

**Oregon Institute of Technology
Medical Imaging Technology Department
Echocardiography Program Assessment
2008-2009**

I. Introduction

At this time, OIT's Bachelor of Science in Echocardiography degree is one of only nine in the United States. OIT provides didactic instruction, clinical observations, leadership and personal training, including advanced skills training. Students are required to complete an 11-month externship at specifically chosen echocardiography laboratories. This externship provides the hands-on training and patient load requirements necessary to meet the prerequisite requirements for the certifying board agency, the American Registry of Diagnostic Medical Sonographers (ARDMS).

The first OIT cohort for Echocardiography began fall 2008, with 14 students. From the beginning of the program in fall 2008 to spring term 2009, the retention rate in the Echocardiography program was 93%. There was attrition of one student entirely from the program as a result of failures in 2 professional classes, ECHO 231 and VAS 210.

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

The Echocardiography faculty agreed to adopt the student learning outcomes as suggested by a programmatic accrediting body, the Joint Review Committee of Diagnostic Medical Sonography (JRCDMS).

Echocardiography Program Purpose

The OIT Bachelor of Science program in Echocardiography provides students with the knowledge, clinical skills and behaviors to become competent echocardiographers.

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 becoming credentialed 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. Employ 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 echocardiography diagnostic procedures and testing.
9. Demonstrate an understanding of diverse cultural and humanistic traditions in the global society.

Additional Student Learning Opportunities

Students will be encouraged to attend American Society of Echocardiography (ASE) conferences when held on the west coast or near their externship sites during the student's senior year.

III. Three-Year Cycle for Assessment of Student Learning Outcomes

The faculty also confirmed the assessment cycle planned, as listed in Table 1 below.

Echocardiography Degree Student Learning Outcomes Assessment Schedule	2008-09	2009-10	2010-11
1. The student will demonstrate the ability to communicate effectively in oral, written and visual forms.			X
2. The student will demonstrate the ability to work effectively in teams.		X	
3. The student will demonstrate an ability to provide basic patient care and comfort.	X		
4. The student will employ professional judgment and discretion.			X
5. The student will demonstrate knowledge and understanding of human gross anatomy sectional anatomy and normal and abnormal cardiovascular anatomy.		X	
6. The student will demonstrate knowledge and understanding of cardiovascular physiology, pathology, and pathophysiology.	X		
7. The student will demonstrate knowledge and understanding of cardiovascular physical principles and instrumentation.	X		
8. The student will demonstrate knowledge and understanding of clinical echocardiography diagnostic procedures and testing			X
9. The student will demonstrate an understanding of diverse cultural and humanistic traditions in the global society.		X	

IV. Summary of 2008-09 Assessment Activities

The faculty conducted formal assessment of three student learning outcomes during fall 2008 to spring 2009. The Echocardiography program accepted its first cohort of students in fall 2008 so at this time there are only sophomore level students. Assessment activities could only be conducted on sophomore level courses.

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

Direct Assessment #1

The faculty assessed this outcome in ECHO 225 in spring term 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	100%
Anticipates/responds to patient needs.	Exam 2	% Scale per # of questions used	80% with 80% or higher	96.9%
Knowledge of Universal Precautions	Exam 3	% Scale per # of questions used	80% with 80% or higher	96.9%
Knowledge of HIPAA Policies	HIPAA Quiz	% Scale per # of questions used	80% with 80% or higher	100%

Students performed above expectations in all categories for PSLO #3. Students on campus didactically are prepared for patient care through simulation of patient interaction in lab practicals and mock scenarios. While on extern, students have actual patient interaction daily. This externship experience is invaluable for learning and carrying out patient care duties with actual scenarios.

As a result of the data, the OIT Echo program will include PSLO #3 and the above performance criteria in the professional competency form. This competency form, when developed, will be given to externship sites to evaluate student performance. Comparison of the campus program outcomes to PSLO #3 and the externship outcomes to PSLO #3 can be further evaluated when there is a cohort of students on externship in 2010.

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

Direct Assessment #1

The faculty assessed this outcome in ECHO 232 in spring term using the midterm practical examination with sophomore echocardiography students. The faculty rated the proficiency of students using the performance criteria described in Table 3 below.

Performance Criteria	Assessment Methods	Measurement Scale	Minimum Acceptable Performance	Results
Performs thorough patient history	Midterm Practical History & Physical	Average Score	80% or higher	92.31%
Evaluates evidence from physical assessment	Midterm Practical Case Study	Average Score	80% or higher	84.62%
Alters protocol as required by findings	Midterm Practical Scanning test	Average Score	80% or higher	90.09%
Correctly recognizes and identifies patient pathology.	Midterm Practical Case Study	Average Score	80% or higher	65.38%

Students performed at or above expectations (80% or higher) on criteria 1 and 2. Students are able to effectively interview mock patients regarding cardiovascular related mock scenarios. They are able to relate history questions pertinent to the physical assessment findings and relate them to cardiovascular conditions.

To evaluate criteria 3, “Alters protocol as required by findings,” student randomly drew the type of valvular pathology their mock practical patient would have. This could be: mitral, aortic, or pulmonic/tricuspid stenosis. Students were then supposed to alter the echo examination to make the appropriate measurements based on the pathology or findings.

Students performed below the anticipated 80% target in correctly recognizing and identifying patient pathology. This is the first practical examination of this type for the echo students. They must use critical thinking skills to relate cardiovascular physiology, pathology, and pathophysiology to echocardiographic findings, patient presentation, and echocardiographic criteria.

Expectations may also be a bit too high due to the student’s limited exposure on campus to actual pathology. Students in the echo program, by the time they have completed their externship, should effectively meet PSLO #6 when they perform actual clinical examinations on varying pathologies.

To ensure that echo students do effectively meet PSLO #6 upon graduation, the above performance criteria will be included in the professional competency form. This competency form, when developed, will be given to externship sites to evaluate student performance. Comparison of the campus program outcomes to PSLO #6 and the externship outcomes to PSLO #6 can be further evaluated when there is a cohort of students on externship in 2010.

However, immediate action plans involve incorporating more mock case studies into the didactic portion of the course. Knowledge and understanding of cardiovascular physiology, pathology, and pathophysiology will continue to be taught repetitively and specifically in separate courses while the students are on the OIT campus.

As a result of the data, the OIT echocardiography faculty have agreed to maintain the current high degree of difficulty required for PSLO #6 on campus and for the extern experience.

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

Direct Assessment #1

The faculty assessed this outcome in VAS 210 in winter term using final examinations on sophomore echocardiography students. The faculty rated the proficiency of students using the performance criteria described in Table 4 below.

Performance Criteria	Assessment Methods	Measure Scale	Minimum Acceptable Performance	Results -% with Target Av. 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	91.2%
Interpret interaction of ultrasound with various media	Final Examination Questions	% scale of 4 questions used	75% with 3 or more questions correct	97.1%
Identify component function of the transducer	Final Examination Questions	% scale of 4 questions used	75% with 3 or more questions correct	94.1%
Apply knowledge of hemodynamic principles	Final Examination Questions	% scale of 3 questions used	75% with 2 or more questions correct	55.9%
Apply physical principles to optimize ultrasound images	Final Examination Questions	% scale of 3 questions used	75% with 2 or more questions correct	97.1%

This is the first cohort of students in the campus echocardiography program to take this course. Students performed above expectations in four of the criteria above. Students performed below expectation in “applying knowledge of hemodynamic principles.” This course is taken in conjunction with Vascular Technology sophomores. Using their program as an assessment model, great effort will be made to continue teaching and continue reviewing hemodynamics throughout the upper division ECHO courses in the Echocardiography program.

One goal of this course is to prepare students for their registry credentialing exam taken through the American Registry of Diagnostic Medical Sonographers (ARDMS). This exam is called the Sonography Principles & Instrumentation (SPI) exam. Pass/failure rates of the SPI exam will be tracked when this cohort of students is eligible to take the exam.

While on externship their senior year, students will take registry review exams via Blackboard CE. One of the registry review exams will include the above performance criteria. Results of the Blackboard CE exam can be correlated to the results of this assessment. Also, it is expected that while students are on externship, they will be directly applying these principles to real patient exams hopefully improving their performance on the Blackboard CE examination and eventually their pass rate on the SPI exam.

Feedback from industry, especially in the extern student's ability to detect pathology (which heavily depends on a student's ability to apply knowledge of hemodynamic principles) will be rated. This can be completed when the first cohort of students completes externship (2011).

As a result of the data, the OIT echocardiography faculty agrees that the overall comprehensive teaching of hemodynamics will meet the needs of industry by the time the Echocardiography student finishes his/her extern experience.

Detailed records of these assessments can be found in the department assessment coordinator's notebook.

V. Summary of Student Learning

Assessment results were discussed with Vascular Technology faculty to compare results. They are an excellent comparator program since numerous courses between the two programs are taught concurrently. Assessment results were also discussed with the Distance Education Echocardiography program faculty.

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

Strengths: Understands Ultrasound Scope of Practice; Anticipates/responds to patient needs; Knowledge of Universal Precautions; Knowledge of HIPAA policies.

Weaknesses: all performance criteria were met

Action plans: Continue teaching and continue reviewing patient management skills throughout the upper division ECHO courses in the Echocardiography program.

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

Strengths: Performs thorough patient history; Evaluates evidence from physical assessment; Alters protocol as required by findings.

Weaknesses: Correctly recognizes and identifies patient pathology.

Action plans: More mock case studies will be incorporated to ECHO 232.

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

Strengths: Demonstrate understanding of the nature of sound waves; Interpret interaction of ultrasound with various media; Identify component function of the transducer; Apply physical principles to optimize ultrasound images.

Weaknesses: Apply knowledge of hemodynamic principles.

Action plans: Continue teaching and continue reviewing hemodynamics throughout the upper division ECHO courses in the Echocardiography program.

VI. Changes Resulting From Assessment

This is the first year of the campus Echocardiography program. There were no outstanding action plans for improvement that were implemented and re-assessed this year.

Appendix A
Student Learning Outcome-Course Matrices

SLO #3: The student will demonstrate an ability to provide basic patient care and comfort.

Courses that are shaded below indicate that the SLO above is taught in the course, students demonstrate skills or knowledge in the SLO, and students receive feedback on the performance on the SLO.

I = Introduced; R = Reinforced; E = Emphasized

	Sophomore			Junior			Senior		
Fall	BIO 220	Cardio Phys		BUS 317	HlthCare Mgmt		ECHO 420	Extern	E
	ECHO 320	Cardio Methods		ECHO 333	Echo III	R			
	PHY 217	Physics of MI		ECHO 321	TEE & Stress				
	WRI 227	Tech Writing		SPE 321	Small Group Comm				
Win	ECHO 231	Echo I		BUS 316	TQM		ECHO 420	Extern	E
	BIO 346	Patho I		CHE 210	Clinical Pharm				
	VAS 210	VAS Physics I		ECHO 376	Survey of Vas Tech	R			
	Soc Sci	Elective		ECHO 325	Pediatric Echo				
				Hum	Elective				
Spr	ECHO 225	Pt Mgmt	IE	ECHO 385	Lab Mgmt		ECHO 420	Extern	E
	ECHO 232	Echo II	IE	ECHO 365	Abd/Renal				
	ECHO 332	Invasive Cardio		ECHO 388	Extern Orient				
	BIO 347	Patho II		Comm	Elective				
	VAS 211	VAS Physics II		Hum	Elective				

Table A1. Student Learning Outcome #3-Course Matrix

**Subject to change as courses are designed and developed.

Appendix A
Student Learning Outcome-Course Matrices

SLO #6: The student will demonstrate knowledge and understanding of cardiovascular physiology, pathology, and pathophysiology.

Courses that are shaded below indicate that the SLO above is taught in the course, students demonstrate skills or knowledge in the SLO, and students receive feedback on the performance on the SLO.

I = Introduced; R = Reinforced; E = Emphasized

	Sophomore			Junior			Senior		
Fall	BIO 220	Cardio Phys	IE	BUS 317	HlthCare Mgmt		ECHO 420	Extern	E
	ECHO 320	Cardio Methods		ECHO 333	Echo III	R			
	PHY 217	Physics of MI		ECHO 321	TEE & Stress	R			
	WRI 227	Tech Writing		SPE 321	Small Group Comm				
Win	ECHO 231	Echo I		BUS 316	TQM		ECHO 420	Extern	E
	BIO 346	Patho I	IE	CHE 210	Clinical Pharm				
	VAS 210	VAS Physics I		ECHO 376	Survey of Vas Tech				
	Soc Sci	Elective		ECHO 325	Pediatric Echo	R			
				Hum	Elective				
Spr	ECHO 225	Pt Mgmt		ECHO 385	Lab Mgmt		ECHO 420	Extern	E
	ECHO 232	Echo II	IE	ECHO 365	Abd/Renal				
	ECHO 332	Invasive Cardio		ECHO 388	Extern Orient				
	BIO 347	Patho II	R	Comm	Elective				
	VAS 211	VAS Physics II		Hum	Elective				

Table A2. Student Learning Outcome #6-Course Matrix

**Subject to change as courses are designed and developed.

Appendix A
Student Learning Outcome-Course Matrices

SLO #7: The student will demonstrate knowledge and understanding of cardiovascular physical principles and instrumentation.

Courses that are shaded below indicate that the SLO above is taught in the course, students demonstrate skills or knowledge in the SLO, and students receive feedback on the performance on the SLO.

I = Introduced; R = Reinforced; E = Emphasized

	Sophomore			Junior			Senior		
Fall	BIO 220	Cardio Phys		BUS 317	HlthCare Mgmt		ECHO 420	Extern	E
	ECHO 320	Cardio Methods		ECHO 333	Echo III	R			
	PHY 217	Physics of MI		ECHO 321	TEE & Stress				
	WRI 227	Tech Writing		SPE 321	Small Group Comm				
Win	ECHO 231	Echo I		BUS 316	TQM		ECHO 420	Extern	E
	BIO 346	Patho I		CHE 210	Clinical Pharm				
	VAS 210	VAS Physics I	IE	ECHO 376	Survey of Vas Tech				
	Soc Sci	Elective		ECHO 325	Pediatric Echo				
				Hum	Elective				
Spr	ECHO 225	Pt Mgmt		ECHO 385	Lab Mgmt		ECHO 420	Extern	E
	ECHO 232	Echo II		ECHO 365	Abd/Renal				
	ECHO 332	Invasive Cardio		ECHO 388	Extern Orient				
	BIO 347	Patho II	IR	Comm	Elective				
	VAS 211	VAS Physics II	IE	Hum	Elective				

Table A3. Student Learning Outcome #7-Course Matrix

**Subject to change as courses are designed and developed.