All medications at Harvard Hospital are prepared in appropriately sized syringes by the pharmacy. A white label with the generic name, strength, and quantity of the medication is affixed to the syringe. Medications are usually in carts and are organized alphabetically. You must give medications to the patient through a working IV for them to work. In addition, you must speak (out loud!) the name of the drug and the quantity you are administering to trigger its effect. A reasonable response time and pharmacological effect will be seen for every medication that you use. You may give meds by other routes (inhaled, ET tube, IM, oral) if clinically appropriate.

**Anesthetic cart:** If appropriate, an anesthetic supply cart will be provided. It is purposefully under stocked, but has everything you will need for the planned cases of the day. Medications are provided on a rack on the top in syringes in alphabetical order. Three pre-made drips are hanging on the back of the cart. Resuscitation meds are not found on the anesthetic cart, but are available on the "crash cart".

**Anesthetic agents:** Although there will be no liquid in the vaporizer and the agent monitor will not register any end-expired values, the anesthetic vapor agents will work physiologically. The uptake and distribution kinetics of vapor agents will be intact.

**Resuscitation:** There is a crash cart in every location at Harvard Hospital. If you need to synchronously or asynchronously cardiovert pads are not available and you will have to use paddles. Gel must be applied to the paddles, the defibrillator charged to the appropriate energy setting, the paddles placed on the chest, and the unit fired. The defibrillator will sound like it charges and fires, though some of the units here do not actually deliver energy. When you shock, the patient will not move because there is no skeletal musculature. The "quick-look" feature of the defibrillator that usually puts the ECG on its screen may not work here. You need to always look at the physiologic monitor instead of the defibrillator screen to interpret the rhythm.

The crash cart contains all of the resuscitation medications in labeled syringes in alphabetical order. 1mg syringes of epinephrine are provided in a separate bin. An intubation kit containing a tracheal tube, laryngoscope, and medications is usually kept on the top of the cart.

**Ancillary equipment:** Harvard Hospital is fully equipped. You may request fluid warmers, infusion pumps, MH carts, cell savers, bypass, radiology studies (X-ray, CT, MRI, etc.), 12-lead ECG, and other studies or devices if appropriate.

**Medical records:** All patients have medical records appropriate for their situation. The medical records at Harvard Hospital are all computerized and can be accessed in each patient location. You will find it easy to navigate the system with a mouse. Click on a tab (e.g. *Radiology, progress, laboratory*) and the first page of that section of the notebook will appear. Click *next* to page through that section of the chart. There are no "notebook" style charts here. The only exceptions to the computerized records are contemporaneous recordings such as anesthesia records, your notes, and results from labs that you take during your care of the patient.

**Stress:** All participants in simulation courses feel some degree of stress from the experience. The combination of responding to medical crises, practicing in an unfamiliar

setting, the uncertainty of the simulation itself, and watching oneself on videotape among colleagues will produce some anxiety for most people. A modicum of this response occurs regardless of one's experience, specialty, or background. Generally this degree of stress is harmless and probably contributes to increased learning in most people. In rare instances a participant is truly upset by the experience, their performance, or how others treated them. If you feel that you are upset by the experience and your reaction persists you are welcome to contact one of our faculty who specializes in work related stress. Dr. [name of psychiatrist], [phone number] or [email address], is available for consultation and would be happy to discuss your concerns.