

Oregon Tech
Medical Imaging Technology Department
Echocardiography Program
2018-2019 Assessment

I. Introduction

Oregon Tech's Bachelor of Science in Echocardiography degree is one of only a few 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, and 22 admitted fall 2018. MIT fall 2019 enrollment in Echocardiography will add the latest cohort of 22 students, with one additional student pending reentry spring 2020.

Upon 2019 graduation, total current enrollment is 62 students, including those anticipated as being accepted for spring 2020 reentry into the Echocardiography Program. 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 2019. Several prior graduates have additionally passed and become registered in Pediatric Echocardiography, and Vascular Ultrasound. 98% of graduates (through the 2019 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.

Retention/Attrition, credentialing success, and placement outcomes for the last three years are reported on the OIT Echocardiography website in Program OUTCOMES:

https://oregontechsfstatic.azureedge.net/sitefinity-production/docs/default-source/academic-excellence/program-outcomes/echo-outcomes-2016-19.pdf?sfvrsn=7988e3e1_0

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 and to try to attend other regional society conferences held near their externship sites throughout the year. Many students also attended the 2019 ASE Scientific Sessions, held in Portland June 21-25, 2019.

Clinical Instructor input was accessed during Externship site visits, and through conference calls throughout the year where discussions covered the logistics of student documentation and updated verbal evaluation of the Trajecsys externship reporting system, areas of didactic concern, modifications to the current externship Competencies, and overall success of the program. Continuing modifications will be directed towards an update of the Competency Evaluations used on externship, better reflecting current practice models, and towards elimination of many of the scoring areas that more properly fit within the Echocardiography Professional Evaluation. CME's were made available 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 2019 Clinical Instructor Workshop. All programs benefit 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. The Medical Director's overview and assessment of the program was a part of the JRC-DMS accreditation site visit, May 2015. An Advisory Board/Committee meeting was convened spring term 2018 and will again be planned for 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 2018-2019 assessments included both Programmatic Student Learning outcomes (PSLO's), and ESLO #3 - Ethical Reasoning.

Note: ESLO#3 is incorporated within the PSLO #4 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 (undergoing revision)
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(3)
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(2)	
7. The student will demonstrate knowledge and understanding of cardiovascular physical principles and instrumentation.		X(5)			X(5)	
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(6)

Table #1. Echocardiography Degree Assessment Cycle – (number) indicates a PSLO that incorporates proposed ESLO's. The pattern is subject to modification.

IV. Summary of 2018-2019 Assessment Activities

A. PROGRAMMATIC Student Learning Outcome #4: The student will employ professional judgment, discretion, and ethics.

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 B1.

Direct Assessment #1

The faculty assessed this outcome in ECHO 388 course during spring term using an ESLO Ethics Assessment assignment, incorporating the American Society of Echocardiography Code of Ethics, and a scenario requiring application of provisions in that code. Sixteen junior Echocardiography students participated in this assessment. The faculty rated the proficiency of students using the performance criteria described in Table #3 on the following page.

Table #3. SLO #4 ECHO 388

Performance Criteria	Assessment Methods	Measure Scale	Minimum Acceptable Performance	Results -% with Target or higher
Demonstrates knowledge of the professional code of ethics	ESLO Ethics Assignment	Level of Proficiency on scale of 1-4 (limited to high proficiency)	80% with 3 or higher	Results
Demonstrates understanding of ASE Code of Ethics	ESLO Ethics Assignment	-- --	-- --	100% scored 3 or higher
Using the code of ethics, describes ethical issue(s) in ethics scenario	ESLO Ethics Assignment	.. ..	.. ..	94% scored 3 or higher
Describes parties involved and discusses their points of view	ESLO Ethics Assignment	.. .. ..	.. .. ..	100% scored 3 or higher
Describes and analyzes possible/alternative approaches	ESLO Ethics Assignment	.. .. ..	.. .. ..	100% scored 3 or higher
Chooses an approach and explains the benefits and risks	ESLO Ethics Assignment	.. .. ..	.. .. ..	100% scored 3 or higher

Assignment results, Spring 2019

Students overall performance was at or above the minimum acceptable level of performance.

In reviewing the raw data, while overall individual scores generally met acceptable minimum acceptable performance, there were areas where there was some degree of uncertainty in identifying ethical issues and linking them to possible alternatives. Ethical issues will continue to be emphasized in on-campus courses. In subsequent Externship Preparation classes, more discussion of the ASE Echo Code of Ethics and examples of how it applies to real world examples will be held prior to administration of testing of understanding of ethics in the health care setting. Professional judgement and discretion are topics covered in a significant amount of class time during spring term in Echo 388.

Direct Assessment #2

The faculty addressed this outcome in ECHO 420 from the 2018-2019 Externship industry assessment of the Cardiac – Adult TTE – Apical Views Competency (generally completed summer term 2018).. Twenty students participated in the assessment. Within the Trajecsyst reporting system, Clinical Instructors rated the proficiency of students using the performance criteria described in Table #4 below.

Performance Criteria	Assessment Methods	Measure Scale	Minimum Acceptable Performance	Results - Competency Scores
Student demonstrates a professional bedside manner.	“The student will employ professional judgment and discretion.”	1-100	Class Item Average of 80 or better	94.5
Student recognizes when a patient’s presenting symptoms are not in keeping with the exam ordered and contact the referring physician’s office or the clinical instructor for exam type verification.	..... ..... ..... ..... .....	1-100	Class Item Average of 80 or better	94.5
Student avoids involvement in echocardiography lab politics and does not engage in negative conversation.	..... ..... .....	1-100	Class Item Average of 80 or better	94.5

Table #4. SLO #4 results for ECHO 420 student competencies.

All students performed at a high level professionalism during the performance of bedside and/or outpatient echocardiograms.

As a result of the data, expected performance in the clinical setting will continue to be emphasized in the Externship Preparation class, spring quarter. Individual student performance will be addressed based on input provided from Clinical Instructors and data obtained in the quarterly Competencies.

Students will continue to be encouraged to seek more difficult scanning subjects while performing on-campus imaging assignments, and to increase scanning opportunities in the on-campus lab setting.

Indirect Assessment #1

The faculty assessed this outcome in ECHO 420 with data from the 2018-2019 Student Program, and Clinical Site Evaluations in the Trajecsys reporting system, asking them to rate how well the OIT Echocardiography program and their extern site prepared them for learning outcome #4. The twenty responding senior Echocardiography students rated their proficiency using the performance criteria described in Table #5 below.

Performance Criteria	Assessment Methods	Measure Scale	Minimum Acceptable Performance	Results -% with Target or higher
Student rating of how OIT prepared them for outcome #4	2018-2019 Echo Program Evaluation	1 – 4 Scale	80% with a score of 3.0 or better	100%
Student rating of how their extern site prepared them for outcome #4	2018-2019 Clinical Site Evaluation	1 – 4 Scale	80% with a score of 3.0 or better	100%

Table #5. SLO #4 results for ECHO 420 Student Program and Site Evaluations

Students had rated preparation provided by both Oregon Tech, and the individual externship sites as preparing them for meeting the goals of working as a health care professional in a clinical setting. There was only one score of “3”.

In response to the data, expected performance in the clinical setting will continue to be emphasized in the Externship Preparation class, spring quarter. Individual student performance will be addressed based on input provided from Clinical Instructors and data obtained in the quarterly Competencies.

This outcome was similarly assessed in 2015-2016. As a result of the one 2015-2016 score where time constraints were noted as a factor in meeting criteria, interim input from Echocardiography faculty to Clinical Instructors (emphasizing timeliness in reporting student deficiencies and the need for adequate documentation in order to institute any corrective action) was successful in increased scores on outcomes. This process will be applied as needed, and any deficiencies corrected, and monitored.

B. Student Learning Outcome #8: The student will demonstrate knowledge and understanding of clinical echocardiographic diagnostic procedures and testing.

The performance criteria for this outcome are:

1. Correlates abnormal test results to the patient history, including demographics and physical data to answer the clinical question.
2. Not only considers general pathological assumptions as being the cause of abnormal test results, but also considers other possibilities or differential diagnosis.

3. Is able to evaluate diagnostic implications regarding what abnormal Doppler findings mean and/or could mean.
4. Is able to answer the clinical question.
5. Student ability to write the actual preliminary report accurately or write an accurate mock preliminary report.

The mapping of this outcome in the Echocardiography curriculum can be found in Appendix B, Student Learning Outcome-Course Matrices Table B1.

Direct Assessment #1

The faculty addressed this outcome at externship sites using the Cardiac – Adult TTE Aortic Stenosis Competency, as assessed by industry. This was the most commonly reported pathology competency (14/20) employing Doppler evaluation. Within the Trajecsyst reporting system, the Clinical Instructors rated the proficiency of 14 senior Echocardiography students using the performance criteria described in Table #6 below.

Performance Criteria	Assessment Methods	Measure Scale	Minimum Acceptable Performance	Results/ Competency Score
Correlates test results with clinical information & question	Aortic Stenosis Competency	1-100	Class Item Average score of 90 or better	98.5
Identifies alternate causes of pathology	Aortic Stenosis Competency	1-100	Class Item Average score of 90 or better	98.5
Recognizes abnormal Doppler findings & implications	Aortic Stenosis Competency	1-100	Class Item Average score of 90 or better	98.5
Writes accurate preliminary report	Aortic Stenosis Competency	1-100	Class Item Average score of 90 or better	98.1

Table #6. Student Competency Evaluation Results for SLO #8, 2018-2019 Externship.

Students performed at or above the minimum level of performance, as judged by industry.

The one significant below minimum score in the 2015-2016 Assessment was attributed to time constraints placed on the student by the clinical site and staff. Additional faculty input since that reporting period, along with an interim Clinical Instructor Workshop, have improved clinical instructor understanding of the competency process, and evaluation within the Trajecsyst system.

As a result of the data, the Clinical Externship experience as detailed by the evaluations at Externship end provided an extremely adequate amount of professional preparation. Competency forms will be

evaluated during the 2020-2021 year, and modifications will be made based on industry recommendations. All Competency Evaluations (three per quarter minimum) are reviewed by faculty, and scores reflect a continuum of an increase in knowledge base, clinical performance, and an understanding of clinical echocardiography as the externship year progresses.

Indirect Assessment #1

The faculty assessed this outcome in ECHO 420, from the student 2018-2019 Student Program, and Clinical Site Evaluations within the Trajecsys reporting system. Twenty senior Echocardiography students rated how well the Oregon Tech Echocardiography program and their extern site prepared them for learning outcome #8. Rating from the responding students is described in Table #7 below.

Performance Criteria	Assessment Methods	Measurement Scale	Minimum Acceptable Performance	Results -% with Rating Score 3 or higher
Student rating of how OIT prepared them for outcome #8.	Student Program Evaluation	% scale per category used	90% with a rating score of 3.0 or better	100%
Student rating of how their extern site prepared them for outcome #8.	Student Clinical Site Evaluation	% scale per category used	90% with a rating score of 3.0 or better	100%

Table #7. ECHO 420 Evaluation Results for SLO #8, spring 2019

Students reported that both the Oregon Tech Echocardiography Program, and their respective clinical externship sites prepared them with the knowledge and understanding of clinical echocardiographic diagnostic procedures and testing required in the clinical environment. The one significant below minimum score was attributed to time constraints placed on the student by the clinical site and staff.

As a result of the data, the program will continue to add additional didactic material as testing procedures, ultrasound equipment, and standards of practice continue to evolve. Major input for new material is provided by attendance at regional echocardiography society meetings and annual American Society of Echocardiography Scientific Sessions, through adopting the latest texts as course requirements, and through review of current literature. Time constraints placed students, as identified in the 2015-2016 assessment, were re-evaluated, and the issue resolved through discussions and input to Clinical Instructors provided during site visits.

C. Student Learning Outcome #9: The student will demonstrate an understanding of diverse cultural and humanistic traditions in the global society.

Indirect Assessment #1

This outcome was assessed in Evaluations completed by both senior students and clinical sites as students approached completion of their clinical externship in ECHO 420, spring term 2019. Twenty externship sites participated in the program evaluation, 20 students completed Clinical Site Evaluations and 20 completed Program Evaluations. The criteria and results are provided in Table #9 below.

Evaluation scale: (1) Poor (2) Satisfactory (3) Good (4) Excellent (n/a) Not applicable

Performance Criteria	Assessment Methods	Measure Scale	Minimum Acceptable Performance	Results -% with Target or higher
The student will demonstrate an understanding of diverse cultural and humanistic traditions in the global society	Student Program Evaluation	1-4 evaluation scale	90% with a score of 3 or better	95% rated the program 3 or higher
The student will demonstrate an understanding of diverse cultural and humanistic traditions in the global society	Student Clinical Site Evaluation	1-4 evaluation scale	90% with a score of 3 or better	95% rated the clinical site 3 or higher
The student will demonstrate an understanding of diverse cultural and humanistic traditions in the global society	Clinical Site Program Evaluation	1-4 evaluation scale	90% with a score of 3 or better	90% rated the program 3 or higher

Table #9. ECHO 420 Program and Site Evaluation results for SLO #9, spring 2019

Results analysis: Compared to the 2015-2016 Assessment Report that utilized the same Indirect Assessment, while the current outcomes meet acceptable performance they are slightly lower in student ratings in all three Performance Criteria. The sample numbers are essentially the same (fewer Clinical sites participated in 2015-2016). Only one student was needed to reduce the % to the 95% level, and multiple factors may be involved: a student was at a new clinical site, the clinical site now had a new Clinical Instructor, personality differences in the class cohort, etc. Overall, the Program considers the Performance Criteria as having been successfully met, and the next assessment data will be looked at for any continuing trend.

Strengths: Externship provides many students with cultural diversity on a scale not experienced if the student originates from many of the smaller communities in the Northwest.

Weaknesses: While cultural diversity can be taught, the Oregon Tech student body does not reflect the wide diversity that students will encounter when going on clinical externship. The selection method for incoming class cohorts has been changed to provide a broader range of faculty input in scoring students for Program acceptance. This will hopefully level the playing field for applicants, and cancel out any unconscious bias that would reflect in the cultural diversity of an individual incoming cohort.

Additionally, as a result of the data, additional presentations of both pathophysiology and imaging resources as viewed globally will be again be provided. In the Externship Preparation classes spring term, students will be presented information on cultural differences that will be encountered on externship.

III. Overall Strengths and Weaknesses:

Student Learning Outcome #4: The student will employ professional judgment, discretion, and ethics.

Strengths: The American Society of Echocardiography has a Code of Ethics that is incorporated in the didactic course material. Professional Evaluations are conducted throughout the on-campus years, providing input that can address individual deficiencies as they arise. Significant discussion occurs during the Externship Preparation class spring term, prior to the clinical externship year. These discussions are of real-life situations that were encountered in prior externship years, and are expanded on as additional cohorts go through the Externship process.

Areas needing improvement: An earlier explanation of the various clinical roles (MD, DO, PA, NP, etc.) that will be encountered when students are at externship sites needs to be integrated in programmatic courses.

Plans for improvement:

- Membership in the American Society of Echocardiography is one of the course requirements for ECHO 333 and ECHO 321 fall courses. As part of the application for membership, applicants must indicate that they agree to conform to the ASE Code of Ethics. A more thorough review of the Code of Ethics, explanation of working echocardiographic lab structure, ethical issues that may arise, and methods of resolution will be given earlier in the programmatic course curriculum
- Ethical and professional issues will be emphasized in the Laboratory Management and Externship Preparation classes just prior to going on Externship.
- More current Externship students will be invited to campus to present overviews of their externship experiences, their areas of concern, and areas of growth that students should expect to encounter.

Student Learning Outcome #8: The student will demonstrate knowledge and understanding of clinical echocardiographic diagnostic procedures and testing.

Strengths: Students performed well as they entered the final two quarters of the externship year. During site visits, Clinical Instructors unanimously indicated that student preparation was improving each externship year.

Weaknesses: Procedures and testing varied somewhat between externship sites. Students have a period of significant growth and knowledge acquisition during their initial quarters of externship. Pre-externship, the sizes of the medical facilities available locally preclude clinical experience that would provide direct patient care within their echocardiography labs prior to externship. Students are additionally limited in the diversity of scanning subjects within the campus lab setting.

Plans for improvement:

- The faculty in the Echo program will increase the number of actual echocardiograms available for review on the CoreSound Echo PACS system, and utilize them for image review, pathology review, testing methods, and reporting practice in the core echocardiography classes.
- Students will also be encouraged to select scanning subjects that may be more difficult to scan, as they progress in scanning ability throughout the on-campus curriculum.
- Externship students will be expected to submit examples of pathologies encountered (submitted to OIT following HIPAA Guidelines and as allowed by individual clinical facilities).

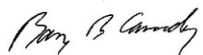
Student Learning Outcome #9: The student will demonstrate an understanding of diverse cultural and humanistic traditions in the global society.

Strengths: Clinical externship provides an introduction to many levels of society, and many cultures as students encounter a wide-diversity of patients in the clinical setting.

Weaknesses: The isolation of the Oregon Tech campus – geographical, cultural, and geopolitical – presents a challenge in terms of patient management and application of imaging with respect to cultural variation that will be encountered in the workforce.

Plans for improvement:

- Encourage recruitment of imaging volunteers from the entire spectrum of ethnicities and cultures that are present in the Oregon Tech community.
- Present information about MIT Program opportunities available to students in the Central Oregon area through representation on the CEAHEC (Cascades East Area Health Education Center) Advisory Board, and provide direct hands-on opportunities to students in learning opportunities that CEAHEC provides, on an on-going basis.
- Research professional literature and present information on challenges represented or seen in active echocardiography labs.
- Continue to highlight culture awareness throughout the core echo classes, with particular emphasis during the Externship Preparation class spring term of the junior year.
- Develop student assessments of their knowledge and perceptions of diversity at Externship locations, that will be performed both early on, and at the end of the Externship year. This will be utilized to not only assess the availability of culturally diverse populations at the various clinical sites, but also assess changes that occur in individual student perception and understanding of diversity in working in a world with increasing cultural complexity.



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Appendix A – 2018-2019 Program Assessment Report – ESLO #3

I. ASE Code of Ethics – Available upon request for review. This Document is for ASE internal use and reference, and is part of the new ASE membership application documentation.

II. Echo 388 ESLO#3 Assignment:

2019 Ethics Homework Assignment

This Assignment will be worth 30 points in the course grading. ☺

For this assignment, please use the American Society of Echocardiography Code of Ethics. The attached rubric will be used to evaluate your proficiency on this assignment. There are two main sections:

- I. List three provisions in the professional ethics code that you think are very important. For each provision, explain why you have selected it as important. Give an example of how this provision might be applied in a professional situation.

Here's the format:

Provision 1:

- a. List provision
- b. Reason for importance and relevance to profession
- c. Applied example illustrating importance

Provision 2:

- a. List provision
- b. Reason for importance and relevance to profession
- c. Applied example illustrating importance

Provision 3:

- a. List provision
- b. Reason for importance and relevance to profession
- c. Applied example illustrating importance

- II. Read the ethics scenario below, and answer the questions which follow it. The following case is fictional but is based on real ethical violations.

Two cardiac sonographers work for the same cardiology group. One is Ted and the other Brenda. Brenda decided it was not necessary to study for or take the registry exam for cardiac ultrasound. Ted has been encouraging her for years to accomplish that task, but Brenda has not wanted to because she doesn't like physics. Neither Ted nor Brenda have been taught how to compare results of their studies with "gold standard" outcomes (i.e. angiography or surgical results). They have not been comparing their results with patient outcomes.

As a result, there was a case last month where a patient was diagnosed with a wall motion abnormality on a standard echo exam, and no stress echocardiogram was performed. The patient was then sent on to angiography, where no evidence of coronary artery disease was found. This started a

discussion between the two sonographers. As they started reviewing and comparing echocardiography findings with cath lab and surgical results, they began to notice a pattern that was alarming. Many of the patients had undergone coronary angiography without any additional stress testing – either through regular stress treadmill, or stress echocardiography procedures. A significant number of the patients undergoing angiography, based on echo findings alone, were found to have no, or insignificant, coronary artery disease. Additionally, of the patients who did proceed on to coronary bypass surgery, many were also coming back in a few months for additional valve repair or valve replacement surgery. Both sonographers thought that this was odd, but decided there was nothing they could do about it, and let it go.

1. Using your professional code of ethics, describe the ethical issue(s).
2. Describe the parties who are or should be involved in the issue(s) and discuss their point(s) of view.
3. Describe and analyze possible/alternative approaches to the issue(s).
4. Choose one of the approaches that you think is best and explain the benefits and risks.

Grading rubric (over-all 16 pt (max) score will be converted to equivalent score on 30 pt scale):

Proficiency Scale	
4	High proficiency
3	Proficiency
2	Some proficiency
1	No/limited proficiency

Scored on: Demonstrates understanding of ASE Code of Ethics
Using the ASE Code of Ethics, Describes ethical issues
Describes parties involved
Describes alternatives
Describes benefits/risks of choices made

Appendix B – 2016-2019 Program Assessment Report – Curriculum Map

Echocardiography B.S.

Curriculum Map

Table B1 Curriculum Map

Three-year Cycle for Assessment of Program Learning Outcomes

STUDENT LEARNING OUTCOME	2016-17	2017-18	2018-19
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
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		
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.			
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
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		
	Business Elective Upper Division	Communication Elective	Humanities Elective
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.			
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.		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