Needs Assessment
HSSOBP: Simulation Design Criterion 6
Reference: Simulation Development - Needs Assessment Tool - please refer to this source for more details
Collaboration
Underlying Cause of Concern (e.g. root cause analysis, failure modes and effect analysis, high risk-low incident):
Summary of request/learning need (new policy, initiative, process):
Overarching Goals/Objectives:
Organizational Initiatives:
Evaluation of Knowledge, Skills, Attitudes (KSA) and/or Behaviors of Individuals
Knowledge gap:
Skills:
Attitudes/Behaviors:
Outcome Data
Healthcare data (i.e., Quality): What outcomes are you seeking?
Main point of contact:
List of team members to interview:
Planning
Process
Policies
Procedures
Environment/physical space
Personnel involved in process/workflow
Equipment required
Technology required (i.e., EMR applications)
Supplies required
Medication required
Staffing levels/skill mix
Shift patterns
Teamwork
Latent Risk Threats:
Standards of Care
Best Practice Guidelines:

Regulations:
Latent Risk Threats:
Overall Recommendations
Latent Risk Threats/Gaps:
Inadequate training
Poor communication
Next Steps
Develop a simulation for UIHC sonography students to improve competency for scanning HOCM before entering the working field.

Reference: Anderson, K., Gilbert. M., Wallin, K., Anderson, H., Brown, L. & Kroschel, T. G. (2018). Identify risk: Improve systems through simulation program development. International Meeting for Simulation in Healthcare, January 13-17, Los Angeles, CA

Findings
High risk - low incident
Process
Train undergraduate echocardiography students how to be proficient in assessing hypertrophic obstructive cardiomyopathy (HOCM).
1.) Patient safety. 2.) Ultrasound program accreditation. 3.) Student satisfaction.
Students are taught about HOCM in the classroom but rarely, if ever, scan HOCM patients before they graduate. This makes it increasingly difficult to prepare them for their career.
The ability to be proficient in scanning a normal echocardiogram without pathology.
The culture is receptive to the need because it is a skill needed to be proficient when students become clinicians.
Quality assurance. Increased patient care. Increased team member confidence.
Zach Larson
Kristy Crow
Current State of Asessment of HOCM in Heart and Vascular Center at UIHC
Written process of what images to obtain when scanning a patient with HOCM.
Written policy for the subject. Copies available. Policy is currently being followed by UIHC Staff.
Staff trains with senior sonographer until they are able to prove competency.
Echocardiography exam room.
Senior sonographers are responsible for scanning HOCM patients. If a patient's interventricular septum diameter measures greater than 1.5 cm, the sonographer initiates HOCM protocol and assesses the heart for outflow obstruction with spectral pulsed wave Doppler, spectral continuous wave Doppler, and Valsalva attempts performed by the patient.
Echocardiography ultrasound machine (Philips Epic)
Epic EMR will provide data regarding a patient's previous echo to compare HOCM severity.
Supplies needed may include EKG electrodes and ultrasound gel. Supplies are located in the exam room and staff knows how to access these supplies.
N/A
Staff required to perform exam is specialized to the echocardiographers.
Minimum of 5 sonographers are in the department on a given day shift.
Sonographers perform the exam individually.
Inadequate training.
Quality assurance performed by echocardiography department manager.

American Society Echocardiography help set standards for assessment of HOCM.
Poor communication.
Potential Solutions
Implement simulation training with high fidelity mannequins
Implement pre-brief and debrief assessments
Responsibilities
Obtain high fidelity mannequin to initiate training simulation of HOCM.

Learner Analysis

HSSOBP: Simulation Design

Provide a general description of the learners

1. Learner Demographics:
Age range
Cultural background
Primary language
2. Educational Background:
Education level
Academic program year
Traditional or non-traditional learners
3. Prior Knowledge and Experience:
Previous clinical experience
Relevant coursework
Skills and competencies
4. Learning Preferences:
Preferred learning styles (visual, auditory, kinesthetic)
Motivation for participating in the simulation
Specific interests related to the simulation topic
5. Access to Technology:
Availability of necessary technology for pre-work
Familiarity with simulation tools and platforms
Accessibility for individuals with disabilities

Reference: Microsoft CoPilot response to prompt "list items for a general analysis of learners for clinical simulation," (4/11/2025)

18-25 year old
Predominantly female
English

College Undergraduate
Senior
Traditional

Started clinical rotations beginning spring of junior year
Cardiac I, Cardiac II, & Advanced Cardiac
Complete Echocardiogram Competency, HOCM Competency

Visual

To further scanning abilities and knowledge for a pathology not commonly seen or evaluated by students.

Cardiac Pathology, specifically cardiomyopathies

Ultrasound equipment available in Holland Classroom.
Familiarity with echocardiography ultrasound machine.
Universal Design. Ability-Based Design.

Learning Objectives

HSSOBP: Outcomes and Objectives

UNMC Office of Faculty Development - Learning Strategies

Write 3-5 learning objectives in the SMART format for the simulation

By the end of this training simulation, the student will be able to:

1.) Demonstrate how to acquire correct, on-axis echocardiographic views of the heart through the parasternal long-axis, parasternal short-axis, apical 5 chamber, and apical 3 chamber that best demonstrate hypertrophic obstructive cardiomyopathy pathology.

2.) Operate sonography instruments such as pulsed-wave and continuous wave Doppler to assess the peak velocity and peak gradient of blood flow through the left ventricular outflow tract (LVOT) while adhering to sonography principles by keeping the Doppler angle ≤ 20° parallel to blood flow.

3.) Interpret LVOT peak velocities and peak gradients to categorize the severity of obstruction including: mild (peak gradient <30 mmHg), moderate (peak gradient 30-50 mmHg), and severe (peak gradient >50 mmHg).

4.) Apply maneuvers to provoke obstruction such as Valsalva, squat-to-stand, and goal-directed Valsalva with use of manometer.

Learner Preparation

HSSOBP Prebriefing: Preparation and Briefing

"Based on needs assessment and purpose of the experience, preparation materials are developed to assure that learners are prepared for the experience and can meet the scenario objectives."

Learner Preparation Summary

Effective learner preparation is essential for maximizing engagement, psychological safety, and learning outcomes in clinical simulation. When designing and assigning prep work, consider the following key elements:

1. Learning Objectives Alignment

- Ensure all preparatory materials directly support the simulation's learning objectives.
- Clearly communicate what learners are expected to know or do before the session.

2. Content and Format

- Include relevant clinical guidelines, protocols, or readings.
- Provide multimedia resources (videos, case studies, checklists) to accommodate different learning styles.
- Keep materials concise and focused to avoid cognitive overload.

4. Skill and Knowledge Readiness

- Assign prerequisite clinical skills or knowledge reviews (e.g., medication administration, communication frameworks like SBAR).
- Consider using quizzes or reflection prompts to assess readiness.

5. Logistics and Access

- Provide clear instructions on how and when to access prep materials.
- Ensure learners have adequate time to complete assignments before the simulation.

6. Inclusivity and Accessibility

- Use inclusive language and accessible formats.
- Be mindful of learners' diverse backgrounds and experience levels.

Reference: Microsoft CoPilot response to prompt "write a summary of elements to consider when designing clinical simulation learner preparation materials," (5/28/2025)

Describe Learner Preparation Materials (include links and descriptions)

Preparation material will meet and support the learning objectives from previous tab.

Students will be given a handout from the American Society of Echocardiography (ASE) explaining the roles of Echocardiography in HOCM. https://www.asecho.org/wp-content/uploads/2025/05/ASE_HCM_Poster_FINAL.pdf
Students will also be given a link to watch a case study of an echocardiogram being performed on a HOCM patient. https://www.youtube.com/watch?v=kgslPFvcKMY

Students will be given a pretest over the Content and Format provided to them.
Students will have to pass a lab competency test of required pictures and measurements that are additional for HOCM patients.

Material will be accessible on ICON (UIowa Canvas) at the start of the semester. Students will be encouraged to review the material at the beginning of the semester and two weeks before the simulation.

Material offered in varied and flexibilty formats such as physical handouts and videos (YouTube)

Prebrief Plan

Healthcare Simulation Standards of Best Practice
Prebriefing: Preparation and Briefing

Assignment: Create a PowerPoint with these items.

Welcome and introduction
Objectives and goals
Learner assessment
Scenario overview
Orientation to the environment
Time allotment and logistics
Safety and confidentiality
Fiction agreement
Expectations and ground rules
Role assignment and clarification
Communication protocols
Debriefing information
Questions and clarifications

HSSOBP: Professional Integrity:

Create and maintain a safe learning environment

Practice inclusion by respecting equity, diversity, and inclusi

Require confidentiality of the performances and scenario cc

Welcome participants and introduce the facilitators. Provide a brief overview of the session's purpose and importance.
State the learning objectives and goals for the simulation.
Inform the learners how they will be evaluated (formative, summative, high stakes)
Provide a detailed overview of the simulation scenario, including context, patient information, and key events.
Familiarize participants with the simulation environment, including the layout, equipment, and any relevant protocols.
Explain the time frame for the simulation and any logistical details, such as breaks and transitions between activities.
Emphasize the importance of safety and confidentiality. Discuss any safety protocols and the need to maintain confidentiality regarding patient information and participant performance.
Treat the simulation as a realistic patient care experience.
Set clear expectations and ground rules for behavior during the simulation. This includes respecting others, staying engaged, and adhering to the simulation protocols.
Clearly assign roles to each participant and provide detailed descriptions of their responsibilities. This helps avoid confusion during the simulation.
Discuss communication strategies and protocols to be used during the simulation. Effective communication is crucial for teamwork and patient safety.
Outline the debriefing process that will follow the simulation. Explain the purpose of debriefing and what participants can expect.
Provide an opportunity for participants to ask questions and seek clarifications. Ensure everyone feels comfortable and prepared to begin the simulation.

Prebrief PowerPoint

Debrief Plan

HSSOBP: The Debriefing Process

Some of the most commonly used debriefing models:

DASH

DASH - Center for Medical Simulation

Debriefing With Good Judgment

Teaching, coaching, or debriefing with Good Judgment: a roadmap for implementing "With Good Judgment" across the SimZones, Fey et al. (2022)

Gather-Analyze-Summarize

Gather - Analyze - Summarize: The simple GAS method for healthcare simulation debriefing (w/ Quick Template), Kim Bailey, Healthy Simulation (2019)

PEARLS

Debrief2Learn - PEARLS Healthcare Debriefing Tool

Plus-Delta

Embracing informed learner self-assessment during debriefing: the art of plus-delta, Cheng et al. (2021)

Describe the Debriefing Model and Provide Rationale for that Choice

The debriefing model used will be the Promoting Excellence and Reflective Learning in Simulation (PEARLS) Healthcare Debriefing Tool. PEARLS was developed for education and healthcare. Students that receive PEARLS training typically have increased learning outcomes (Høegh-Larsen et al., 2023). PEARLS is a blended debriefing approach that includes feedback, debriefing and guided reflection (Høegh-Larsen et al., 2023). The rationale for choosing PEARLS in an echocardiography simulation is getting the opportunity to use this blended approach to analyze technical skills while getting the student's self-reflection of their performance. Another strength of the PEARLS practice is the instructor summary or guided reflection at the end to help correct any areas that are a need for improvement on the skill moving forward.

References

Anne Mette Høegh-Larsen, Monika Ravik, Inger Åse Reierson, Sissel Iren Eikeland Husebø, Marianne Thorsen Gonzalez,PEARLS Debriefing Compared to Standard Debriefing Effects on Nursing Students' Professional Competence and Clinical Judgment: A Quasi-Experimental Study,
Clinical Simulation in Nursing,Volume 74,2023,Pages 38-48,ISSN 1876-1399,https://doi.org/10.1016/j.ecns.2022.09.003.(https://www.sciencedirect.com/science/article/pii/S1876139922000767)

Simulation Fidelity

HSSOBP: Simulation Design Criterion 6

Physical fidelity (describe how the simulation equipment and environment will replicate real-life physical characteristics, such as realistic manikins and functional medical equipment):

Conceptual fidelity (describe how the scenarios will be accurate and relevant to real-life situations):

Psychological fidelity (describe how you will address psychological and emotional aspects, including how learners may perceive and react to the scenario):

Environmental fidelity (describe how the simulation will replicate the actual clinical environment where such a scenario would take place, such as a hospital room, operating room, or outdoors, with appropriate sounds, lighting and equipment):

Describe each of the fidelity characteristics:

High fidelity mannequins will be used to simulate varying degrees of HOCM severity (mild, moderate and severe). This type of physical fidelity demonstrates to students how hemodynamics differ in patients with this pathology.
In real-life situations, students must have their patients Valsalva to help determine the severity of the obstruction. This scenario will help students identify those situations more clearly and better their ability to perform procedures.
Induce cognitive load components such as realistic distractions (patient talking) or unexpected complications (patient passing out from performing Valsalva)

Simulation will be held in one of the echocardiogram rooms in the Heart and Vascular Center at UIHC to help replicate the clinical environment as much as possible.

Scenario

HSSOBP: Simulation Design

Scenario Introduction example: You are working in the obstetrics unit of a hospital. Sarah Johnson, a 28-year-old pregnant woman at 34 weeks gestation, has been admitted to the unit with complaints of severe headache, visual disturbances, and swelling in her hands and feet. She has a history of hypertension during her previous pregnancy. Chief complaint: “I’ve had a terrible headache for the past few hours, and my vision is blurry. My hands and feet are also very swollen.” Then provide as many details as you want about the patient's history and current status.

Patient's Name:
Age:
Gender:
Occupation:
Marital status:
Presenting situation (main symptoms, duration of symptoms, severity and impact on daily life):
Opening statement:
History of present illness (onset and progression of symptoms, associated symptoms, aggravating or relieving factors, previous treatments and outcomes):
Past medical history (chronic illnesses, previous surgeries or hospitalizations):
Allergies:
Medications:
Family history:

Social history (lifestyle factors such as smoking, alcohol use, drug use; diet and exercise habits, living situation and support system)

Laboratory and diagnostic test results (include reference ranges):
Psychosocial factors (mental health status, stressors and coping mechanisms, cultural and spiritual beliefs):
Patient's goals and preferences (treatment preferences, goals for health, advance directives or living wills):

Complete each item that is applicable to the scenario:

You are working in the outpatient area of the Heart and Vascular Center. The next patient is a 48-year-old male who has a medical history of HOCM diagnosed a few years prior, intermittent exertional dyspnea and presyncope, and hypertension. Patient medications include 50 mg of Metoprolol daily.

Currently, the patient is being brought in for an outpatient transthoracic echocardiogram (TTE) for symptoms of worsening exertional dyspnea over the past two weeks and new exertional lightheadedness. The TTE is for assessing LVOT gradients and determining if the patient is a candidate for Camzyos treatment for his HOCM.

John Schultz
48
Male
Construction
Married

Worsening exertional dyspnea

Intermittent exertional dyspnea and presyncope.

HOCM
None
50 mg Metoprolol
HTN. Father died of sudden cardiac death.

Tries to stay active but is increasingly difficult with worsening dyspnea

Increased BNP (150 pg/ml) (<100 pg/ml) and Troponin (0.20 ng/mL) (<0.04ng/ml)

Seeking relief for shortness of breath. Would like to be considered candidate for Camzyos treatment given prior history of HOCM.

Physical Exam

General appearance:
Level of consciousness - alert, drowsy, unresponsive
Signs of distress - pain, respiratory distress
Nutritional status - well-nourished, cachectic
Hygiene and grooming
Vital signs:
Blood pressure
Heart rate
Respiratory rate
Temperature
Oxygen saturation
Skin:
Color
Lesions or rashes
Turgor and hydration status
Scars or wounds
Head and Neck:
Head: shape, size, symmetry
Eyes: pupil size and reaction, conjunctiva, sclera
Ears
Nose
Throat
Neck
Cardiovascular system
Heart sounds (S1, S2, murmurs, rubs, gallops)
Peripheral pulses (radial, femoral, dorsalis pedis)
Capillary refill time
Jugular venous pressure
Respiratory system
Breath sounds (clear, wheezes, crackles, rhonchi)
Chest expansion and symmetry
Percussion notes (resonant, dull, hyperresonant)
Use of accessory muscles
Gastrointestinal system
Abdominal inspection (distension, scars, masses)
Bowel sounds
Palpation
Percussion
Rectal exam (if indicated)
Genitourinary system
External genitalia (lesions, discharge)
Pelvic exam (for females, if indicated) - results?
Prostate exam (for males, if indicated) - results?
Urinary bladder palpation

Musculoskeletal system
Joint inspection
Range of motion
Muscle strength and tone
Spine alignment and curvature
Neurological system
Mental status (orientation, memory, cognition)
Cranial nerves examination
Motor function
Sensory function
Reflexes
Lymphatic system
Lymph node palpation
Location of enlarged nodes
Endocrine system
Thyroid gland
Signs of hormonal imbalance
Obstetrics
Signs of pregnancy (gravid abdomen)
Abdominal exam - size and shape of the abdomen, striae, scars, fundal height, fetal position and movements, auscultation, fetal lie, presentation and position
Fetal assessment - fetal heart rate monitoring, ultrasound
Gynecology
Breast exam - symmetry, skin changes, nipple discharge
Breast exam - lumps, masses, tenderness
Abdominal exam for scars, distension, palpation for tenderness or masses
External genitalia - inspection for lesions, discharge, swelling
Speculum exam - visualization of the cervix, vaginal walls
Bimanual exam - assessment of the uterus, adnexa and cervix
Pap smear and HPV testing
Additional tests: Colposcopy for abnormal Pap smear results, endometrial biopsy for abnormal uterine bleeding, transvaginal ultrasound for pelvic pain, abnormal bleeding, or masses

Reference: Text generated by Microsoft CoPilot in response to a prompt to list possible physical exam components for a simulation (2024).

Provide the details for each item that is applicable to the simulation:

Alert
Dyspnea

150/90
85 bpm

99%

Harsh, systolic ejection murmur

Scenario Algorithm

State Name	Heart rate	Blood pressure	ECG rhythm
1. Baseline	85 bpm	150/90	NSR
2. Next state (Mild HOCM Simulation)	95 bpm	165/92	NSR
3. Next state (Moderate HOCM Simulation)	101 bpm	175/95	Tacycardia
4. Next state (Severe HOCM Simulation)	110 bpm	190/100	Tacycardia
5. Next state			
Conclusion			

Which parameters should be displayed on the waveform monitor?	**In each cell, type Y or N**
Arterial BP	No
BP	Yes
CVP	No
Secondary EKG	No
SpO2	No
CO2	No
PAP	No
Primary ECG	Yes
AGT	No
CO2	No
O2	Yes
Tblood	No
Tperi	No
awRR	No
N2P	No
Pulse	Yes
Train of four	No

Temperature	Respiratory rate	SpO2	Breath sounds	Bowel sounds	Skin	LOC	Pain
		99%					
		95%					
		92%					
		89%					

Additional hemodynamics	**Labs**	**Patient's responses and actions**	**Learning outcomes or actions desired (what should happen to move to the next state)**	**Transitions (method to go from one state to another, this could be duration, e.g. move to next state after 2 minutes has passed or wait for learner action)**
Aortic valve (AV) peak velocity 2.2 m/s due to obstruction			Learner identifies obstruction and states the patient must perform a Valsalva maneuver	
AV peak velocity 2.8 m/s			Learner identifies the severity of obstruction (Mild)	
AV peak velocity 3.4 m/s			Learner identifies the severity of obstruction (Moderate)	
AV peak velocity 4.2 m/s			Learner identifies the severity of obstruction (Severe)	

Equipment List

Manikins:	High fidelity echocardiography mannequin programmed with a variety of HOCM cases.
Task trainers:	
Virtual reality simulators:	
Medical instruments:	Mannequin. Mannequin software.
Diagnostic equipment:	Echocardiography ultrasound machine.
Emergency equipment:	
Patient monitoring systems	EKG. 02 Sensor.
Surgical instruments:	
Pharmaceutical supplies:	
Environmental setup (hospital bed, medical carts, personal protective equipment):	Ultrasound scanning table.
Audio-Visual equipment:	
IT and software:	
Miscellaneous (anatomical models, teaching aids, communication devices):	

Learner Assessment

HSSOBP: Evaluation of Learning and Performance

Instruments and Information

Creighton Competency Evaluation Instrument (C-CEI)

Training for using the C-CEI

Search for Objective Structured Assessment of Technical Skills (OSATs) or validated checklists

The level of assessment in clinical simulations is directly influenced by the stakes involved. Higher stakes simulations, such as those used for certification or licensure, require rigorous and comprehensive assessment to ensure competency and safety. Conversely, lower stakes simulations, often used for practice or formative feedback, may involve less intensive evaluation, focusing more on learning and improvement rather than formal validation.
Formative assessments should focus on ongoing feedback and learning adjustments. Examples include short quizzes, faculty feedback, checklists, standardized patient assessments, and debriefing discussions.

Summative assessments should focus on measuring a learner's competence and achievement at the end of a learning period. Examples include: OSCE, standardized checklists and rating scales, video review, standardized patient assessments, and debriefing.

Describe how the learners will be evaluated and provide links to external resources (e.g. learner assessment tool)

Global Rating Scale (GRS). Set items will be made for learners to be evaluated on, such as participation, communication, and technical skills. These items will be scored from 1 to 5 and will be designated with Likert-Style scoring (5-Outstanding, 4-Exceeds Expectations, 3-Meets Expectations 2-Needs Improvement, 1-Unnacceptable). There will be 10 items learners are evaulated on for a total score of 50 points for the simulation. Scores will determine students proficiency and track their improvement over time.

Simulation Evaluation

HSSOBP: Evaluation of Learning and Performance

Examples

Access the list on Healthy Simulation - Evaluating Healthcare Simulation

Modified Simulation Effectiveness Tool (SET-M) - link with description on Healthy Simulation

Describe how the simulation will be evaluated and provide links to external resources (e.g. survey)

The Simulation Efffectiveness Tool - Modified (SET-M) will be used to evaluate the simulation. This evaluation has been used in the past with simulations with high-fidelity mannequins, which this simulation will plan to use.This method of evaluation will help evaluators quickly identify areas of the simulation that need improved. For example, if more than 25% of participants rank an area of simulation low, then facilitors must consider making a change to that area.
https://www.healthysimulation.com/wp-content/uploads/2024/01/Simulation-Effectiveness-Tool-Modified-SET-M-040320.pdf

This is an example of a schedule.
Please modify or replace with
your simulation schedule.

Prebrief	1:00-1:30 - All students and faculty in room 634 for prebrief	
Duration	**Room 1 - Simulation: HOCM** **Facilitator: Zach Larson**	
1:30-2:00 p.m.	Group 1	
2:00-2:30 p.m.	Group 2	
2:30-3:00 p.m.	Group 3	
	Group 1 student names	**Group 2 student names**
	A.) Grace	A.) Greta
	B.) Hailey	B.) Kayla
Debrief	3:00-4:00 p.m. - All students and faculty in room 634 for debrief	

Group 3 student names
A.) Sara
B.) Kelsey

Facilitation

HSSOBP: Facilitation	
Facilitator Details	
Name(s) of facilitator(s):	Zach Larson
Date of practice session:	1/12/2026
Date and time of simulation:	1/26/2026, 1:00 pm
Location of simulation:	Holland Classroom, 7th Floor, General Hospital
Do you have a back-up plan if a facilitator isn't available?	DMS educators Kristy, Adam, or Hannah will fill in for una
Checklist of possible items to provide to the facilitator(s):	
Provide copy of scenario, procedure steps, critical actions, patient history, etc.	Yes
Debriefing guide and framework	Yes
Feedback forms	Yes
Role assignments and prebrief document	Yes
Learner objectives	Yes
Sign-in sheets, pens	Yes

ɜvailable facilitator

List the Learner Roles	Expectations (what will the learner do in this role?)
Learners will assume the role of cardiac sonographer when evaluating HOCM	The learner will identify HOCM by acquiring the necessary additional images needed for HOCM assessment. Learners will be required to assess the severity of HOCM by having the ultrasound mannequin simulate a patient performing a Valsalva maneuver. The student then must determine the severity of the obstruction based off of the aortic valve peak velocities.

Supporting Documents (script, checklist, forms, guides, results - develop in Word)

HOCM Protocol.pdf

Pilot Test

HSSOBP: Simulation Design, Criterion 11

Describe the plan for the simulation pilot test:

Participant for the pilot test would be a staff sonographer from the Heart and Vascular Center at UIHC. Ideally this sonographer would be a previous student from the DMS program so they can relate more closely to the current students. A checklist will be used to have the tester demo the high fidelity mannequin. Support would be available for the mannequin to ensure all of the severities of HOCM can be ran properly. Improvements and revisions will be made after the pilot test. Multiple pilot tests will be encouraged.