

USE OF A HUMAN PATIENT SIMULATION CENTER TO DESIGN AND TEST AN ELECTRONIC ANESTHESIA RECORD BEFORE IMPLEMENTATION

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Human Patient Simulation Labs are designed to train clinicians by using simulated clinical scenarios and to improve psychomotor skills. We describe a novel use of the patient simulation laboratory to design, validate data and test downtime situations of a new electronic anesthesia record system that the Department of Anesthesia was implementing.

The University of Iowa Hospitals recently adopted EPIC electronic anesthesia records after a long preparation. During this time, we used our patient simulation lab for the purpose of designing and testing this interface. We have a fully equipped, state of the art, patient simulation lab that is configured primarily as an operating room. with an anesthesia machine- GE ADU and a Datex-Ohmeda S/5 monitor attached. The Department of Anesthesia Simulation Center is comprised of approximately 400 square feet of simulation space. One arm is focused on psychomotor skills; the second arm of the curriculum is focused on clinical knowledge and the third arm of the curriculum is focused on team training and human factors.

The primary adult mannequin in the Center is a METI Human Patient Simulator (HPS). The HPS is capable of a modeling a wide range of physiologic responses to the administration of drugs and other stimuli. Additionally, the facility has one infant mannequin, a METI Emergency Care Simulator (ECS) and a Laerdal Advanced Life Support (ALS) trainer. The METI HPS has the capability to model and display uptake and distribution of volatile anesthetic agents. The Andros module that creates and updates those models was only briefly used during development of the Anesthesia Record. Instead, fresh gas flows, along with the dial setting on an empty vaporizer, was recorded and ported over to EPIC. All physiological data were simulated including advanced cardiac monitoring like PAP, CO, etc. The only data that would not come out of the mannequin were Entropy and NMT.

To do the design and testing, Capsule Neuronâ was set up in the Simlab, which sends the data from the ADU/S5 to Capsule Server and then to EPIC over the Ethernet. A test system, EPIC POC (Proof of Concept), was used for the purpose of validation and testing. All the data that came out of the S5 and the ADU were viewed from the doc flow sheets of EPIC as well as the anesthesia record.

In coordination with the Clinical Application wing and the Server team of the Hospital Information Systems Department and EPIC developers, we were able to use the Simlab for the following purposes.

A. Data validation

1. See whether all physiological data was getting populated
2. Validate the values of those data getting displayed
3. Validate the appropriate units of those data

B. Layout and Design

C. Testing of the System

1. Testing all down time situations by breaking the connections at the different points of the network.
2. Autovalidation of data and cached data after downtime situations.
3. Testing various generations of Datex-Ohmeda S5 monitors with different software versions and interface levels.

D. Training

1. Training our clinical superusers
2. Additional training for clinical providers after the initial class room training

Future plans for the patient simulation center includes using it as a site future testing and development and training of new members of the department. Additionally we are planning to develop the HPS Lab as a site, which other institutions, planning to implement similar anesthesia records, can also utilize to get their "superuser" staff trained and experienced with the system.