

Oregon Tech
Medical Imaging Technology Department
Echocardiography Program
2020-2021 Assessment

I. Introduction

Oregon Tech's Bachelor of Science in Echocardiography degree is one of only a few programmatically accredited B.S. Degree programs in echocardiography in the United States. Oregon Tech provides didactic instruction, clinical observations, and individual, hands-on training - including basic and advanced training in imaging skills needed *"To prepare competent entry-level adult cardiac sonographers in the cognitive (knowledge), psychomotor (skills), and affective (behavior) learning domains"*.

Students are required to complete a final 11-month clinical externship at specifically chosen echocardiography laboratories. Externship provides the hands-on training and patient load requirements necessary to meet the prerequisite requirements of the certifying board agency, the American Registry of Diagnostic Medical Sonographers (ARDMS), to be able to sit for the registry exam in adult echocardiography. Occasionally, a student may have the opportunity to complete additional directed clinical externship in pediatric echocardiography, and that, along with further clinical experience acquired in the month's post-graduation, be qualified to sit for the ARDMS pediatric echocardiography registry exam.

The first Oregon Tech cohort for Echocardiography began fall 2008, with 14 students, and additional cohorts of 17 students in the fall of 2009, 20 students in the fall of 2010, 20 students in the fall of 2011, 24 admitted fall 2012, 20 admitted fall 2013, 20 admitted fall 2014, 20 admitted fall 2015, 22 admitted fall 2016, 20 admitted fall 2017, 22 admitted fall 2018, and 22 in the fall 2019, which includes 2 that reentered. An additional student from the 2018 cohort will join this cohort during Externship summer 2021. MIT fall 2020 enrollment in Echocardiography will add the latest cohort of 22 students, with one additional student pending reentering fall 2021.

All graduates known to have applied for registry exams through either ARDMS or CCI, have passed the Adult Echocardiography Registry, with a 100% first exam pass rate for the class of 2021. Several prior graduates have additionally passed and become registered in Pediatric Echocardiography, and Vascular Ultrasound. 98% of graduates (through the 2021 graduates) have worked or are working as cardiac sonographers, either per diem or in scheduled positions. Annual salaries reported varied from \$62,000 to \$87,000 for FT positions, excluding on-call wages.

One of the major goals of the Echocardiography program (along with Diagnostic Medical Sonography, and Vascular Technology) had been to obtain JRC-DMS/CAAHEP Programmatic Accreditation. The JRC-DMS self-study was submitted fall 2014, the JRC-DMS site visit occurred May 2015, and finalized submission of documentation for the accreditation process was completed by the end of June 2015. All three ultrasound programs received CAAHEP Initial Accreditation in September 2015. Reaccreditation site visits (virtual) were conducted fall 2020, with 5-year reaccreditation pending.

Retention/Attrition, credentialing success, and placement outcomes for the three-year period through 2020 are reported on the OIT Echocardiography website in Program OUTCOMES:

[Echocardiography B.S. | Oregon Tech \(oit.edu\)](https://oit.edu/echocardiography-b.s.)

II. Program Purpose, Educational Objectives, and Student Learning Outcomes

The Echocardiography faculty agreed to adopt the student learning outcomes as suggested by the Joint Review Committee on Education in Diagnostic Medical Sonography (JRCDMS).

Echocardiography Program Purpose

The Oregon Tech Bachelor of Science program in Echocardiography provides students with the knowledge, clinical skills, values and behaviors to become competent cardiac sonographers.

Minimum Expectations: The program will meet the following goal, defining minimum expectations:

"To prepare competent entry-level adult cardiac sonographers in the cognitive (knowledge), psychomotor (skills), and affective (behavior) learning domains"

Echocardiography Program Educational Objectives

1. The program prepares students to utilize diagnostic techniques, sound judgment and good decision making to provide patient services.
2. The program communicates the importance of being credentialed (RDCS, RCS) in the profession of echocardiography.
3. The program prepares students who think critically, communicate effectively and exemplify professional ethics.
4. The program conveys the importance of becoming life-long learners and responsible citizens.

Expected Program Student Learning Outcomes

Graduates from this program will be able to:

1. Demonstrate the ability to communicate effectively in oral, written and visual forms.
2. Demonstrate the ability to work effectively in teams.
3. Demonstrate an ability to provide basic patient care and comfort.
4. Demonstrate professional judgment, discretion, and ethics.
5. Demonstrate knowledge and understanding of human gross anatomy, sectional anatomy, and normal and abnormal cardiovascular anatomy.
6. Demonstrate knowledge and understanding of cardiovascular physiology, pathology, and pathophysiology.
7. Demonstrate knowledge and understanding of cardiovascular physical principles and instrumentation.
8. Demonstrate knowledge and understanding of clinical echocardiographic diagnostic procedures and testing.
9. Demonstrate an understanding of diverse cultural and humanistic traditions in the global society.

Additional Student Learning Opportunities and Programmatic Input

Students have been encouraged to attend meetings sponsored by northwest regional chapter of the American Society of Echocardiography (the Willamette Valley Society of Echocardiography - WVSE) held quarterly in Portland or through Zoom and to try to attend other regional society conferences held near their externship sites throughout the year.

As a result of gathered input from all communications with Externship sites, staff, and students, continuing modifications will be directed towards an update of the Competency Evaluations used on externship, better reflecting current practice models, and working towards elimination of many of the scoring areas that more properly fit within the Echocardiography Professional Evaluation. With programmatic accreditation it is possible to offer CME's through SDMS for clinical site staff directly involved in the hands-on training for students on their Clinical Externship. Many Echocardiography Clinical Instructors attended the spring 2020 Clinical Instructor Workshop. All programs benefited from the combined CI inputs and suggestions at these workshops.

The program's Medical Director was frequently updated on the progress of the program's development, and provided input as needed. An Advisory Board/Committee meeting was convened March 2021. The Medical Director's overview and assessment of the program, and Advisory Board minutes were a part of the JRC-DMS reaccreditation site visit documentation, November 2020.

Much of the externship assessment material has been incorporated within the Trajecsys reporting system, and full details of all externship scoring is available on-line as needed.

III. Assessments – the 2020-2021 assessments included both Programmatic Student Learning Outcomes (PSLO's), and the Essential Student Learning Outcome (ESLOs) –The proposed new ESLO pattern is shown in Table #2.

Note: These ESLOs are incorporated within the PSLO #1 in the three-year assessment cycle. The faculty confirmed the assessment cycle planned, noted in Table 1 on the following page.

Three-Year Cycle for Assessment - Echocardiography Student Learning Outcomes

| Echocardiography Degree Student Learning Outcomes Assessment Schedule | 2016-17 | 2017-18 | 2018-19 | 2019-20 | 2020-21 | 2021-2022 |
|--|----------------|----------------|----------------|----------------|----------------|------------------|
| 1. The student will demonstrate the ability to communicate effectively in oral, written and visual forms. | X(1) | | | X(1) | | |
| 2. The student will demonstrate the ability to work effectively in teams. | X(4) | | | X(4) | | |
| 3. The student will demonstrate an ability to provide basic patient care and comfort. | | X | | | X | |
| 4. The student will employ professional judgment and discretion, including ethics. | | | X(3) | | | X |
| 5. The student will demonstrate knowledge and understanding of human gross anatomy sectional anatomy and normal and abnormal cardiovascular anatomy. | X | | | X | | |
| 6. The student will demonstrate knowledge and understanding of cardiovascular physiology, pathology, and pathophysiology. | | X(2) | | | X | |
| 7. The student will demonstrate knowledge and understanding of cardiovascular physical principles and instrumentation. | | X(5) | | | X | |
| 8. The student will demonstrate knowledge and understanding of clinical echocardiography diagnostic procedures and testing | | | X | | | X |
| 9. The student will demonstrate an understanding of diverse cultural and humanistic traditions in the global society. | | | X(6) | | | X |

Table #1. Echocardiography Degree Assessment Cycle – (a number) indicates a PSLO that incorporates proposed ESLO’s. The ISLO/ESLO pattern is undergoing revision.

| ISLO/ESLO Three Year Academic Assessment Cycle (Student Success) | | |
|--|--|--|
| <u>Year 1</u> ISLO/ESLO's 2020-2021 | <u>Year 2</u> ISLO/ESLO's 2021-2022 | <u>Year 3</u> ISLO/ESLO's 2022-2023 |
| <p align="center">Plan</p> <p align="center">Communication, Teamwork, Ethical Reasoning Upcoming assignments & assessments; Reflect and Evaluate</p> | <p align="center">Plan</p> <p align="center">Diverse Perspectives including Cultural Sensitivity & Global Awareness Upcoming assignments & assessments; Reflect and Evaluate</p> | <p align="center">Plan</p> <p align="center">Inquiry & Analysis includes problem solving & Info Literacy, critical analysis & logical thinking Quantitative Literacy & Reasoning Upcoming assignments & assessments; Reflect and Evaluate</p> |
| <p>PLAN: Course Selections, Assignment Design, Rubric Design. (Program Planning report due start of winter quarter, feedback given by spring term).</p> | | |
| <p align="center">Assess</p> <p align="center">Inquiry & Analysis includes problem solving & Info literacy, critical analysis & logical thinking Quantitative Literacy & Reasoning Collect Academic Assessment (FALL & WINTER) Analyze (SPRING)</p> | <p align="center">Assess</p> <p align="center">Communication, Teamwork, Ethical Reasoning Collect Academic Assessment (FALL & WINTER) Analyze (SPRING)</p> | <p align="center">Assess</p> <p align="center">Diverse Perspectives including Cultural Sensitivity & Global Awareness Collect Academic Assessment (FALL & WINTER) Analyze (SPRING)</p> |
| <p>ASSESS: Direct Measures- (circle) Faculty Grades (Rubric), Standardized Tests, Exams, Pre and Post Test Designs, Competency-Based Demonstrations, Portfolios Indirect Measures- (circle) Faculty Grades- DFW, Surveys & Reflections, Course Evaluations, Graduation Rates, Retention Rates. Program Collect and Analyze Report due at the end of spring term and feedback given by fall term.</p> | | |
| <p align="center">Act</p> <p align="center">Diverse Perspectives including Cultural Sensitivity & Global Awareness Close loops, make improvements and remeasure Engage campus (professional development)</p> | <p align="center">Act</p> <p align="center">Inquiry & Analysis includes problem solving & Info literacy, critical analysis & logical thinking Quantitative Literacy & Reasoning Close loops, make improvements and remeasure Engage campus (professional development)</p> | <p align="center">Act</p> <p align="center">Communication, Teamwork, Ethical Reasoning Close loops, make improvements and remeasure Engage campus (professional development)</p> |

Table #2. OIT 3-year Assessment Cycle.

IV. Summary of 2020-21 Assessment Activities

A. ESLO #2: Oregon Tech students will engage in a process of inquiry and analysis.

Definition: Inquiry and analysis consists of posing meaningful questions about situations and systems, gathering, and evaluating relevant evidence, and articulating how that evidence justifies decisions and contributes to students' understanding of how the world works.

Criteria for Inquiry and Analysis Assessment

- The following are criteria used in the assessment of student work:
 - Identify: Identify a meaningful question or topic of inquiry.
 - Investigate: Critically examine existing knowledge and views on the question or topic of inquiry.
 - Support: Collect evidence based on the methodology or principles of discipline.
 - Evaluate: Critically analyze and distinguish evidence obtained.
 - Conclude: Come to a judgment based on evidence and understand the limitations and implications of that judgment.
- The Inquiry and Analysis ISLO Assessment was performed during the spring term of the echocardiography junior year. Assignments utilizing Differential Diagnosis were carried out as part of the Echocardiography Externship Prep class (ECHO 388, utilizing case studies presented during the Echocardiography Externship Prep course. See full description of the ESLO design, and the Assessment Rubric (Table A1) in Appendix B.

ESLO #2 2020-2021 Outcomes – Direct Assessment

| Performance Criteria | Assessment Method | Measure Scale | Minimum Acceptable Performance | Results -% with Target or higher |
|----------------------|--------------------------------------|---------------|-----------------------------------|----------------------------------|
| Identification | differential diagnosis assignment | 1-4 Scale | 75% with a score of 3.0 or better | 82% |
| Investigate | . differential diagnosis assignment. | 1-4 Scale | 75% with a score of 3.0 or better | 82% |
| Support | differential diagnosis assignment.. | 1-4 Scale | 75% with a score of 3.0 or better | 94% |
| Evaluation | differential diagnosis assignment.. | 1-4 Scale | 75% with a score of 3.0 or better | 71% |
| Conclude | differential diagnosis assignment.. | 1-4 Scale | 75% with a score of 3.0 or better | 41% |

Table #1 - Direct Assessment Assignment- Inquiry and Analysis ESLO - Spring 2021 Echo 388 Outcomes

- The ESLO assignment produced interesting results.
- When participation was directed towards utilizing their didactic and imaging background within echocardiography in identification of initial possible pathologies

based on imaging provided, the performance was universally of a higher level, with completely acceptable performance based on the assignment criteria. These outcomes were particularly heartening, as they demonstrated retention of basic programmatic material, and an ability to apply/integrate that material in a methodical manner within a clinical situation.

- Most successful was the support section, with identification of additional imaging information that would assist in narrowing down or defining pathology utilized in the exercise.
- The Evaluation and Conclude phases failed to meet expectations. It is felt that at this point, more than assessing the students, the assessment perhaps is more valuable in evaluation of the actual structure of the exercise, exercise implementation, and the placement or timing of the exercise within the assessment year. Evaluation also identifies the need to make or incorporate Differential Diagnosis as a stronger part of the Echocardiography Program.
- The following points, therefore, need to be made:
 - The basic structure was modified from that used in 2017-2018, where an additional initial exercise where students designed a decision tree was used. That potentially could be put back in as a “warm-up” assignment.
 - Finding newer examples of case studies/pathologies, with clearer images and more clearly focused imaging patterns or protocols would be invaluable.
 - There was a disconnect between students’ listing of possible pathologies, and their identification of the actual MAIN pathology that was the focus of the exercise. The assessment exercise needs to be given within, or closer to the teaching fall junior Core imaging class, Echo 333, where the pathology that is utilized would have recently been covered.
 - Giving the assessment during spring term puts it into a time in the school year where juniors, realistically, are more focused on the upcoming Externship than on anything else. Reflection assignments are perhaps a quick afterthought. Repeating the exercise as a class discussion in the junior spring term would be better preparation for the Externship year.
 - The concepts of decision trees, and differential diagnosis need to be introduced at an earlier point in the program, preferably winter term of the sophomore year, as part of learning the thought process that goes into the performance of an echocardiogram.
- Going forward, imaging lab exercises utilizing differential diagnosis will be incorporated on a more frequent basis, providing a real-world setting that can be practiced on campus, several times prior to the Externship year.

B. Programmatic Student Learning Outcome #3. The student will demonstrate an ability to provide basic patient care and comfort.

The mapping of this outcome in the Echocardiography courses can be found in Appendix B, Student Learning Outcome-Course Matrices Table A1.

Direct Assessment #1

The faculty assessed this outcome in MIT 225 in spring term 2021 using select questions from various examinations and the Health Insurance Portability and Accountability Act (HIPAA) quiz

with sophomore echocardiography and vascular students. The faculty rated the proficiency of students using the performance criteria described in Table #2 below.

| Performance Criteria | Assessment Methods | Measurement Scale | Minimum Acceptable Performance | Results |
|--|---------------------------|---------------------------------|---------------------------------------|----------------|
| Understands Ultrasound Scope of Practice | Exam 1 | % Scale per # of questions used | 80% with 80% or higher | 89.5% |
| Anticipates/responds to patient needs. | Exam 2 | % Scale per # of questions used | 80% with 80% or higher | 94.7% |
| Knowledge of Universal Precautions | Exam 3 | % Scale per # of questions used | 80% with 80% or higher | 94.7% |
| Knowledge of HIPAA Policies | HIPAA Quiz | % Scale per # of questions used | 80% with 80% or higher | 89.5% |

Table #2. PSLO #3, MIT 225 exam results, Spring 2021

- Students performed above expectations in all categories for PSLO #3. For most students, this course is the first formal introduction to the deeper issues they will face while working with real patients on externship and in full time employment in the echocardiography field. Students usually observe these issues while on campus and during rotations at Sky Lakes Medical Center, but how they will be affected by situations will be determined while on externship and when they are employed.
- As a result of the data, the OIT Echocardiography program faculty has decided to continue the same in-depth coverage in this course to prepare students for the realities they would face in the field.

Direct Assessment #2

The faculty assessed this outcome in ECHO 420 from the 2020-2021 academic year using student competencies for echocardiography as assessed by industry. The faculty rated the proficiency of students using the performance criteria described in Table #3 below.

| Performance Criteria | Assessment Methods | Measure Scale | Minimum Acceptable Performance | Results -% with Target or higher |
|--|--------------------------------------|----------------------|---------------------------------------|---|
| Knowledge of Universal Precautions | Student Competency Evaluation #3, a. | 1 – 100% Scale | 90% with 90% or higher | 100% |
| Anticipates/ responds to patient needs. | Student Competency Evaluation #3, b. | 1 – 100% Scale | 90% with 90% or higher | 100% |
| Knowledge of HIPAA Policies | Student Competency Evaluation #3, d. | 1 – 100% Scale | 90% with 90% or higher | 100% |
| Performs Within the Echocardiography Scope of Practice | Student Competency Evaluation #3, e. | 1 – 100% Scale | 90% with 90% or higher | 100% |

Table #3. PSLO #3, ECHO 420 extern competencies results

- Students performed above the level of minimum acceptable performance in all criteria.
- As a result of the data from the last cycle where PSLO #3 was assessed, the performance level in this assessment cycle was increased to 90% with a target of 90% performance or higher. Within individual competency scores, there were occasional scores at 85%, but those occurred generally in the first quarter of Externship when students are first introduced to actual hospital in-patient settings. Past the first quarter, scores are universally 90% or higher.

Indirect Assessment #1

The faculty assessed this outcome in ECHO 420 from the student 2020-2021 exit surveys asking them to rate how well the OIT Echocardiography program and their extern site prepared them for this learning outcome #3. The students rated their proficiency using the performance criteria described in Table #4 below.

| Performance Criteria | Assessment Methods | Measure Scale | Minimum Acceptable Performance | Results -% with Target or higher |
|--|---------------------------|----------------------|---------------------------------------|---|
| Student rating of how OIT prepared them for outcome #3. | Exit Survey | 1 – 4 Scale | 80% with a score of 3.0 or better | 89.5% |
| Student rating of their final proficiency in outcome #3. | Exit survey | 1 – 4 Scale | 80% with a score of 3.0 or better | 100% |

Table #4. PSLO #3 ECHO 420 student self-assessment results

- Students rated OIT fairly closely. In some individual cases, the preparation provided by OIT was rated higher than that provided by the externship site. Expected was the reporting that OIT provided only satisfactory preparation (2 out of 13 responses). Since OIT does not have the capability to allow echocardiography students access to direct patient care environments, it is felt that the real world setting is one of the significant benefits to be realized by the externship experience.
- As a result of this assessment activity, the Echocardiography faculty will meet with the patientcare management faculty to improve orientation to what will be met in the setting of hospital facilities.
- Additional emphasis on patient care will be provided in the Externship Preparation class during the spring term prior to externship.

C. Programmatic Student Learning Outcome #6: The student will demonstrate knowledge and understanding of cardiovascular physiology, pathology, and pathophysiology.

The Echocardiography faculty conducted an analysis of where this outcome is reflected in the curriculum. The mapping of this outcome in the Echocardiography courses can be found in Appendix B, Student Learning Outcome-Course Matrices Table A2.

Direct Assessment #1

The faculty assessed this outcome in the ECHO 333 course during fall term 2020 using the final practical patient history and physical, the final practical imaging exam, and a final exam of pathology images. The faculty rated the proficiency of students using the performance criteria described in Table #5 below.

| Performance Criteria | Assessment Methods | Measure Scale | Minimum Acceptable Performance | Results - % with Target or higher |
|---|---------------------------|--------------------------|---------------------------------------|--|
| Evaluates evidence from patient history and physical | Final Practical | % scale of correct | 80% with 80% or higher | 100% |
| Performs appropriate physiological tests | Final Practical | % scale per choices used | 80% with 80% or higher | 100% |
| Correctly identifies patient pathology | Pathology images final | 0 – 100 % | 75% with 75% or higher | 100% |
| Extends/ Identifies protocols as required by findings | Final Practical | % scale per choices used | 80% with 80% or higher | 100% |

Table #5. PSLO #6 ECHO 333 results, fall 2020

- Students performed at the required level of fall term junior clinical experience, in the setting of the Oregon Tech Echocardiography Lab and with the imaging subjects that are available.
- As a result of the data, the current imaging protocols will be continued, and imaging skills built up in the prior year's imaging courses will be rapidly renewed as students return for fall classes.
- Sophomore imaging assignments for spring quarter will be continued, as there is no dedicated imaging class spring term in the sophomore curriculum. There will also be increased emphasis on incorporation of patient care subject matter within as many of the core courses as possible.
- Results from winter Echo 232 Practical exams (the areas of imaging needing attention) will be reviewed, and addressed early on in the fall Echo 333 Lab sessions to improve imaging proficiency and accuracy.

Direct Assessment #2

The faculty also assessed this outcome in ECHO 420 from the 2020-2021 academic year using student competencies for cardiac ultrasound as assessed by industry. The faculty rated the proficiency of students using the performance criteria described in Table #6 below.

| Performance Criteria | Assessment Methods | Measure Scale | Minimum Acceptable Performance | Results -% with Target or higher |
|---|-------------------------------|----------------------|---------------------------------------|---|
| Evaluates evidence from patient history and physical | Student Competency Evaluation | 1 – 100% Scale | 80% with a score of 80% or better | 100% |
| Performs appropriate physiological tests | Student Competency Evaluation | 1 – 100% Scale | 80% with a score of 80% or better | 100% |
| Correctly identifies patient pathology | Student Competency Evaluation | 1 – 100% Scale | 80% with a score of 80% or better | 100% |
| Extends/ Identifies protocols as required by findings | Student Competency Evaluation | 1 – 100% Scale | 80% with a score of 80% or better | 100% |

Table #6. PSLO #6 results for ECHO 420 student competencies.

- Students performed at a high level of clinical performance, reflecting adequate levels of clinical preparation during the on-campus sophomore and junior years.
- As a result of the data, increased use of case studies will be emphasized to increase the confidence needed for students to grow in the areas of critical thinking, and clinical application of didactic knowledge.

Indirect Assessment #1

The faculty assessed this outcome in ECHO 420 from the student 2020-2021 exit surveys asking them to rate how well the OIT Echocardiography program and their extern site prepared them for this learning outcome #6. The student rated their proficiency using the performance criteria described in Table #7 below.

| Performance Criteria | Assessment Methods | Measure Scale | Minimum Acceptable Performance | Results -% with Target or higher |
|--|----------------------------|----------------------|---------------------------------------|---|
| Student rating of how OIT prepared them for outcome #6 | 2020-21 Extern Exit Survey | 1 – 4 Scale | 80% with a score of 3.0 or better | 100% |
| Student rating of their final proficiency in outcome #6. | 2020-21 Extern Exit Survey | 1 – 4 Scale | 80% with a score of 3.0 or better | 100% |

Table #7. PSLO #6 results for ECHO 420 student self-assessment

- Students had rated their training as providing satisfactory or better preparation for understanding cardiovascular physiology, pathology, and pathophysiology.
- Compared to the prior 2014-2015 results, the scores from the clinical externship area increased from 94% to 100%. As faculty performed site visits over the intervening years, an emphasis was placed on both increasing exposures to image interpretation by allowing extern students opportunities to sit with the reading physicians during study review, and on increased mentoring on the part of the imaging lab staff.
- The results indicate that those discussions with Clinical Instructors brought positive outcomes.

D. Programmatic Student Learning Outcome #7: The student will demonstrate knowledge of cardiovascular physical principles and instrumentation.

The Echocardiography faculty conducted an analysis of where this outcome is reflected in the curriculum. The mapping of this outcome in the Echocardiography courses can be found in Appendix B, Student Learning Outcome-Course Matrices Table A3.

Direct Assessment #1

The faculty assessed this outcome in MIT 231 course during winter term using final exam questions with sophomore echocardiography students. The faculty rated the proficiency of students using the performance criteria described in Table #8 below.

| Performance Criteria | Assessment Methods | Measure Scale | Minimum Acceptable Performance | Results -% with Target or higher |
|---|-----------------------------|-----------------------------|---------------------------------------|---|
| Demonstrate understanding of the nature of sound waves | Final Examination Questions | % scale of 3 questions used | 75% with 2 or more questions correct | 90% |
| Interpret interaction of ultrasound with various media | Final Examination Questions | % scale of 4 questions used | 75% with 3 or more questions correct | 80% |
| Identify component function of the transducer | Final Examination Questions | % scale of 4 questions used | 75% with 3 or more questions correct | 65% |
| Apply physical principles to optimize ultrasound images | Final Examination Questions | % scale of 3 questions used | 75% with 2 or more questions correct | 60% |

Table #8. PSLO #7 results for MIT 231 final exam questions, winter 2021

- Students performed at the anticipated level of students in the initial core echocardiography class. While the data was not available for the hemodynamic principles assessment question, it is anticipated that students were at the acceptable level of performance, as the subject area was taught in conjunction with the areas that were provided with a score.
- In the 2014-2015 Assessment Report, the score for “Identify component function of the transducer” had a 78% assessment outcome. Didactic instruction in that subject area was monitored. The outcome is now higher, possibly due to several factors: selection of incoming cohorts being made with higher selection standards, continued emphasis on that teaching module by faculty, and better application/incorporation of sonographic principles and instrumentation within the on campus imaging lab setting.

Direct Assessment #2

The faculty also assessed this outcome in ECHO 420 from the 2020-2021 senior extern year, using cardiac scanning competencies where this outcome is assessed by industry. The faculty rated the proficiency of students using the performance criteria described in Table #9 below.

| Performance Criteria | Assessment Methods | Measure Scale | Minimum Acceptable Performance | Results -% with Target or higher |
|--|---------------------------------|----------------------|---------------------------------------|---|
| Selects appropriate technique(s) for examination | Student Competency Evaluation | 1 – 100% Scale | 80% with a score of 80% or better | 100% |
| Adjusts instrument controls to optimize image quality. | Student Competency Evaluation . | 1 – 100% Scale | 80% with a score of 80% or better | 100% |
| Takes appropriate measurements | Student Competency Evaluation | 1 – 100% Scale | 80% with a score of 80% or better | 100% |
| Recognizes and compensates for acoustic artifacts | Student Competency Evaluation | 1 – 100% Scale | 80% with a score of 80% or better | 100% |
| Minimizes patient exposure to acoustic energy. | Student Competency Evaluation | 1 – 100% Scale | 80% with a score of 80% or better | 100% |

Table #9. PSLO #7 results for ECHO 420 student competencies

- Students performed at an extremely high level of proficiency, reflecting the value of the full-time clinical externship experience.
- This is the best possible result, and the quality of the clinical sites that are utilized will continue to be monitored, and applied to new clinical sites as they are added to the Echocardiography program.

Indirect Assessment #1

The faculty assessed this outcome in ECHO 420 from the student 2020-2021 exit surveys asking them to rate how well the OIT Echocardiography program and their extern site prepared them for this learning outcome #7. The students rated their proficiency using the performance criteria described in Table #10 below.

| Performance Criteria | Assessment Methods | Measure Scale | Minimum Acceptable Performance | Results -% with Target Av. or higher |
|--|---------------------------|---------------------------|---------------------------------------|---|
| Student rating of how OIT prepared them for outcome #7. | Exit Survey | % scale per category used | 80% with a score of 3.0 or better | 94.7% |
| Student rating of their final proficiency in outcome #7. | Exit survey | % scale per category used | 80% with a score of 3.0 or better | 94.7% |

Table #10. PSLO #7 results for ECHO 420 student self-assessment

- It should be noted that the majority of the students, if not all, have already passed the ARDMSSonography Principles and Instrumentation exam required for taking the Adult Echocardiography Registry Exam.

IV. Evidence of Student Learning

During the 2020-2021 academic year, the program faculty formally assessed the student learning outcomes summarized below. Additional details on these assessment activities are documented earlier in this assessment report and are available in programmatic records.

ESLO #2: Oregon Tech students will engage in a process of inquiry and analysis.

Strengths: The assessment exercise mimicked real-world settings, where the initial patient information, combined with the sequence of acquired images presents a evolving set of potential pathologies and diagnoses. As an actual echocardiography study progresses, it is inherent in the imaging setting that the cardiac sonographer understands the process of differential diagnosis, utilize this process, and in many cases alter or customize a study, as the diagnosis list often changes as an exam progresses. The ability to learn this thought pattern prior to Externship takes full advantage of the imaging systems, PACS images, and didactic material provided on campus.

Plans for improvements: Additional differential diagnosis assignments will be incorporated within the junior level Echo 333 and Echo 334 courses. In the Echo 232 sophomore core course it will be presented as a process that is utilized and that may at that earlier setting may help sophomore students sort through why components in an echo exam are arranged the way that they are.

Programmatic Student Learning Outcome #3. The student will demonstrate an ability to provide basic patient care and comfort.

Strengths: As much as is possible, students are exposed to patient care settings within the simulated lab settings on campus. Real world situations are observed during clinical rotations at both Sky Lakes Medical Center, and Klamath Heart Clinic, and are reported on by students as they perform the clinical rotations. For many, this is the first “live” introduction to the medical environment.

Plans for improvement: Based on feedback from clinical externship sites, increase or modify simulated patient care scenarios within the Echo 225 course. Provide new scenarios to students in the Echo 388 Externship Preparation course.

Programmatic Student Learning Outcome #6: The student will demonstrate knowledge and understanding of cardiovascular physiology, pathology, and pathophysiology.

Strengths: The Oregon Tech Echocardiography program's didactic presentations flex and evolve as ways of assessing cardiovascular physiology, pathology, and pathophysiology with ultrasound grow through both the technological advances in imaging equipment, and through the resultant emerging application of new imaging modalities. The importance of the Externship year is of greatest significance to the success of the program, as reflected in the 100% pass rates on the ARDMS national registry exam in adult echocardiography. Externship puts all the pieces of the "puzzle" together.

Plans for improvement: Continue to seek input from our clinical externship affiliates during externship site visits. Encourage increased attendance to the annual Clinical Instructor Workshops. Encourage increased attendance on the part of students to the Willamette Valley Society of Echocardiography meetings to be involved in presentations from those very active in the profession: both sonographers, and cardiologists.

Programmatic Student Learning Outcome #7: The student will demonstrate knowledge of cardiovascular physical principles and instrumentation.

Strengths: The didactic course work within the curriculum at OIT is extensive, at the highest level of preparatory learning leading to programmatic success and is seen in both the recognition of the quality of our students by our clinical externship sites, and in the results from the ARDMS SPI registry exam pass rates – 100%.

Plans for improvement: As familiarity with the current ultrasound platforms increases, incorporate the platforms more directly within the appropriate didactic course lab sessions.

Overall outcomes: The Oregon Tech Echocardiography Program continues stay programmatic accreditation by follow The Joint Review Committee on Education in Diagnostic Medical Sonography, The Commission on Accreditation of Allied Health Education Programs and American Society of Echocardiography guidelines and standards. We will continue keep these standards as the program matures, improve assessment outcomes, and growth in terms of both clinical affiliates for externship along with increasing enrollment that can be supported by available on-campus, and off-campus faculty, facilities, and industry needs.

Appendix A – 2019-2022 Program Assessment Report – Curriculum Map

Echocardiography B.S.

Curriculum Map

Table A1 Curriculum Map

Three-year Cycle for Assessment of Program Learning Outcomes

| STUDENT LEARNING OUTCOME | 2019-20 | 2020-21 | 2021-22 |
|---|----------------|----------------|----------------|
| 1. Demonstrate the ability to communicate effectively in oral, written and visual forms. | F, P, C | | |
| 2. Demonstrate the ability to work effectively in teams. | F, P, C | | |
| 3. Demonstrate an ability to provide basic patient care and comfort. | | F, P, C | |
| 4. Demonstrate professional judgment, discretion, and ethics. | | | F, P, C |
| 5. Demonstrate knowledge and understanding of human gross anatomy, sectional anatomy, and normal and abnormal cardiovascular anatomy. | F, P, C | | |
| 6. Demonstrate knowledge and understanding of cardiovascular physiology, pathology, and pathophysiology. | | F, P, C | |
| 7. Demonstrate knowledge and understanding of cardiovascular physical principles and instrumentation. | | F, P, C | |
| 8. Demonstrate knowledge and understanding of clinical echocardiographic diagnostic procedures and testing. | | | F, P, C |
| 9. Demonstrate an understanding of diverse cultural and humanistic traditions in the global society. | | | F, P, C |

***Assessment of Program Student Learning Outcomes (2 Directs, 1 Indirect)**

***Assessment of Communication Essential Student Learning Outcome (1 Direct Oral, 1 Direct Written)**

F - Foundation

P - Practice

C - Capstone

Freshman Year N/A

Sophomore Year

| | BIO 220 | BIO 346 | BIO 347 |
|--|--------------------|--------------------|--------------------|
| OIT-BECH 2016-17.1 Demonstrate the ability to communicate effectively in oral, written and visual forms. | | | |
| OIT-BECH 2016-17.2 Demonstrate the ability to work effectively in teams. | | | |
| OIT-BECH 2016-17.3 Demonstrate an ability to provide basic patient care and comfort. | | | |
| OIT-BECH 2016-17.4 Demonstrate professional judgment, discretion, and ethics. | | | |
| OIT-BECH 2016-17.5 Demonstrate knowledge and understanding of human gross anatomy, sectional anatomy, and normal and abnormal cardiovascular anatomy. | F | F | F |
| OIT-BECH 2016-17.6 Demonstrate knowledge and understanding of cardiovascular physiology, pathology, and pathophysiology. | | F | F |
| OIT-BECH 2016-17.7 Demonstrate knowledge and understanding of cardiovascular physical principles and instrumentation. | | | |
| OIT-BECH 2016-17.8 Demonstrate knowledge and understanding of clinical echocardiographic diagnostic procedures and testing. | | | |
| OIT-BECH 2016-17.9 Demonstrate an understanding of diverse cultural and humanistic traditions in the global society. | | | |
| OIT-ESLO 2016-17.1.A Communicate effectively orally. | | | |
| OIT-ESLO 2016-17.1.B Communicate effectively in writing. | | | |

| | ECHO 225 | ECHO 231 | ECHO 232 |
|--|---------------------|---------------------|---------------------|
| OIT-BECH 2016-17.1 Demonstrate the ability to communicate effectively in oral, written and visual forms. | F | F | P |
| OIT-BECH 2016-17.2 Demonstrate the ability to work effectively in teams. | | | |
| OIT-BECH 2016-17.3 Demonstrate an ability to provide basic patient care and comfort. | F | F | P |
| OIT-BECH 2016-17.4 Demonstrate professional judgment, discretion, and ethics. | | | |
| OIT-BECH 2016-17.5 Demonstrate knowledge and understanding of human gross anatomy, sectional anatomy, and normal and abnormal cardiovascular anatomy. | | F | P |
| OIT-BECH 2016-17.6 Demonstrate knowledge and understanding of cardiovascular physiology, pathology, and pathophysiology. | | F | P |

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| OIT-BECH 2016-17.7 Demonstrate knowledge and understanding of cardiovascular physical principles and instrumentation. | | F | P |
| OIT-BECH 2016-17.8 Demonstrate knowledge and understanding of clinical echocardiographic diagnostic procedures and testing. | | | F |
| OIT-BECH 2016-17.9 Demonstrate an understanding of diverse cultural and humanistic traditions in the global society. | | | |
| OIT-ESLO 2016-17.1.A Communicate effectively orally. | | | |
| OIT-ESLO 2016-17.1.B Communicate effectively in writing. | | | |

| | ECHO 320 | ECHO 332 | MIT 231 |
|--|---------------------|---------------------|--------------------|
| OIT-BECH 2016-17.1 Demonstrate the ability to communicate effectively in oral, written and visual forms. | | | |
| OIT-BECH 2016-17.2 Demonstrate the ability to work effectively in teams. | | | |
| OIT-BECH 2016-17.3 Demonstrate an ability to provide basic patient care and comfort. | | | |
| OIT-BECH 2016-17.4 Demonstrate professional judgment, discretion, and ethics. | | | |
| OIT-BECH 2016-17.5 Demonstrate knowledge and understanding of human gross anatomy, sectional anatomy, and normal and abnormal cardiovascular anatomy. | | P | |
| OIT-BECH 2016-17.6 Demonstrate knowledge and understanding of cardiovascular physiology, pathology, and pathophysiology. | P | | |
| | ECHO 320 | ECHO 332 | MIT 231 |
| OIT-BECH 2016-17.7 Demonstrate knowledge and understanding of cardiovascular physical principles and instrumentation. | | | F |
| OIT-BECH 2016-17.8 Demonstrate knowledge and understanding of clinical echocardiographic diagnostic procedures and testing. | F | | |
| OIT-BECH 2016-17.9 Demonstrate an understanding of diverse cultural and humanistic traditions in the global society. | | | |
| OIT-ESLO 2016-17.1.A Communicate effectively orally. | | | |
| OIT-ESLO 2016-17.1.B Communicate effectively in writing. | | | |

| | MIT 232 | PHY 217 | WRI 227 |
|---|--------------------|--------------------|--------------------|
| OIT-BECH 2016-17.1 Demonstrate the ability to communicate effectively in oral, written and visual forms. | | | F |
| OIT-BECH 2016-17.2 Demonstrate the ability to work effectively in teams. | | | |

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| OIT-BECH 2016-17.3 Demonstrate an ability to provide basic patient care and comfort. | | | |
| OIT-BECH 2016-17.4 Demonstrate professional judgment, discretion, and ethics. | | | |
| OIT-BECH 2016-17.5 Demonstrate knowledge and understanding of human gross anatomy, sectional anatomy, and normal and abnormal cardiovascular anatomy. | | | |
| OIT-BECH 2016-17.6 Demonstrate knowledge and understanding of cardiovascular physiology, pathology, and pathophysiology. | | | |
| OIT-BECH 2016-17.7 Demonstrate knowledge and understanding of cardiovascular physical principles and instrumentation. | P | F | |
| OIT-BECH 2016-17.8 Demonstrate knowledge and understanding of clinical echocardiographic diagnostic procedures and testing. | | | |
| OIT-BECH 2016-17.9 Demonstrate an understanding of diverse cultural and humanistic traditions in the global society. | | | |
| OIT-ESLO 2016-17.1.A Communicate effectively orally. | | | |
| OIT-ESLO 2016-17.1.B Communicate effectively in writing. | | | |

Junior Year

| | CHE 360 | ECHO 321 | ECHO 325 |
|--|--------------------|---------------------|---------------------|
| OIT-BECH 2016-17.1 Demonstrate the ability to communicate effectively in oral, written and visual forms. | | P | P |
| OIT-BECH 2016-17.2 Demonstrate the ability to work effectively in teams. | | | |
| OIT-BECH 2016-17.3 Demonstrate an ability to provide basic patient care and comfort. | | | |
| OIT-BECH 2016-17.4 Demonstrate professional judgment, discretion, and ethics. | | | |
| OIT-BECH 2016-17.5 Demonstrate knowledge and understanding of human gross anatomy, sectional anatomy, and normal and abnormal cardiovascular anatomy. | | P | F |
| OIT-BECH 2016-17.6 Demonstrate knowledge and understanding of cardiovascular physiology, pathology, and pathophysiology. | | P | F |
| OIT-BECH 2016-17.7 Demonstrate knowledge and understanding of cardiovascular physical principles and instrumentation. | | P | |
| OIT-BECH 2016-17.8 Demonstrate knowledge and understanding of clinical echocardiographic diagnostic procedures and testing. | | P | |
| OIT-BECH 2016-17.9 Demonstrate an understanding of diverse cultural and humanistic traditions in the global society. | | | |
| OIT-ESLO 2016-17.1.A Communicate effectively orally. | | P | P |
| OIT-ESLO 2016-17.1.B Communicate effectively in writing. | | P | P |

| | ECHO 333 | ECHO 334 | ECHO 376 |
|--|---------------------|---------------------|---------------------|
| OIT-BECH 2016-17.1 Demonstrate the ability to communicate effectively in oral, written and visual forms. | P | P | |
| OIT-BECH 2016-17.2 Demonstrate the ability to work effectively in teams. | P | | |
| OIT-BECH 2016-17.3 Demonstrate an ability to provide basic patient care and comfort. | P | P | |
| OIT-BECH 2016-17.4 Demonstrate professional judgment, discretion, and ethics. | | | |
| OIT-BECH 2016-17.5 Demonstrate knowledge and understanding of human gross anatomy, sectional anatomy, and normal and abnormal cardiovascular anatomy. | P | P | F |
| OIT-BECH 2016-17.6 Demonstrate knowledge and understanding of cardiovascular physiology, pathology, and pathophysiology. | | | F |
| | ECHO 333 | ECHO 334 | ECHO 376 |
| OIT-BECH 2016-17.7 Demonstrate knowledge and understanding of cardiovascular physical principles and instrumentation. | | | |
| OIT-BECH 2016-17.8 Demonstrate knowledge and understanding of clinical echocardiographic diagnostic procedures and testing. | | | |
| OIT-BECH 2016-17.9 Demonstrate an understanding of diverse cultural and humanistic traditions in the global society. | | | |
| OIT-ESLO 2016-17.1.A Communicate effectively orally. | | | |
| OIT-ESLO 2016-17.1.B Communicate effectively in writing. | | | |

| | ECHO 385 | ECHO 388 | SPE 321 |
|--|-----------------|---------------------|--------------------|
| OIT-BECH 2016-17.1 Demonstrate the ability to communicate effectively in oral, written and visual forms. | P | P | F |
| OIT-BECH 2016-17.2 Demonstrate the ability to work effectively in teams. | P | | F |
| OIT-BECH 2016-17.3 Demonstrate an ability to provide basic patient care and comfort. | | | |
| OIT-BECH 2016-17.4 Demonstrate professional judgment, discretion, and ethics. | | | |
| OIT-BECH 2016-17.5 Demonstrate knowledge and understanding of human gross anatomy, sectional anatomy, and normal and abnormal cardiovascular anatomy. | | | |

| | | | |
|--|---|-------------------------------|----------------------------|
| OIT-BECH 2016-17.6 Demonstrate knowledge and understanding of cardiovascular physiology, pathology, and pathophysiology. | | | |
| OIT-BECH 2016-17.7 Demonstrate knowledge and understanding of cardiovascular physical principles and instrumentation. | | | |
| OIT-BECH 2016-17.8 Demonstrate knowledge and understanding of clinical echocardiographic diagnostic procedures and testing. | | | |
| OIT-BECH 2016-17.9 Demonstrate an understanding of diverse cultural and humanistic traditions in the global society. | F | P | |
| OIT-ESLO 2016-17.1.A Communicate effectively orally. | | | |
| OIT-ESLO 2016-17.1.B Communicate effectively in writing. | P | | |
| | ECHO 385 | ECHO 388 | SPE 321 |
| OIT-BECH 2016-17.1 Demonstrate the ability to communicate effectively in oral, written and visual forms. | P | P | |
| OIT-BECH 2016-17.2 Demonstrate the ability to work effectively in teams. | | | |
| OIT-BECH 2016-17.3 Demonstrate an ability to provide basic patient care and comfort. | | | |
| | Business Elective Upper Division | Communication Elective | Humanities Elective |
| OIT-BECH 2016-17.4 Demonstrate professional judgment, discretion, and ethics. | | | |
| OIT-BECH 2016-17.5 Demonstrate knowledge and understanding of human gross anatomy, sectional anatomy, and normal and abnormal cardiovascular anatomy. | | | |
| OIT-BECH 2016-17.6 Demonstrate knowledge and understanding of cardiovascular physiology, pathology, and pathophysiology. | | | |
| OIT-BECH 2016-17.7 Demonstrate knowledge and understanding of cardiovascular physical principles and instrumentation. | | | |
| OIT-BECH 2016-17.8 Demonstrate knowledge and understanding of clinical echocardiographic diagnostic procedures and testing. | | | |

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| OIT-BECH 2016-17.9 Demonstrate an understanding of diverse cultural and humanistic traditions in the global society. | | | F, P |
| OIT-ESLO 2016-17.1.A Communicate effectively orally. | | F, P | |
| OIT-ESLO 2016-17.1.B Communicate effectively in writing. | | P | |
| | | | |

Senior Year

| | ECHO 420 | Student Exit Survey |
|--|-----------------|----------------------------|
| OIT-BECH 2016-17.1 Demonstrate the ability to communicate effectively in oral, written and visual forms. | C | C |
| OIT-BECH 2016-17.2 Demonstrate the ability to work effectively in teams. | C | C |
| OIT-BECH 2016-17.3 Demonstrate an ability to provide basic patient care and comfort. | C | C |
| OIT-BECH 2016-17.4 Demonstrate professional judgment, discretion, and ethics. | C | C |
| OIT-BECH 2016-17.5 Demonstrate knowledge and understanding of human gross anatomy, sectional anatomy, and normal and abnormal cardiovascular anatomy. | C | C |
| OIT-BECH 2016-17.6 Demonstrate knowledge and understanding of cardiovascular physiology, pathology, and pathophysiology. | C | C |
| OIT-BECH 2016-17.7 Demonstrate knowledge and understanding of cardiovascular physical principles and instrumentation. | C | C |
| OIT-BECH 2016-17.8 Demonstrate knowledge and understanding of clinical echocardiographic diagnostic procedures and testing. | C | C |
| OIT-BECH 2016-17.9 Demonstrate an understanding of diverse cultural and humanistic traditions in the global society. | C | C |
| OIT-ESLO 2016-17.1.A Communicate effectively orally. | C | C |
| OIT-ESLO 2016-17.1.B Communicate effectively in writing. | C | C |

Appendix B – 2020-2021 Program Assessment Report – Inquiry and Analysis Assessment

2020-2021 Echocardiography Inquiry and Analysis ESLO Assessment

- A. The Inquiry and Analysis ISLO Assessment was applied during the spring term of the echocardiography junior year, as part of the Echocardiography Externship Preparation class (ECHO 388), utilizing case studies that were presented in class and/or on-line. While the course content focused largely on preparation for the upcoming Externship year, the assessment tool builds on the knowledge learned during prior sophomore and junior professional echocardiography courses that examined the echocardiography process, cardiac anatomy and physiology, cardiac pathologies, and cardiac hemodynamics in the adult patient. This assessment was applicable in this class setting, as graduates may in the future function in a lab management role where they will be asked to lead staff sonographers in more critically learning how to assess data and images in their imaging exams.
- B. The intent, along with continued scanning of adult patients during the term in ECHO 334, was to maintain imaging skills, keep current in application of calculation and measurement ultrasound platform software packages, and continue in utilizing the knowledge base previously learned. In addition, the ESLO exercise reinforces, or in some cases introduces, the practice of viewing/utilizing the echocardiogram as a differential diagnostic tool.
- C. The concept:
- Physicians have long utilized the method of “differential diagnosis” in systematically narrowing down the disease states responsible for, or contributory to the symptoms a patient presents.
 - In the case of the cardiac sonographer, the actual performance of the imaging exam is in many cases dependent on the recognition by the sonographer, that the initial diagnosis does not “fit” with the images and data that are initially obtained.
 - At this point, the expectation of well-trained sonographers would be that they will apply critical thinking, consciously or subconsciously using the differential diagnosis thought process, and then perform additional (differential) scanning that will provide information that completes the study data needed for the range of diagnoses that match the initial imaging and data obtained.
 - The junior level student in the OIT Echocardiography Program should be able to incorporate the above concepts on a basic level. During the senior year of clinical externship, the student will be building imaging skills and assessment capability, and then begin to incorporate the process of differential thinking and then exam modification needed to obtain adequate diagnostic studies on patients with the increased range of pathologies that present.
- D. The exercise:
- a. Presented as one in-class assignment, with a point value of 16 pts. Due to COVID-19, the exercise required modifications, some students participating in the assignment in-person, some on-line via ZOOM. Sections of the Inquiry and Analysis OIT Inquiry and Analysis Performance Criteria were

structured as follows:

- i. **Identification:** Students will be provided a basic patient scenario, with some amount of clinical information, along with an initial series of imaging clips. They will be expected to identify the abnormalities seen in these initial images and list a minimum number of possible causal pathologies that fit the clinical data and imaging provided.
- ii. **Investigate:** Students will next clarify the additional imaging information, and the views needed, that would narrow down the possible pathologies the study patient could have (and in an actual setting, would obtain those images). Students must also provide the rationale behind why they selected their specific desired additional imaging information.
- iii. **Support:** As the exercise progresses, additional sets of images will be provided. This simulates the ongoing active process of image acquisition in the real-world patient setting. Students will be required to detail additional imaging views, modalities, and measurements needed.
- iv. **Evaluate:** Students will evaluate the initial information, the additional information that they are given (imaging clips), and then make on-going evaluations listing the narrowed number of pathologies that would “fit” diagnoses based on the total available data. This may be presented in narrative form, with rationale.
- v. **Conclude:** The students’ final evaluation of the narrowed number of pathologies that would “fit” total data available. Students will then be asked to provide a reflection statement (which was submitted outside of the exercise). They will be asked to think how their thought process changed, as they went from the initial information provided, through the additional imaging sets, and on to their final thoughts and how (or not) they changed in what they thought they were looking for. They will be asked to briefly summarize how the exercise might modify their “vision: in approaching an unknown patient, and if they felt they had an initial understanding of what is meant by “differential diagnosis.

b. Rubric: (following page)

2020-2021 Echocardiography Inquiry and Analysis ESLO Rubric

| Performance Criteria | Limited Proficiency | Developing Proficiency | Proficiency | High Proficiency |
|---|--|---|--|--|
| <p><u>Identification</u> <u>(Imaging sets #1 and #2)</u></p> <p>Issue Introduction, Clinical Context Image Recognition, <u>Initial</u> <u>Identification</u> of Differential Diagnoses</p> | <p>1 Pt If the student correctly answers with 1 of the pathologies or factors listed under “High Proficiency”.</p> | <p>2 Pts If the student correctly answers with 2-3 of the pathologies or factors listed under “High Proficiency”.</p> | <p>3 Pts If the student correctly answers with 4- of the pathologies or factors listed under “High Proficiency”.</p> | <p>4 Pts Correctly identifies 5 or more or more of the following possible pathologies or casual factors below.</p> <ul style="list-style-type: none"> a. <input type="checkbox"/> Dilated cardiomyopathy b. <input type="checkbox"/> Concentric ventricular hypertrophy c. <input checked="" type="checkbox"/> Asymmetric septal hypertrophy d. <input type="checkbox"/> Apical hypertrophy e. <input type="checkbox"/> Amyloidosis f. <input type="checkbox"/> Fabry’s disease g. <input type="checkbox"/> Aortic stenosis h. <input checked="" type="checkbox"/> Hypertrophic obstructive cardiomyopathy i. <input type="checkbox"/> CAD/ischemic heart disease j. <input checked="" type="checkbox"/> Systemic hypertension k. <input type="checkbox"/> Congenital abnormalities l. <input type="checkbox"/> Mitral stenosis m. <input checked="" type="checkbox"/> Mild MR n. <input checked="" type="checkbox"/> Severe MR o. <input type="checkbox"/> Aortic dissection p. <input type="checkbox"/> Prosthetic AV dysfunction q. <input type="checkbox"/> Prosthetic MV dysfunction r. <input type="checkbox"/> Restrictive cardiomyopathy s. <input type="checkbox"/> Cardiac tamponade t. <input checked="" type="checkbox"/> Pulmonary hypertension u. <input type="checkbox"/> Heart failure with preserved EF v. <input type="checkbox"/> Heart failure with reduced EF w. <input type="checkbox"/> Volume overload x. <input checked="" type="checkbox"/> Hypovolemia y. <input type="checkbox"/> LV non-compaction |

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| <p><u>Investigate</u> <u>(Imaging sets #1 and #2)</u> Identification, selection of additional information and imaging needed</p> | <p>1 Pt If the student correctly answers with 1 of the choices listed under “High Proficiency”.</p> | <p>2 Pts If the student correctly answers with 2 of the 5 choices listed under “High Proficiency”.</p> | <p>3 Pts If the student answers with 3 of the 5 choices listed under “High Proficiency”.</p> | <p>4 Pts If the student answers with at least 4 additional imaging modalities and/or imaging windows or views from the following choices:</p> <ul style="list-style-type: none"> • CF Doppler of the MV • CF Doppler of the TV • Gradient of TV Insufficiency • M-mode of the MV • M-mode of the AV • Apical views (4Ch, 2 Ch) • CW Doppler of the AV/LVOT • PW Doppler “walked” through the LV/LVOT • CW Doppler of the AV LVOT with Valsalva/Amyl Nitrate • PW Doppler of the Pulmonary Veins • PISA on the MR if needed • LA measurement • CF AV |
| <p><u>Support</u> <u>(Imaging set #3)</u> Identification, selection of additional information and imaging needed</p> | <p>1 Pt If the student correctly answers with 2 total, to this point, of the choices listed under “High Proficiency”.</p> | <p>2 Pts If the student correctly answers with 3 total, to this point, of the choices listed under “High Proficiency”.</p> | <p>3 Pts If the student answers with 4 total, to this point, of the choices listed under “High Proficiency”.</p> | <p>4 Pts If the student has at least 5 total, to this point, of the imaging modalities and/or imaging windows or views from the following choices:</p> <ul style="list-style-type: none"> • CF Doppler of the MV • CF Doppler of the TV • Gradient of TV Insufficiency • M-mode of the MV • M-mode of the AV • Apical views (4Ch, 2 Ch) • CW Doppler of the AV/LVOT • PW Doppler “walked” through the LV/LVOT • CW Doppler of the AV LVOT with Valsalva/Amyl Nitrate • PW Doppler of the Pulmonary Veins • PISA on the MR if needed |

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| <p><u>Evaluate</u> <u>(Imaging set #3)</u></p> <p>Evaluation of data and images provided</p> <p>Narrowed diagnoses based on images provided. provided.</p> | <p>1 Pt</p> <p>If the student answers with 1 of the correct pathologies listed under “High Proficiency”.</p> | <p>2 Pts</p> <p>If the student answers with 2 of the correct pathologies listed under “High Proficiency”.</p> | <p>3 Pts</p> <p>If the student answers with 3 of the pathologies listed under “High Proficiency”.</p> | <p>4 Points</p> <p>If the student chooses 4 correctly from this list of pathologies (or has THE most correct pathology plus one):</p> <ul style="list-style-type: none"> a. <input type="checkbox"/> Dilated cardiomyopathy b. <input checked="" type="checkbox"/> Concentric ventricular hypertrophy c. <input type="checkbox"/> Asymmetric septal hypertrophy d. <input type="checkbox"/> Apical hypertrophy e. <input type="checkbox"/> Amyloidosis f. <input type="checkbox"/> Aortic stenosis g. <input type="checkbox"/> Hypertrophic obstructive cardiomyopathy h. <input type="checkbox"/> CAD/ischemic heart disease i. <input checked="" type="checkbox"/> Systemic hypertension j. <input type="checkbox"/> Congenital abnormalities k. <input type="checkbox"/> Mitral stenosis l. <input checked="" type="checkbox"/> Mild MR m. <input checked="" type="checkbox"/> Severe MR n. <input type="checkbox"/> Aortic dissection o. <input type="checkbox"/> Prosthetic AV dysfunction p. <input type="checkbox"/> Prosthetic MV dysfunction q. <input type="checkbox"/> Restrictive cardiomyopathy r. <input checked="" type="checkbox"/> Pulmonary hypertension s. <input type="checkbox"/> Heart failure with preserved EF t. <input type="checkbox"/> Volume overload u. <input checked="" type="checkbox"/> Hypovolemia |
|--|---|--|--|---|

| | | | | |
|---|---|--|--|---|
| <p><u>Conclude</u></p> <p>Identification of the pathology provided.</p> <p>Reflection statement.</p> | <p>0-1 Pt</p> <p>Correct identification of pathology provided.</p> <p>Minimal reflection statement or demonstration of gained insight on integration of the concept of differential diagnosis.</p> | <p>2 Pts</p> <p>Correct identification of pathology provided.</p> <p>Reflection statement demonstrates moderate level of self-assessment and demonstration of gained insight on integration of the concept of differential diagnosis.</p> | <p>3Pts</p> <p>Correct identification of pathology provided.</p> <p>Reflection statement demonstrates level of understanding that the process of differential diagnosis is understood and was correctly applied. May demonstrate understanding of additional imaging modalities that may be needed.</p> | <p>4 Pts</p> <p>Correct identification of pathology provided.</p> <p>Reflection statement demonstrates and explains high level of understanding that the process of differential diagnosis is understood and was correctly applied. May demonstrate understanding of additional imaging modalities that may be needed. Provides insight into how the exercise has affected their current scanning methods and may be improved as they continue on in the program and into the Externship year.</p> |
|---|---|--|--|---|