Problem Addressed:
The goal of this project was to create a modular chest wall with a fluid filled pericardium that could function as a standalone pericardiocentesis task trainer or be integrated with current training equipment. The model must be of a size commiserate with a 24-25-week premature infant. The model needed to provide realistic tactile and clinical experiences for the learners and reproduce the procedural steps necessary for a successful pericardiocentesis. It was imperative that the model be ultrasound compatible as well for realism and addition depth of training. A rib model was created as a 3D solid model using Creo Parametric software. The rib dimensions were based on literature estimation and scaled CT data from term infants in our NICU. The material selected was resin similar to ABS plastic. The model is scaled to represent a 24-25 week infant. Once the chest wall was generated, the heart structure and pericardium needed to be designed. While many options exist, this model uses a rubber ball and a balloon purchased at a party supply store. The rubber ball is inserted into the balloon, which is then filled with water to simulate a fluid filled pericardium. The water can be dyed red or white to mimic either serosanguinous fluid or lipid depending on the needs of the scenario. The entire chest wall and balloon are embedded in either a gelatin mixture or ecoflex product with cellulose powder. This serves as a suspension media and conveys ultrasound compatibility properties. The final step involves creation of a skin layer to cover the chest wall. The skin layer improves tactile sensation and realism. It consists of Dragon Skin FX Pro with a slacker additive. The end-product is a highly functional and realistic. It also serves as a low-cost option for teaching pericardiocentesis. ABS filament costs between 25-40$ per spool, depending on needs and quality. The balloons, rubber ball and gelatin cost 6-8$ combined. 3D printers come in a variety of costs, however many sim centers and hospitals have access to 3D
printers without having to buy one. Many quality 3D printers can be purchased for much less than the cost of an adult ultrasound compatible pericardiocentesis trainer. The model is also reusable, nearly 5-8 attempts can be used with the gelatin-based model before the balloon needs to be refilled and tracks begin to appear in the media. Once the chest wall is 3D printed, the gelatin or ecoflex can be removed and the model can be set again for multiple uses in the future.

**Primary Function:**
To teach the pericardiocentesis to neonatologists, residents, nurse practitioners, fellows and all who care for neonate at risk of tamponade.
Presentation Title: Spike-able, Water Tight IV Bag Caps

Presenters:
Sarah Rucker, Zamierowski Institute for Experiential Learning (ZIEL)

Entry Type: New Innovation (device, process, or technology that has not previously existed)

Software/Hardware: Hardware (includes but is not limited to: devices, gadgets, simulation equipment, AV equipment, apparatus, gear, kits, wearables and moulage)

SimVentor Category: Simulation Center Operations

Problem Addressed:
Going through a new bag of simulated IV fluids for each case of a sim is not cost-effective. After using a parafilm barrier that allowed for a realistic spike, but was not always water tight or easy to secure, we needed something more durable, easier to put on, and would hold a water-tight seal for long periods of time.
Our Teflon caps allow us to refill and quickly cap IV bags for immediate learner use, allow the bags to be hung without fear of leakage, and provide a realistic spike for learners. One 12-foot length of 6mm suction tubing makes roughly 576 caps that fit most IV bags.

Primary Function:
The water-tight Teflon IV Caps enable sim centers to continuously reuse IV bags of all volumes, while providing a realistic spike for learners.
Date: 8/11/2020  
Start Time: 2:00 PM  
End Time: 3:30 PM  

Presentation ID: 56781  

Presentation Title: Abscess Task Trainer  

Presenters:  
Savanna Mahn, University of Florida  
Ceri Borde, University of Florida  
Chris Egan, University of Florida  

Entry Type: Modification (evolution or change to previously existing device, process, or technology)  

Software/Hardware: Hardware (includes but is not limited to: devices, gadgets, simulation equipment, AV equipment, apparatus, gear, kits, wearables and moulage)  

SimVentor Category: Moulage, theatrical props and tools for enhanced realism  

Problem Addressed:  
Describe how to create an abscess trainer  
Discuss how cost effective it is to make trainers rather than purchase them  
Discuss courses that may utilize abscess trainers  

Primary Function:  
Describe how to create an abscess trainer for the practice of drainage, debridement, and wound packing. Trainers are cost effective, quick to make, and reusable.
Date: 8/11/2020  
Start Time: 2:00 PM  
End Time: 3:30 PM  

Presentation ID: 56783  

Presentation Title: Simulated Surgical Blood Pouch  

Presenters:  
Savanna Mahn, University of Florida  
Ceri Borde, University of Florida  
Chris Egan, University of Florida  

Entry Type: New Innovation (device, process, or technology that has not previously existed)  

Software/Hardware: Hardware (includes but is not limited to: devices, gadgets, simulation equipment, AV equipment, apparatus, gear, kits, wearables and moulage)  

SimVentor Category: Moulage, theatrical props and tools for enhanced realism  

Problem Addressed:  
Learn how to create a simulated surgical blood pouch to increase realism in surgical simulations.  

Primary Function:  
Describe how to make a Simulated Surgical Blood Pouch  
Discuss material used  
Describe courses and simulations that would benefit from a Simulated Surgical Blood Pouch
Date: 8/11/2020  
Start Time: 2:00 PM  
End Time: 3:30 PM  

Presentation ID: 56827  

Presentation Title: Low Cost Simulation Solutions  

Presenters:  
Dylan Cooper, MD, Indiana University School of Medicine  
Dane Rogers, Indiana University Health  
Matthew Needler, IU Health  
Ryan Stambro, The Simulation Center at Fairbanks Hall  

Entry Type: New Innovation (device, process, or technology that has not previously existed)  

Software/Hardware: Hardware (includes but is not limited to: devices, gadgets, simulation equipment, AV equipment, apparatus, gear, kits, wearables and moulage)  

SimVentor Category: Moulage, theatrical props and tools for enhanced realism  

Problem Addressed:  
Patient safety relies on effective training of healthcare providers in multiple procedures to include intravenous pumps, suturing and cutting skills, and rare procedures, such as cricothyroidotomy. While commercially available solutions exist for these procedures, they are often cost prohibitive. Utilizing the proposed solutions allows organizations to train providers across broad sets of objectives, while being cost effective. The IV cheater solution allows organizations to maintain high fidelity training without distraction or disruption to supply. Simulated skins offer a cost-effective, simple, and reproducible option for multiple procedures involving cutting or repairing skin. Finally, the commercially available cricothyroidotomy trainers are expensive and often one-time use, while this low cost solution is easily reproducible at minimal costs and can be used repetitively.  

Primary Function:  
The IV pump cheater allows learners to program IV pumps in the absence of running fluids. Simulated skin facilitates realistic skill training at a minimal cost. The 3D printed cricothyroidotomy trainer simulates a rare and dangerous procedure.
**Presentation ID:** 55306

**Presentation Title:** Bleed at the Click of a Button

**Presenters:**
Josh Brooks, OhioHealth
Thomas Gutman, Ohio Health

**Entry Type:** New Innovation (device, process, or technology that has not previously existed)

**Software/Hardware:** Hardware (includes but is not limited to: devices, gadgets, simulation equipment, AV equipment, apparatus, gear, kits, wearables and moulage)

**SimVentor Category:** Moulage, theatrical props and tools for enhanced realism

**Problem Addressed:**
This addressed our need for bleeding internal organs. We were able to create a hepatic adenoma an a liver we made from silicone foam. The device can also be used to add a bleeding function to low fidelity mannequins.

**Primary Function:**
To create internal bleeding on a mannequin.
**Date:** 8/13/2020  
**Start Time:** 2:00 PM  
**End Time:** 3:30 PM  

**Presentation ID:** 56775  

**Presentation Title:** “Oh Baby”: Design of a Low-Cost Fetus with Umbilical Cord and Placenta Assembly for Use in Multiple Rounds of Procedural Peri-Mortem Cesarean Section  

**Presenters:**  
Kathleen McCarthy, RN,AD, BSN, MAED/AEDL, CCRN-K, CHSE, Mercy Health St. Vincent Medical Center  

**Entry Type:** New Innovation (device, process, or technology that has not previously existed)  

**Software/Hardware:** Hardware (includes but is not limited to: devices, gadgets, simulation equipment, AV equipment, apparatus, gear, kits, wearables and moulage)  

**SimVentr Category:** Simulation Platforms and Devices  

**Problem Addressed:**  
The 80-hour work week and scheduled group didactic time with a large group of residents has made this creation necessary. Back to back sessions necessitates short turn-over or reset of the simulation scene. This affords the change out of abdominal covers and uterus assembly to start the next group. This design provides an easy way to create uterus with a fetus, umbilical cord, and placenta for procedural practices without damaging expensive simulators, fetuses or costly consumables. Creation and assembly can be done in advance saving time and at a low-cost solution. Many simulation centers have limited resources such as obstetric simulators with multiple fetuses, concerns over repair costs due to damage during simulation which requires use of a scalpel and cost of consumables.  

**Primary Function:**  
Creates the fetus model at low cost, adding to the realism of the perimortem crisis. The ability to make 6 or more of these models in advance creates the rapid turnover to repeat additional groups within a specified time period.
Date: 8/13/2020
Start Time: 2:00 PM
End Time: 3:30 PM

Presentation ID: 56826
Presentation Title: Recycle CPR Task Trainers into TracheOstomy Mannequins

Presenters:
Nikki Blodgett, Purdue University Northwest
Shannon McCarter, MSN, RN, Purdue Northwest
Debra Alexander, MSN, RNC-OB, Purdue University Northwest

Entry Type: Modification (evolution or change to previously existing device, process, or technology)

Software/Hardware: Hardware (includes but is not limited to: devices, gadgets, simulation equipment, AV equipment, apparatus, gear, kits, wearables and moulage)

SimVentor Category: Simulation Platforms and Devices

Problem Addressed:
This invention, which we have come to call CPR-TOM (TracheOstomy Mannequin), addresses the issue of performing tracheostomy care without needing high cost task trainers. There are other solutions that attempt to address this issue. The comparable solutions to our approach, is take a foam head and placing a tracheostomy in its neck. These foam heads have inherent problems, An example of the foam head that is typically used it pictured to the right. As I said before this solution has issues. The issues with the foam head solution is that it 1) does not lay flat and would have the head in an unrealistic position during tracheostomy care, 2) the foam is not durable and could easily be broken, 3) is a challenge to store because they need to sit upright and are bulky, and 4) would be difficult to clean because it is made of foam.
The CPR-TOM invention corrects these issues and more. CPR-TOM can be cleaned frequently and will not be damaged by the cleansers, light weight and portable, stores flat, is cost efficient because it involves repurposing and reusing existing supplies, allows you to visibly see what happens when a patient is suctioned, made of extremely durable plastic that was designed to withstand the pressure of CPR, lays flat or can sit up to allow for complete tracheostomy care to be preformed, and suction orally and through the tracheostomy.

Primary Function:
The primary function of CPR-TOM is for psychomotor skills practice. The students to practice tracheostomy care to be performed and repeated until competency is established.
Date: 8/13/2020  
Start Time: 2:00 PM  
End Time: 3:30 PM  

Presentation ID: 56839  

Presentation Title: IM a Flush Pad: A Cost-Effective Solution To Injection And Intravenous Practice  

Presenters:  
Nikki Blodgett, Purdue University Northwest  
Debra Alexander, MSN, RNC-OB, Purdue University Northwest  
Shannon McCarter, MSN, RN, Purdue Northwest  

Entry Type: New Innovation (device, process, or technology that has not previously existed)  

Software/Hardware: Hardware (includes but is not limited to: devices, gadgets, simulation equipment, AV equipment, apparatus, gear, kits, wearables and moulage)  

SimVmentor Category: Simulation Platforms and Devices  

Problem Addressed:  
This invention allows students to practice their psychomotor skills IV or SUBQ/IM to gain competence in medication administration. It also allows for the skill to be performed in a safe environment and without the risk of injuring a patient. There are other solutions that attempt to address this issue. The existing solutions, that are comparable to this invention, are a gel-like injection pad and a task trainer arm. These solutions are not without issues. The issues with both the injection pad and task trainer IV arm solutions are: 1) costly, 2) have a short lifespan, 3) increased risk of accidental needle sticks because of the depth of the pad, 4) difficult to store and frequently leak, 5) singular in their purpose (only for SUBQ/IM injections or only for IV), 6) the task trainer arm requires internal flushing often with bleach, and 7) the task trainer arm is bulky and heavy.  
Our new invention overcomes these challenges: 1) it is a combination for IV, SUBQ/IM injections, 2) stores flat and can be stacked for even more convenient storing, 3) lightweight and portable, 4) cost-efficient in comparison to the alternative, 5) prevents accidental needle sticks because of the plastic container and depth of pad, and 6) it cleans up quickly by air drying after being used.  

Primary Function:  
The primary function of the IM a Flush pad is to allow students to develop and practice their psychomotor skill of administering medications. This includes flushing IVs and SUBQ/IM injections in a realistic manner.
Date: 8/13/2020  
Start Time: 2:00 PM  
End Time: 3:30 PM  

Presentation ID: 56706  

Presentation Title: Knee Effusion  

Presenters:  
Jamie Hamilton, ND STAR  
Tim Shea, CHSOS, University of North Dakota School of Medicine & Health Sciences  

Entry Type: New Innovation (device, process, or technology that has not previously existed)  

Software/Hardware: Hardware (includes but is not limited to: devices, gadgets, simulation equipment, AV equipment, apparatus, gear, kits, wearables and moulage)  

SimVentor Category: Moulage, theatrical props and tools for enhanced realism  

Problem Addressed:  
This contraption addresses the issue of knee effusion findings. A search for “manikin knee effusion” returns an arthrocentesis knee [task] trainer from SynDaver (for $1,498) and a search for “simman 3g knee effusion” returns a knee aspiration and injection trainer from Lapidot Medical. There does not appear to be an easy to find task trainer or manikin accessory to teach knee effusion symptoms.  

Primary Function:  
Emulate the findings consistent with a knee effusion.